

Webinar Will Begin Momentarily

TODAY'S AGENDA:

- Welcome
- Speaker Introduction
- Presentation
- Q&A
- Closing



Professional Education Series

Support. Inform. Educate. Empower.

Gluten Myths Busted: Separating Fact from Fiction



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Gluten Myths Busted: Separating Fact from Fiction

Jessica Lebovits, RD, CDN



Financial Disclosures:

None

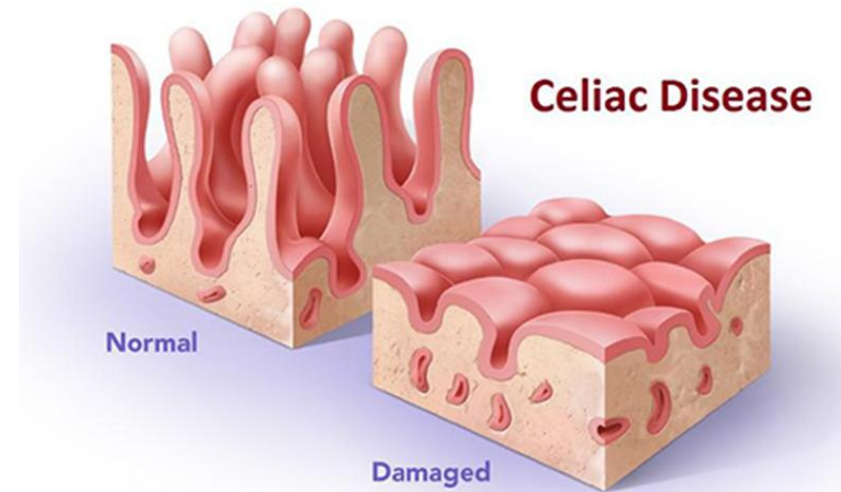


The background features a large, semi-transparent red stamp with the word "MYTH" in a bold, sans-serif font, tilted diagonally. The stamp is set against a backdrop of overlapping, wavy, semi-transparent shapes in shades of light blue, green, and yellow. The overall composition is clean and modern.

Gluten is a starch.

Overview

- **Gluten:**
 - A protein found in wheat, barley, and rye that provides structure and elasticity
- **Celiac Disease:**
 - A genetically mediated autoimmune disease in which gluten triggers intestinal inflammation and subsequent damage
- **Treatment:**
 - At present, the only treatment of celiac disease is a strict, lifelong adherence to a GFD



Where is Gluten Found?

Gluten is a protein found in wheat, barley, rye, and all products made with these grains. This includes:



- Wheat (semolina, spelt, triticale, kamut)
- Malt (vinegar, flavoring)
- Brewer's yeast
- Couscous
- Farro
- Matzo
- Communion wafers
- Soy sauce
- Seitan

Potential hidden sources of gluten:



- Salad dressings, marinades, gravies, sauces
- Candy, licorice
- Soups, broths, bouillon cubes
- Powdered beverage mixes
- Seasoning mixes/blends
- Imitation crab (e.g. California rolls)
- Sushi rice
- Meatballs, meatloaf, burgers
- Asafetida/hing spice
- Injera bread

Misinformation in Celiac Disease

#glutenfree

1502 tweets per day



#celiac

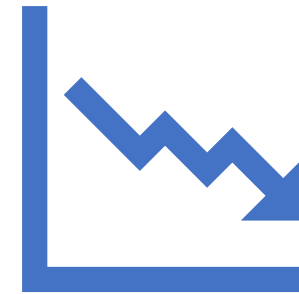
69 tweets per day

Most material around #glutenfree and #celiac on Twitter comes from those outside of the medical community or family members.

Hypervigilance Reduces Quality of Life (QOL)



Increased anxiety/fatigue



Decreased QOL



**Gluten only triggers
gastrointestinal symptoms.**

Pathophysiology of Celiac Disease

Clinical Manifestations

- **Gastrointestinal:**

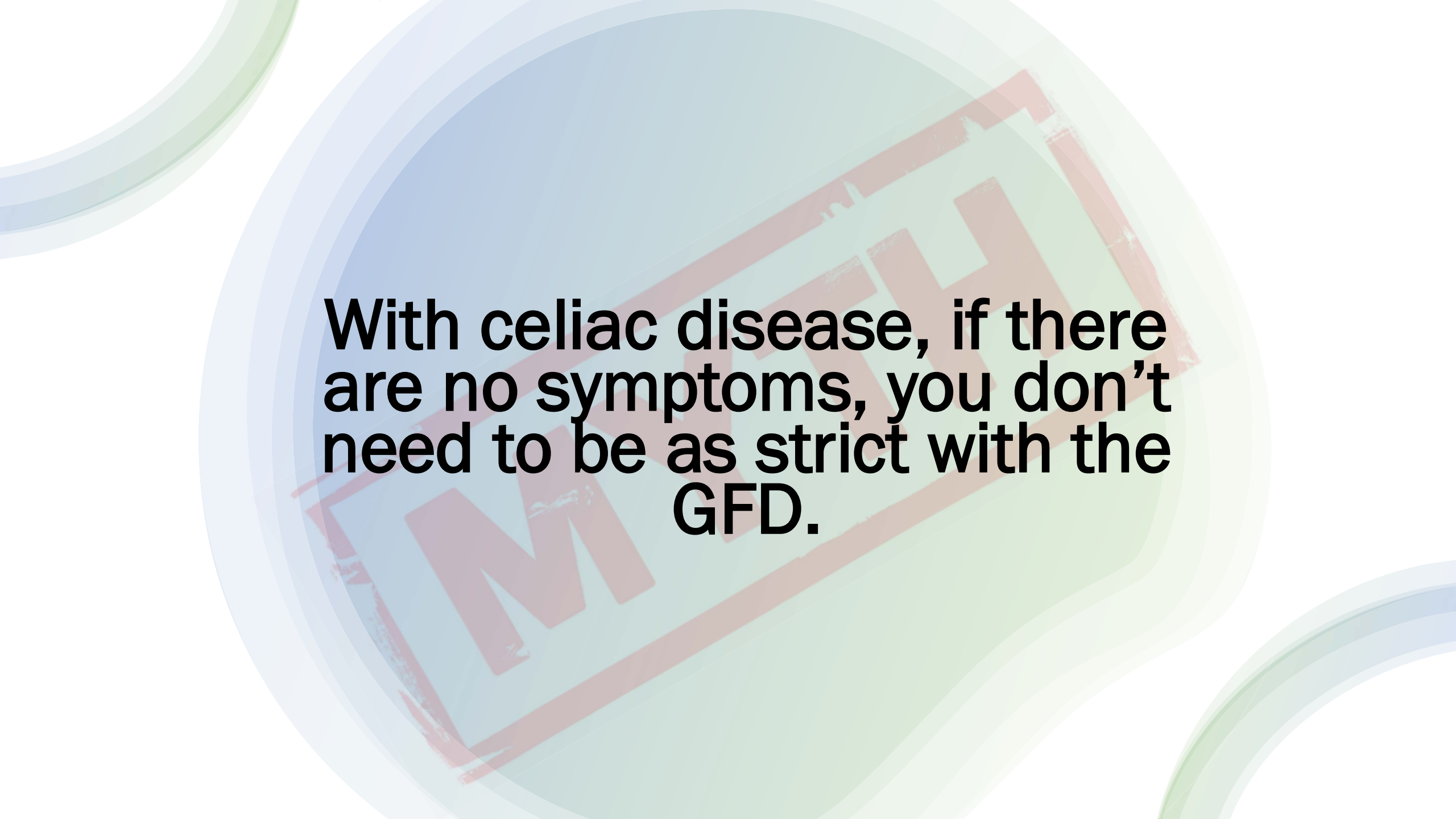
- Abdominal pain
- Bloating
- Nausea/Vomiting
- Malabsorption/FTT
- Diarrhea
- Constipation
- Hypertransaminasemia
 - (“celiac hepatitis”)
- Pancreatitis
- Pancreatic exocrine insufficiency

- **Extraintestinal:**

- Anemia
- Hyposplenism
- Osteoporosis
- Arthritis
- Dermatitis Herpetiformis
- Aphthous ulcers
 - (canker sores)
- Dental enamel hypoplasia
- Infertility

- **Neurological:**

- Gluten ataxia
- Peripheral neuropathy
- Epilepsy
- Headache
- Brain fog



With celiac disease, if there are no symptoms, you don't need to be as strict with the GFD.

The background features several overlapping circles in shades of light blue and light green. A large, semi-transparent red watermark with the word "NO" in a bold, sans-serif font is oriented diagonally across the center of the image. The text "If you feel better off gluten, stay off gluten." is centered in a bold, black, sans-serif font.

**If you feel better off
gluten, stay off gluten.**

Diagnosis

GFD Before Testing

- **Genetics:**
 - HLA-DQ2 and HLA-DQ8
- **Serology Testing:**
 - tTG, IgA; DGP, IgA; DGP, IgG; EMA
- **Endoscopy + Intestinal Biopsy:**
 - Villous atrophy +/- Intraepithelial lymphocytes (IELs)
- **Skin Biopsy:**
 - IgA deposits +/- neutrophils/eosinophils

The background features several overlapping, semi-transparent circles in shades of light blue, green, and yellow. A large, stylized red watermark, resembling a geometric pattern or a large letter 'H', is oriented diagonally across the center of the image. The text is centered within the blue circle.

**Celiac disease is only
confirmed after an
intestinal biopsy.**

Diagnosis

Biopsy Debate

ESPGHAN Criteria (2020)

Symptomatic

tTG, IgA > 10x the UL of the laboratory

Positive EMA-IgA in a second sample

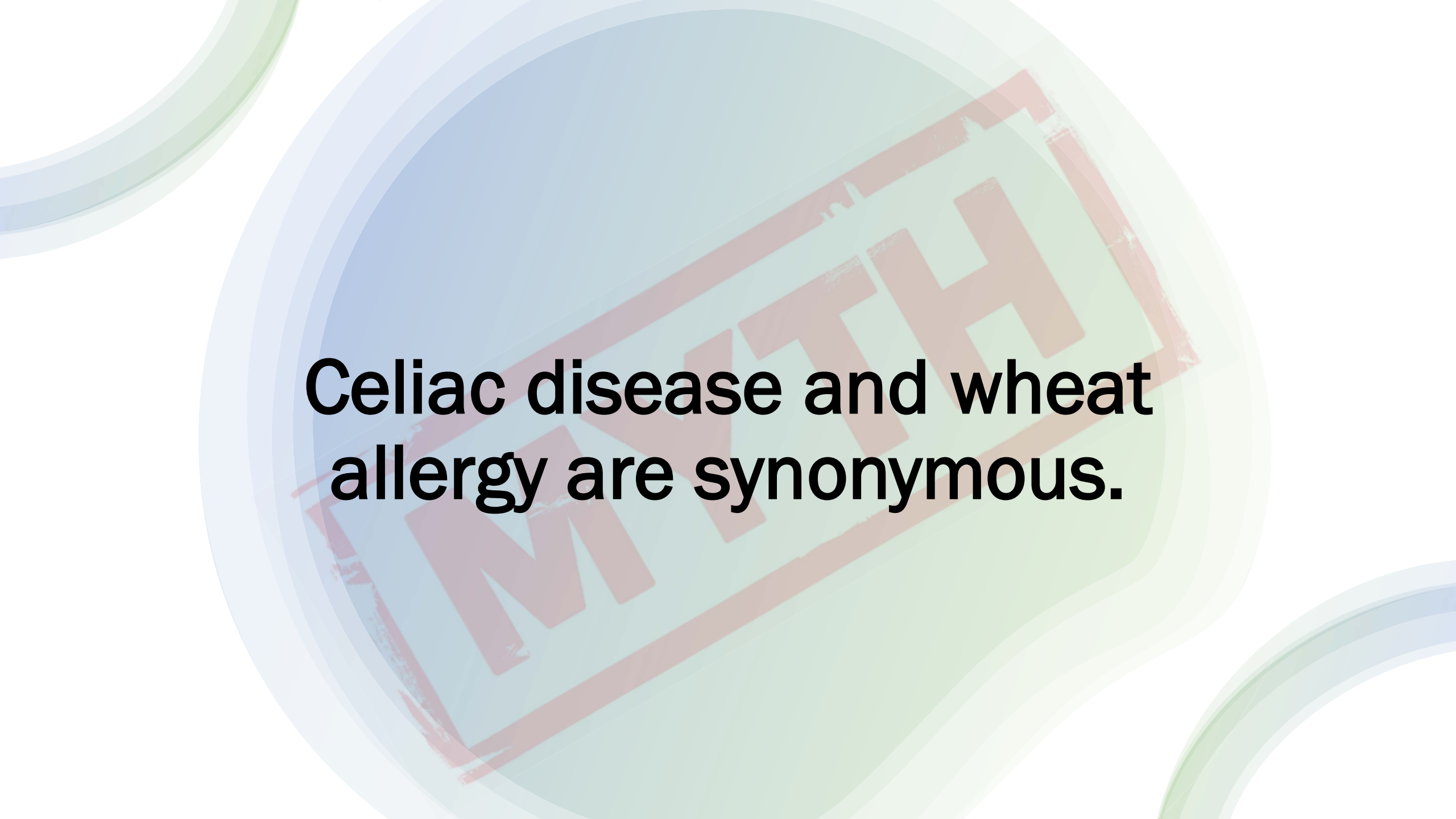
Question/recommendation	Quality of evidence	Strength of recommendation	Dissent
1. Should a combination of noninvasive serology tests vs duodenal biopsy be used to confirm the diagnosis of CD in children and adults?			
A. We recommend EGD with multiple duodenal biopsies for confirmation of diagnosis in both children and adults with suspicion of CD	Moderate	Strong	1
B. We suggest a combination of high-level TTG IgA (>10× upper limit of normal) with a positive EMA in a second blood sample as reliable tests for diagnosis of CD in children. In symptomatic adults unwilling or unable to undergo upper GI endoscopy, the same criteria may be considered after the fact, as a diagnosis of likely CD.	Moderate	Conditional	0

Diagnosis

Dermatitis Herpetiformis (DH)

- A chronic, intensely itchy, blistering skin manifestation of celiac disease
- Affects ~10% of people with celiac disease
- More common in men
- Typically younger individuals (15-40)
- Treatment:
 - GFD
 - Symptomatic treatment:
 - Dapsone
 - Sulphapyridine





**Celiac disease and wheat
allergy are synonymous.**

Gluten-Related Disorders

Wheat Allergy

- Allergic reaction to wheat (albumin, globulin, gliadin, gluten)
- When the body produces antibodies to proteins found in wheat, which may result in symptoms within minutes to hours after intake.
 - Swelling, itching or irritation of the mouth or throat
 - Hives, itchy rash or swelling of the skin
 - Nasal congestion
 - Headache
 - Difficulty breathing
 - Cramps, nausea or vomiting
 - Diarrhea
 - Anaphylaxis
- Diagnosis: skin-prick tests, blood tests (IgE antibodies)



Gluten is the trigger for Non-Celiac Gluten Sensitivity (NCGS).

Gluten-Related Disorders

NCGS/NCWS

- Improvement of intestinal symptoms, extraintestinal symptoms, or both, following elimination of gluten
 - This diagnosis is only given after both celiac disease and wheat allergy are excluded
- Symptoms within hours and resemble celiac disease symptoms
- Alternative triggers may be provoking these reactions:
 - Fructans/fodmaps
 - Amylase trypsin inhibitors (ATIs)
 - Wheat germ agglutinin (WGA)
 - Glyphosate
- Since main trigger within wheat hasn't yet been identified → GFD
- No consensus on how strictly NCGS needs to avoid gluten

The background features several overlapping circles in light blue and light green. A large, semi-transparent red watermark with the word 'MATH' in a bold, sans-serif font is oriented diagonally across the center of the image.

**There is no harm in
following a GFD.**

Treatment

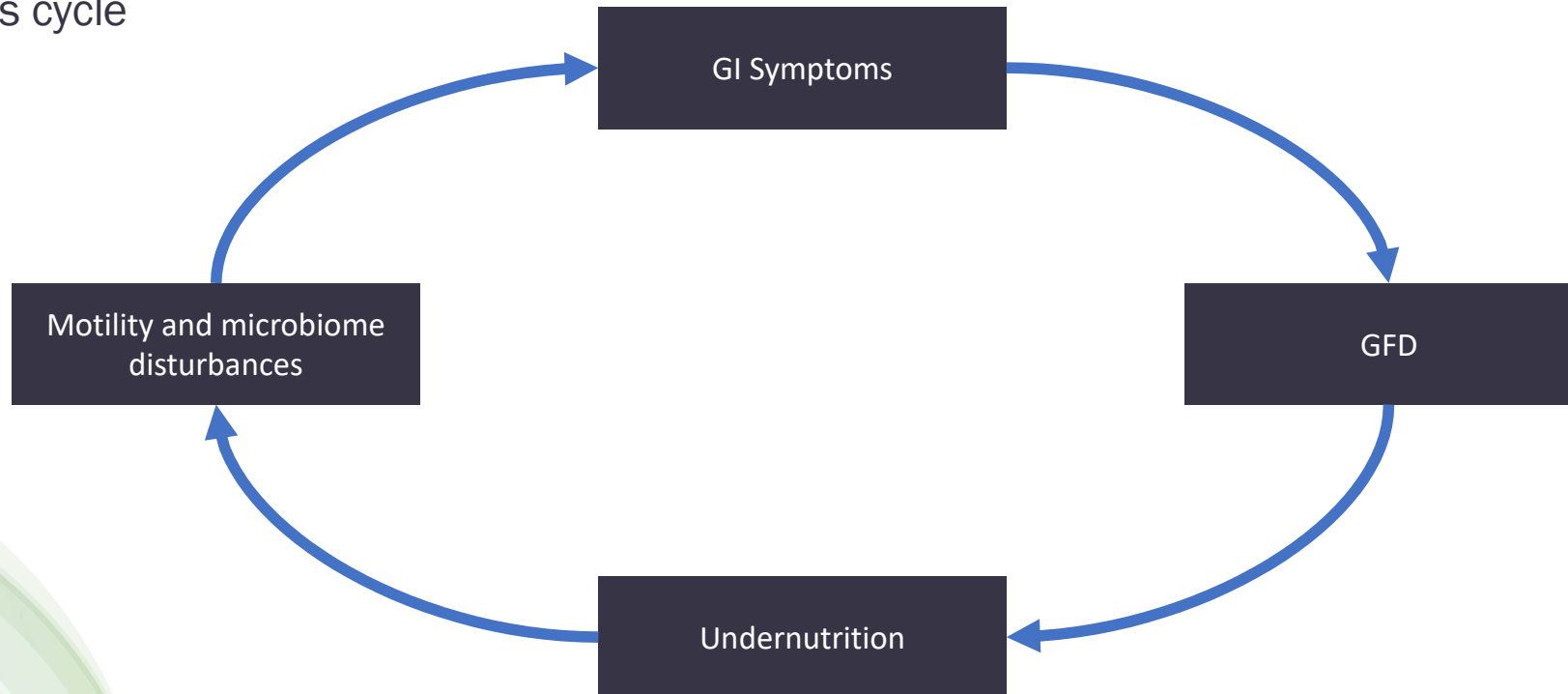
Burden of the GFD

Management of Daily Life	Emotional & Psychological	Relationships
Cost	Desire to eat forbidden foods	Ignorance and poor awareness by others
Time	Stigmatization, isolation and fear of “being a bother”	Social withdrawal and social isolation
Access & Availability	Anxiety, frustration and feeling of being continually “on call” monitoring diet	Hostility from peers
Reduced enjoyment of food and eating	Feeling of need to put in “double the work”	Dilemmas with food made by others
Reduced travel	Sadness	
Difficulty identifying gluten-free food (reading food labels)	Sacrifice and feeling of restricted food choice	
Access to quality/reliable information*	Guilt	
	Anger	

Treatment

Risk of Disordered Eating

- Very strict GFD is associated with higher rates of disordered eating
- Patients with exclusion diet history were **>3x** more likely to have ARFID symptoms
- Vicious cycle



The background features several overlapping circles in shades of light blue, green, and yellow. A large, semi-transparent red watermark with the letters 'MATH' is oriented diagonally across the center of the image.

**The GFD is an overall
healthy diet.**

Treatment

Nutrients of Concern

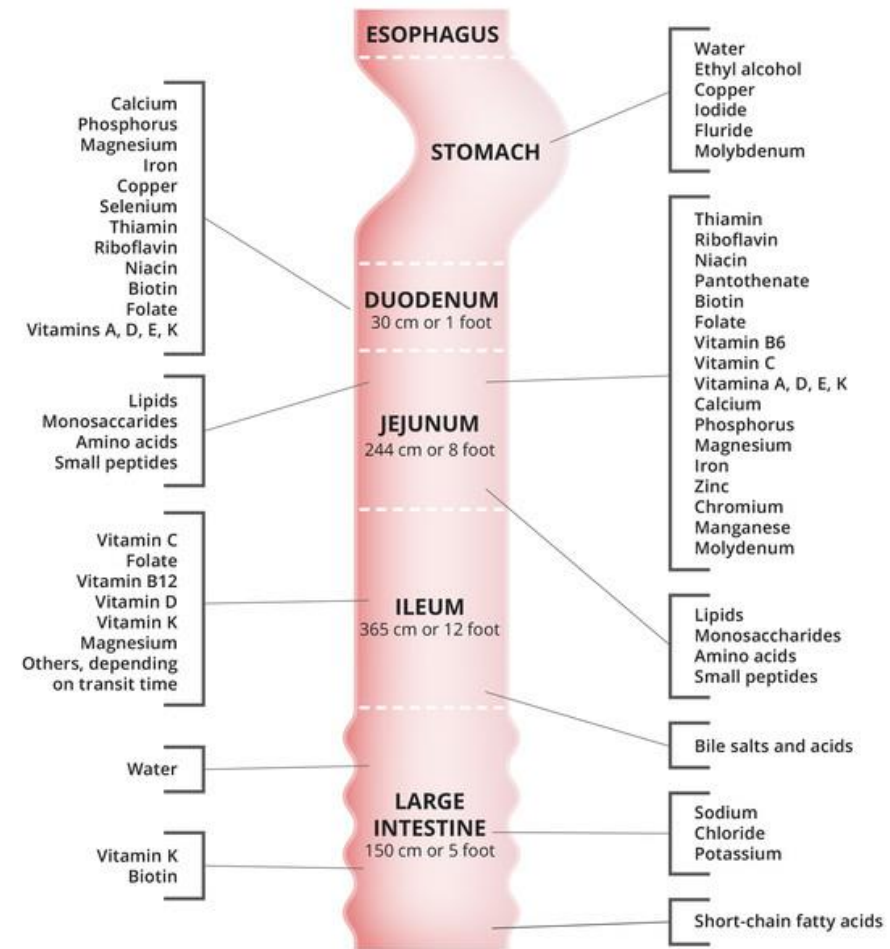
Calcium

Vitamin D

Vitamin B12

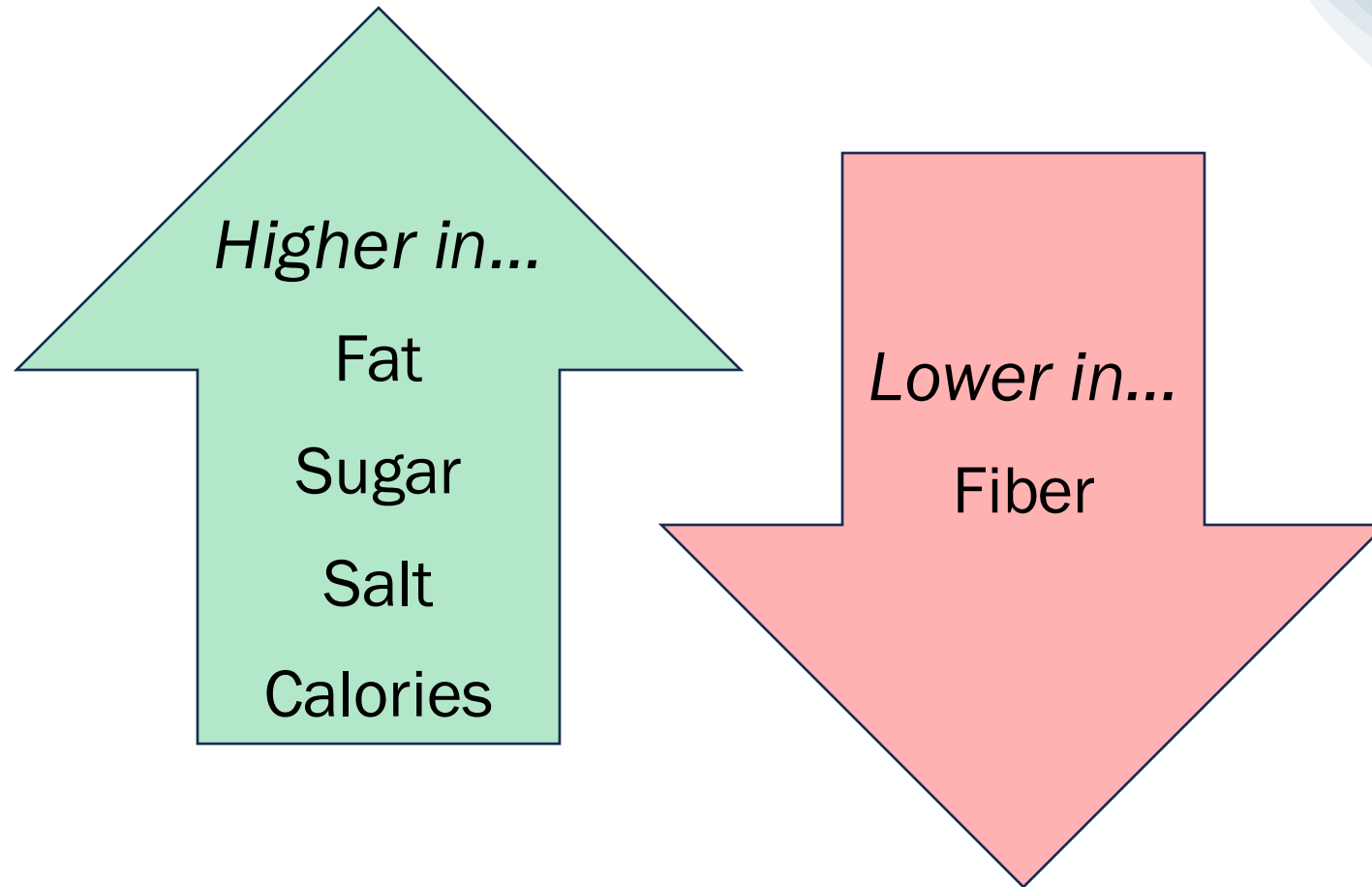
Folate

Iron



Treatment

Nutrients of Concern





**Anyone on a GFD needs to
take a multivitamin.**

Treatment

Multivitamin

- Prioritize nutrients from food first
- RDs to evaluate patients' diets for:
 - Inadequate variety
 - Inadequacies
 - Risk factors: lactose intolerance, veganism, vegetarianism
- Recommend MVM if nutritional inadequacies cannot be alleviated through improved eating habits
- Consider MVM, if nutrient deficiencies (e.g. folate, vitamin D) are found through lab work
- Recommend prenatal MVM for all pregnant or lactating patients

NUTRITION REVIEWS IN GASTROENTEROLOGY, SERIES #7

Neha D. Shah, MPH, RD, CNSC, CHES, Series Editor
Elizabeth Wall, MS, RDN-AP, CNSC, Series Editor

Micronutrient Considerations for Celiac Disease



Jessica Lebovits



Anne R. Lee

The background features several overlapping circles in light blue and light green. A large, semi-transparent red 'X' watermark is oriented diagonally across the center of the image.

**Most patients who need
a GFD also need to avoid
dairy.**

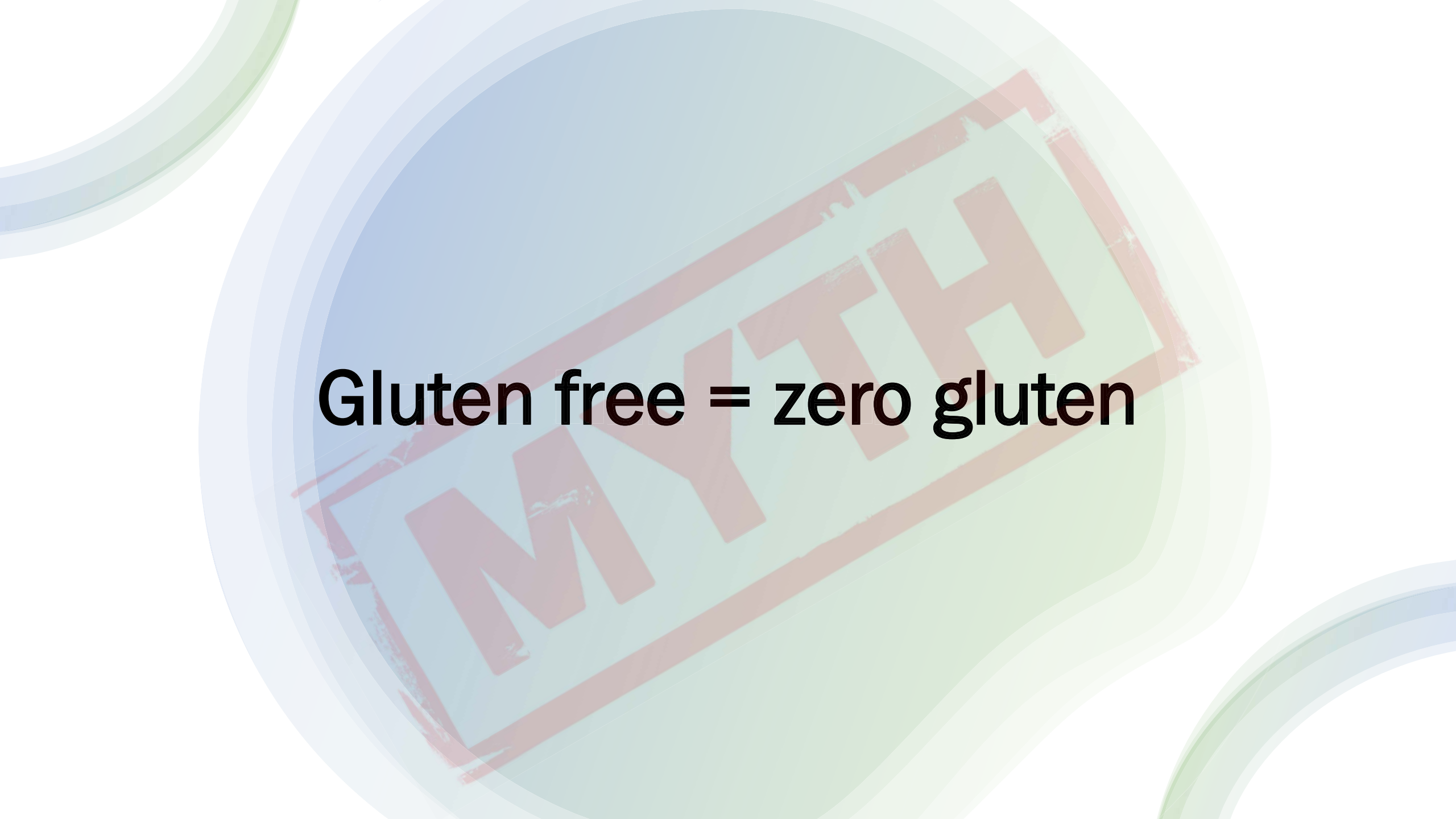
Treatment

Lactose Intolerance

- **Lactose:**
 - Sugar naturally found in dairy
- **Lactose intolerance:**
 - Lactase enzyme deficiency
- **Symptoms:**
 - Gas, bloating, cramps, diarrhea, etc.
- **Treatment:**
 - Reduced lactose diet (individualized)
 - Lactase enzymes

Lactose Content of Foods:

Food and Beverages	Lactose (g)
Milk: whole, low-fat, skim (1 cup)	12-13
Buttermilk (1 cup)	9-12
Fat free dry milk (1/3 cup)	12
Goat milk (1 cup)	9-11
Chocolate milk (1 cup)	9-10
Ice cream (1/2 cup)	6-9
Yogurt (5 oz)	3-5
Cottage cheese (1/2 cup)	3-5
Condensed milk, whole (2 tbsp)	4
Evaporated milk (2 tbsp)	3
Sherbet (1/2 cup)	2
Cream cheese (2 tbsp)	1-2
Cheese: Mozzarella (1 cup)	<1-2
Cheese: Blue, Brie, Goat (1 oz)	<1-2
Cheese: American (1 slice- 2/3 oz)	1
Half and half (1 oz)	1
Light cream (1 oz)	1
Cheese: Cheddar, Swiss, Parmesan (1 cup)	<1
Sour cream (2 tbsp)	<1
Whipped cream (2 tbsp)	<1
Butter, margarine (1 tbsp)	Trace

The background features several overlapping circles in light blue and light green. A large, faint, red watermark with the word 'MYTH' in a bold, sans-serif font is oriented diagonally across the center of the image.

Gluten free = zero gluten

GFD

GFD is not a zero gluten diet



20ppm = The concentration of gluten that is widely accepted as safe for those with celiac disease and has been adopted as the international standard.

The background features several overlapping circles in light blue and light green. A large, faint, red watermark with the word 'MATH' in a stylized font is oriented diagonally across the center of the image.

**Only choose products
labeled certified GF.**

Standard Gluten Free Label

“Gluten Free”
“No gluten”
“Free of Gluten”
“Without gluten”

GFD Certified GF



This certification assures consumers that the product does not contain gluten over the FDA's allowable **limit of less than 20 ppm** and that it is manufactured in a facility that aims to prevent cross-contact.



This certification assures consumers that the product does not contain gluten over the FDA's allowable **limit of less than 20 ppm** and is endorsed by Beyond Celiac and other regional and national organizations.

OLD VERSION

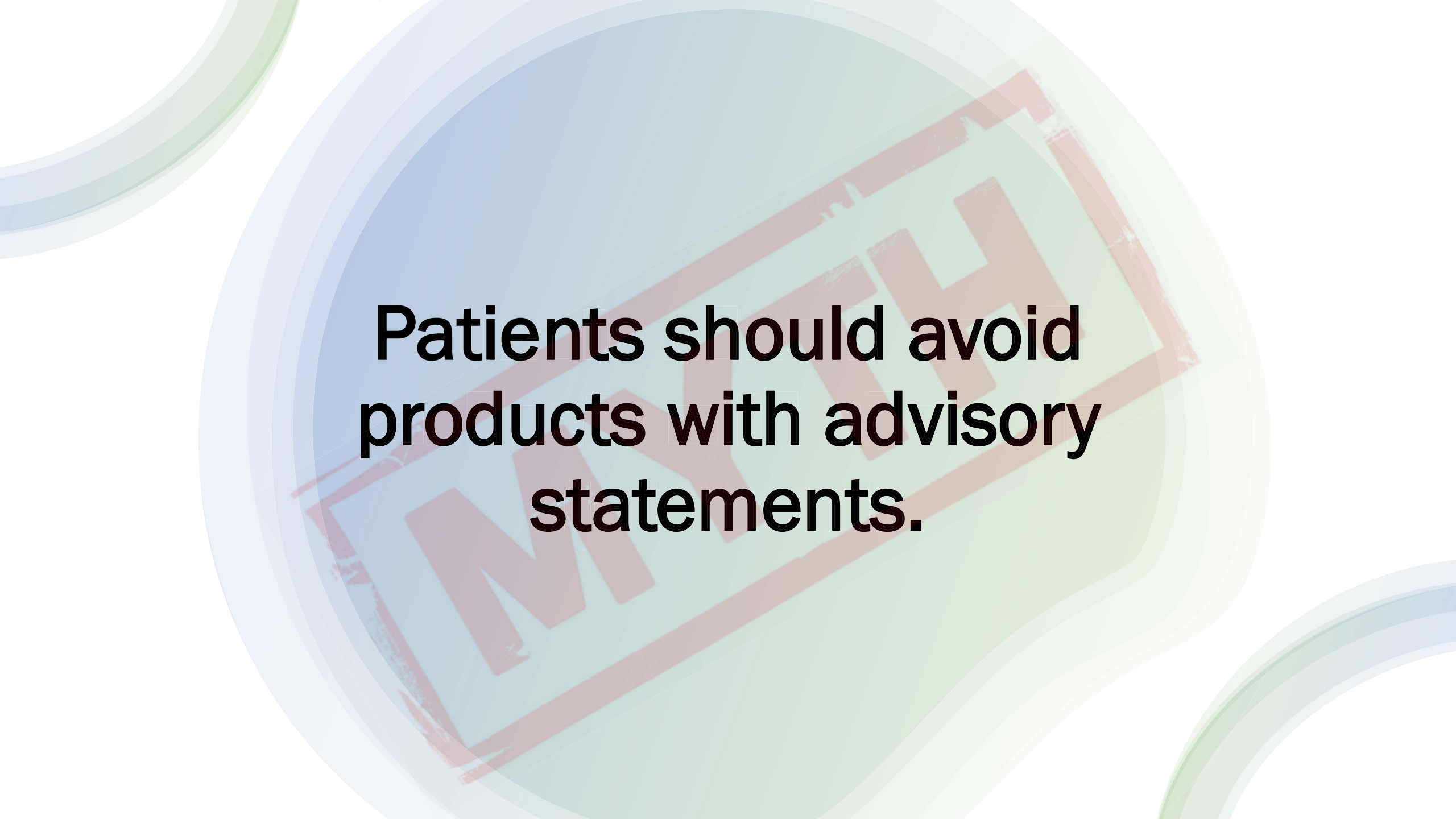


This certification assures consumers that the product does not contain gluten over the FDA's requirements and meets a standard of **10 ppm or less**. This is certified by Gluten-free Certification Organization.

NEW VERSION



This certification assures consumers that the product does not contain gluten over the FDA's requirements and meets a standard of **5 ppm or less**. This is certified by Gluten Free Food Program and endorsed by National Celiac Association.

The background features several overlapping circles in light blue, green, and yellow. A large, semi-transparent red 'X' is superimposed over the center of the image.

**Patients should avoid
products with advisory
statements.**

GFD

Advisory Statements

“May contain...”

“Manufactured in
the same facility...”

“Made on shared
equipment...”



The background features several overlapping circles in light blue, green, and yellow. A large, semi-transparent red 'X' watermark is oriented diagonally across the center of the image.

**A GF menu ensures
that the food is safe.**

GFD

Restaurants

Find Me GF



Atly GF Map



	GLUTEN FREE	
FEATURING OUR AMAZING STORE MADE PIZZA CRUST		
PIZZA	Medium Flat Size- Add \$4 To Cost Of Medium Pizza	
NACHOS	Our Corn Chips Are Gf, For Our Top Nachos Order Without Seasoning...see Nachos On Appetizer Page	
SPINACHOKE DIP	Served With Corn Chips	13.99
CHICKEN FINGERS	Hand Breaded With Our Exclusive Coating With Fresh Carrots & Celery	17.99
SALADS	Any Of Our Green Salads, Specialty Breadbowl Salads Ask For GF Additions	
PASTAS	Ask For GF Pasta Any Toppings... Add 3.50	
BLACK ANGUS	Steak With Lettuce And GF Bun	15.89
TURKEY BURGER	Our Own Recipe On GF Bun	15.89
BEYOND BURGER	A Non-soy Meatless Burger, GF Bun	16.89
CHOCOLATE DECADENCE FLOURLESS CAKE	Amazingly Rich Torte With Chocolate Ganache	8.99
OUR GLUTEN -FREE CRUST MIX	Make Your Own!	6.99
PAR BAKED GF CRUST	Half-baked For A Quick Completion	6.99

Evidence for GFD Recommendations

Quality of the Evidence

Green: Relatively sufficient evidence to recommend this guidance.

Yellow: Relatively insufficient evidence to recommend this guidance.

Red: Inadequate evidence to recommend this guidance.

The background features several overlapping circles in light blue and light green. A large, semi-transparent red 'X' watermark is oriented diagonally across the center of the image.

**Only use GF cosmetics,
toothpaste, and topicals.**

Evidence for GFD Recommendations

Cosmetics, Toothpaste, Topicals

- No scientific evidence that gluten-containing products that are not ingested are harmful for celiac disease.
 - GFWD 2012: 0/6 products tested contained quantifiable gluten
 - 2019 Italian study: tested toothpastes, dental tablets, mouthwashes, lip balms, and lipsticks (n=66)
 - 94% tested <20 ppm
 - 6% tested >20 ppm (4 products total: 20.7, 31.4, 35, 27.4 ppm)
 - GFWD 6/5/23: Non-GF labeled lipstick sample tested well below 20ppm

Recommendation: Cosmetics, toothpaste, and topicals with gluten-containing ingredients do not need to be avoided. Choosing only GF-labeled products is not necessary for most celiac disease patients.



**Dark liquor is not GF.
Corona beer is GF.
Beware of wine barrels.**

Evidence for GFD Recommendations

Alcohol



Beer

- Conventional beer: Made from barley, not allowed on a GFD (e.g. Corona).
- Gluten-removed beer: inadequate evidence concerning the effectiveness of gluten removal
- GF beer: Should be made from GF grains and tested to be <20ppm



Wine

- Proper distillation is capable of removing all proteins, including gluten
- GFWD 2018: All distilled liquors tested <20ppm (14 alcohols tested)



Liquor

- Wine is made from grapes, and therefore naturally GF.
- GFWD 2012:
 - Two bottles of wine aged in oak barrels sealed with a wheat flour paste were tested for gluten using sandwich and competitive R5 ELISA.
 - All results were <5 and 10ppm

Recommendation:

- Unflavored distilled spirits, wine, and certified GF beer do not need to be avoided.
- Regular beer and malt beverages should be avoided.
- **Gluten-removed beer should be avoided.**

The background features a large, semi-transparent red stamp with the word 'MYTH' in a bold, sans-serif font, oriented diagonally from the bottom-left to the top-right. The stamp is set against a backdrop of overlapping, wavy, semi-transparent shapes in shades of light blue, green, and yellow. The text 'Spices have hidden gluten.' is centered in a bold, black, sans-serif font.

Spices have hidden gluten.

Evidence for GFD Recommendations

Spices

- Canadian Food Inspection Agency Report (2013):
 - Tested 268 samples of ground spices
 - 25 samples tested >20ppm
- GFWD (11/2017):
 - All samples tested <20ppm



Recommendation: Read ingredients when purchasing spices. Spices do not need to be avoided. If a patient is incredibly sensitive, consider advising them on spices that are labeled GF, especially for those used frequently.

The background features several overlapping circles in light blue, green, and yellow. A large, semi-transparent red stamp is oriented diagonally across the center. The stamp contains the word "NATURAL" in a bold, sans-serif font, with the letters "N", "A", and "T" being significantly larger and more prominent than the others.

**“Natural flavors” have
hidden gluten.**

Evidence for GFD Recommendations

Natural Flavors

FDA definition: the essential oil, oleoresin, essence or extractive, protein hydrolysate, distillate, or any product of roasting, heating or enzymolysis, which contains the flavoring constituents derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose significant function in food is flavoring rather than nutritional

- Natural flavors may be derived from gluten-containing grains.
- **BUT** unless you see the words wheat, barley, rye, or malt on the label of food product, the natural flavor probably does not contain protein from these sources.

Recommendation: “Natural flavors” do not need to be avoided in the US.

The background features several overlapping circles in shades of light blue and light green. A large, red, 3D-style stamp with the word 'MYTH' in bold, capital letters is oriented diagonally across the center. The stamp has a distressed, ink-like texture.

It's safe to double dip.

Evidence for GFD Recommendations

Spreads and Condiments

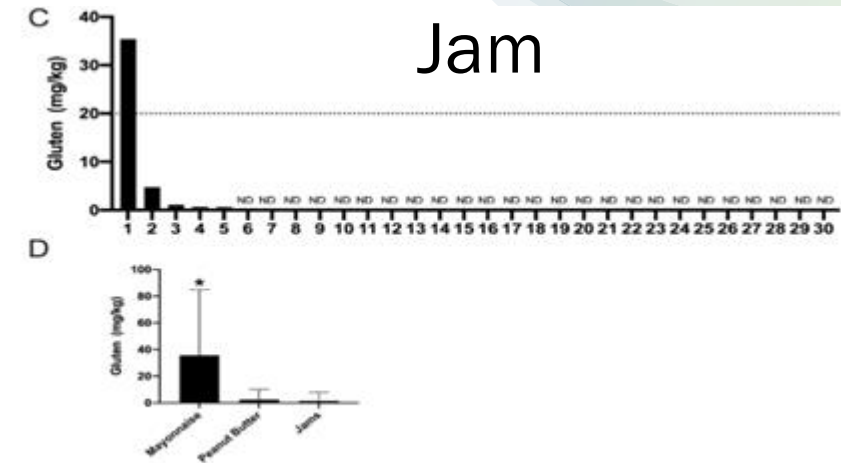
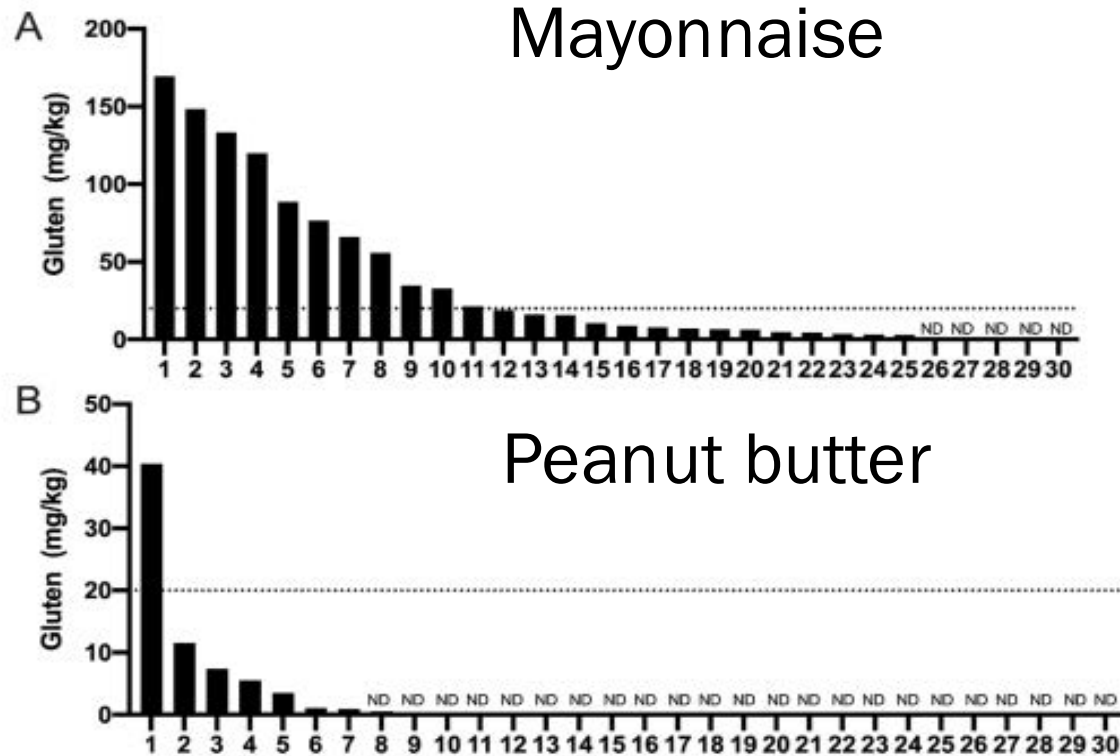
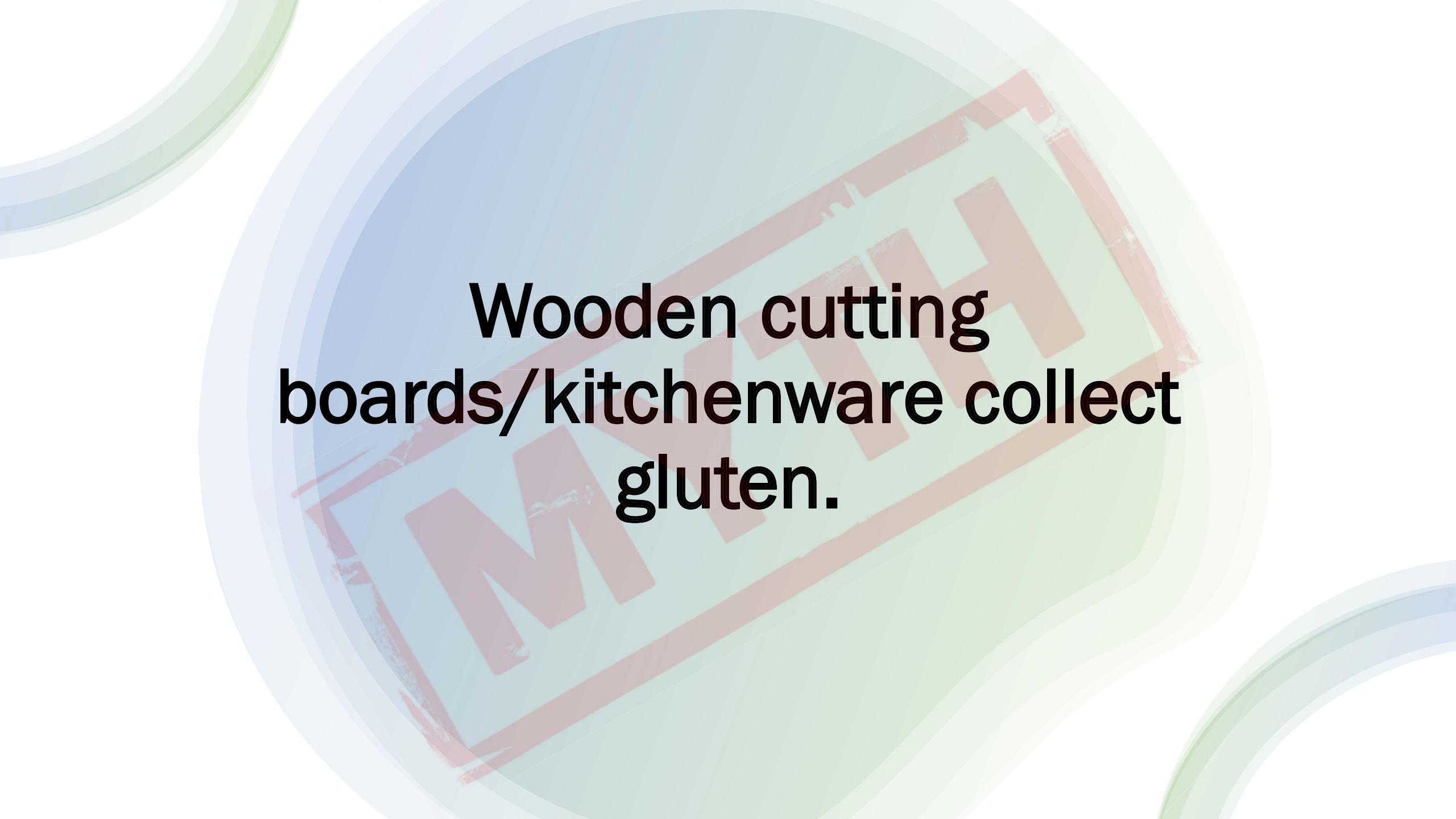


Fig. 3. Mayonnaise (A), peanut butter (B), and jams (C) were used with gluten-containing bread and the resultant levels of gluten from cross-contact were tested with the ALLER-TEK ELISA Test Kit. (D) The average of all the tested samples show that only the mayonnaise average gluten level was higher than 20 mg/kg and was the only condiment that was statistically different (* $p < 0.05$) from the other condiments.

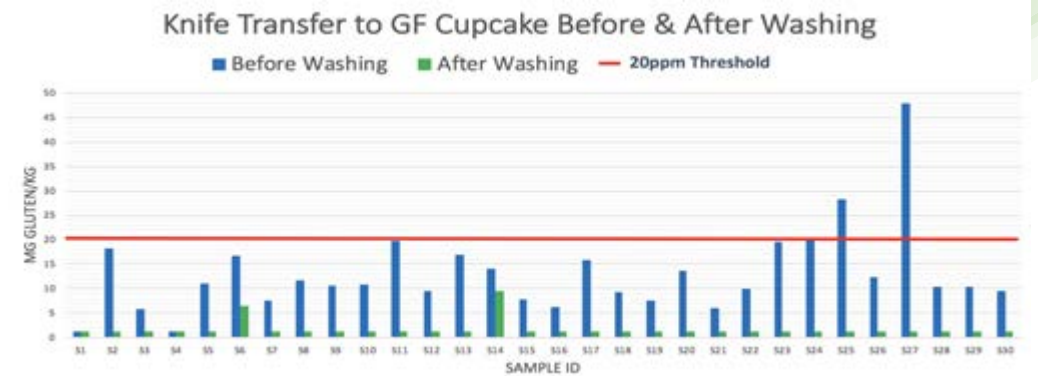
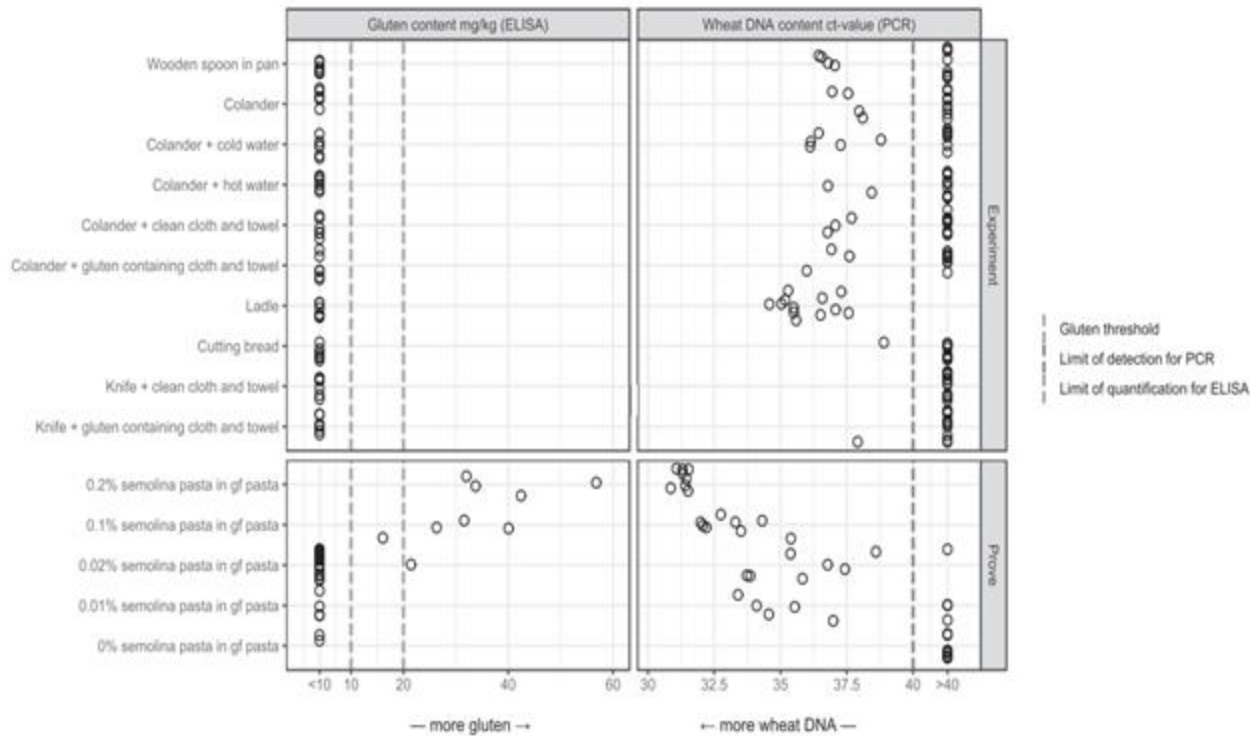
Recommendation: Because gluten levels in shared spreads / condiment jars can vary, avoid spreads / condiment jars if they are used for gluten-containing foods. Purchase separate spreads / condiments, or squeeze bottles, for GF food preparation and use a clean knife when preparing food.

The background features several overlapping circles in light blue, green, and yellow. A large, semi-transparent red 'X' watermark is oriented diagonally across the center of the image.

**Wooden cutting
boards/kitchenware collect
gluten.**

Evidence for GFD Recommendations

Utensils



Recommendation: Clean utensils and surfaces should be used to prepare GF foods. The type of material (i.e. wood) does not affect risk of cross-contact. When cookware is unable to be thoroughly cleaned, separate cookware is recommended.

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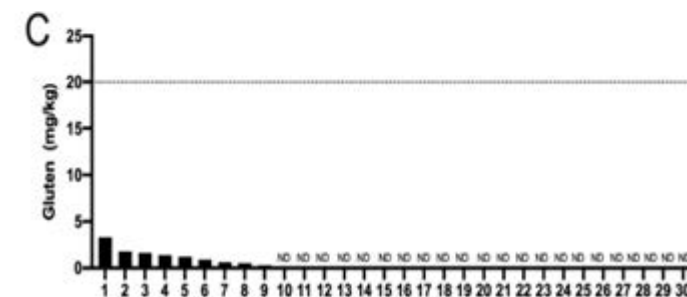
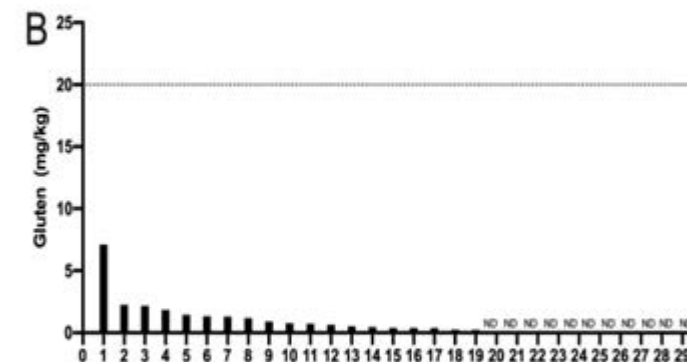
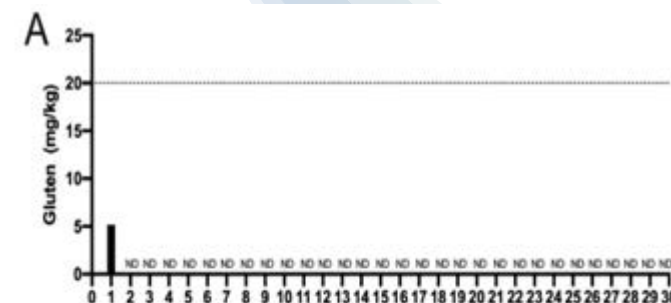
**Shared toasters are never
safe.**

Evidence for GFD Recommendations

Toasters



Recommendation: Shared toasters may be used safely in home settings. Pop-up toasters are likely to carry a lower risk than rolling toasters. Toaster ovens can often be cleaned more easily and allow for aluminum foil to be used to prevent cross-contact.



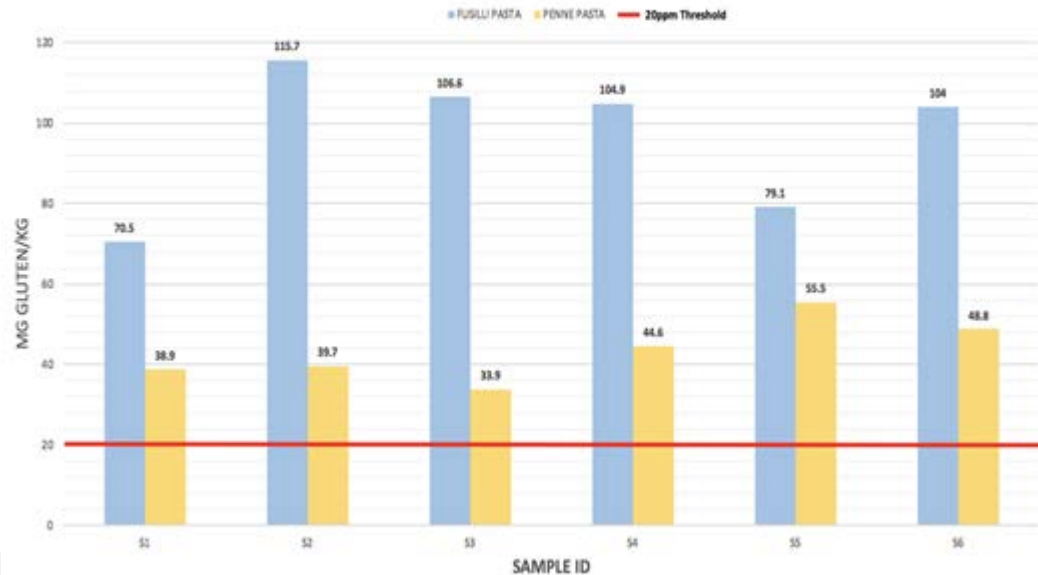
The background features several overlapping circles in shades of light blue and light green. A large, semi-transparent red watermark with the word 'NO' in a bold, sans-serif font is oriented diagonally across the center of the image. The text is centered over this background.

**Gluten-containing pasta is
always superior to
GF pasta.**

Evidence for GFD Recommendations

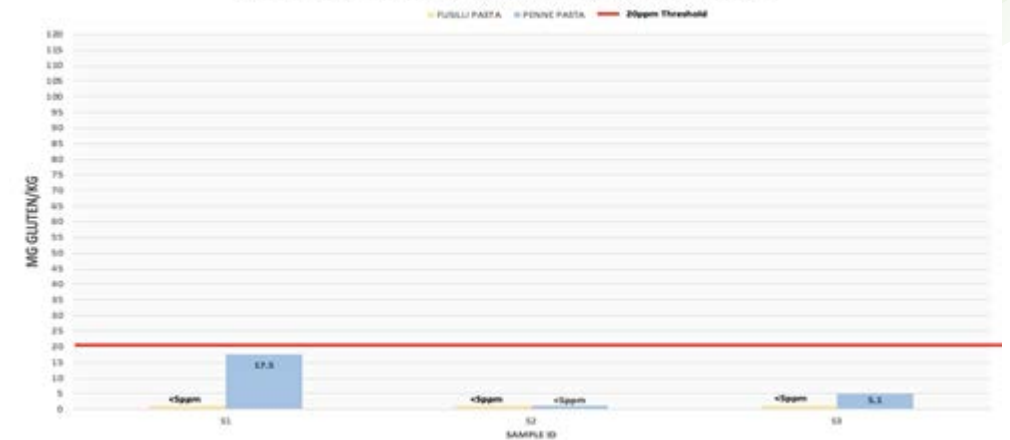
Pasta

Gluten Transfer from Gluten-Containing Pasta to Gluten-Free Pasta Cooked in the Same Water

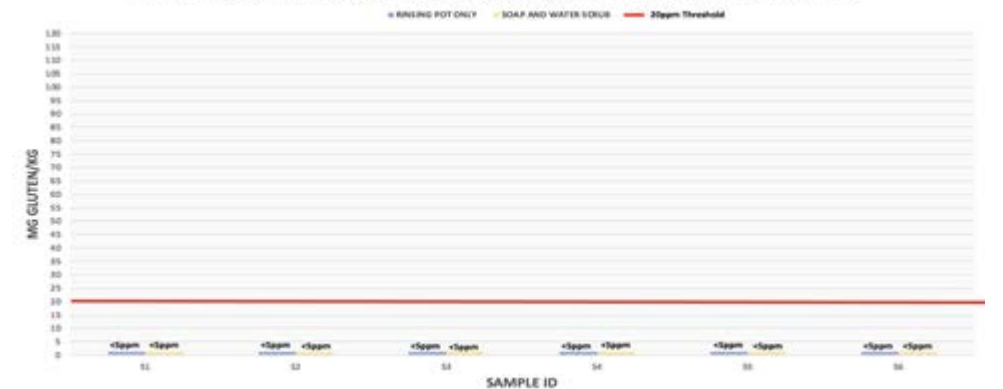


Recommendation: Pasta should be cooked in clean water and in a clean pot.

Gluten Detected on GF Pasta After Rinsing With Water



Gluten Transferred to Gluten-Free Pasta Cooked in a Shared Pot AFTER Washing





**GF pizza must be cooked in
a separate oven to be safe.**

Evidence for GFD Recommendations

Pizza

Table 2. Results of surveys on gluten content in declared or expected gluten-free foods from restaurants and other food businesses.

City	Survey Year	No. of Venues	Type of Venue	No. of Gluten-Free Products Sampled	Type of Food	No. of Samples with Gluten <LOD (%)	No. of Samples with Gluten >LOD and <20 ppm (%)	No. of Samples with Gluten >20 ppm (%)	Source
Turin (Italy)	2016–2017	28	Pizza restaurant	56	Gluten-free pizza	55 (98.2)	1 (1.8)	0	Present study
City not reported (Italy)	Not reported	5	Pizza restaurant	84	Gluten-free pizza	75 (89.3)	9 (10.7)	0	[9]
Brasilia (Brazil)	2014	25	Bakery	130	Gluten-free bread, biscuits and cakes; tapioca flour biscuits	Not reported	Not reported	28 (21.5)	[20]
Brasilia (Brazil)	Not reported	20	Restaurant	60	Beans	Not reported	Not reported	10 (16.6)	[21]
Melbourne (Australia)	2016	127	Food business	158	Mixed gluten-free foods (e.g., chicken burger, banana bread, calamari)	144 (91.1)	5 (3.2)	9 (5.7)	[22]



Evidence for GFD Recommendations

Pizza

- In this study, specific precautions were used:
 - Ingredients for GF pizzas were stored on separate shelves of the refrigerator and in a separate cabinet.
 - GF pizzas were prepared in clean, dedicated spaces.
 - Cooks wore disposable uniforms and washed their hands with soap each time they were in contact with wheat flour and other gluten-containing ingredients.
 - A dedicated paddle was used to put GF pizzas into the oven.

TABLE 4. Concentration of gluten in GF pizzas cooked in shared-production pizza houses^a

	Gluten concn (ppm)				
	Pizza house 1	Pizza house 2	Pizza house 3	Pizza house 4	Pizza house 5
ALT	6.4; BLQ (×2)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3)
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3)
	BLQ (×3)	5.0; BLQ (×2)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3)
	8.2; BLQ (×2)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	5.0; BLQ (×2) ^b
	8.3; BLQ (×2)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	8.5; BLQ (×2) ^b
	15.6; 6.1; BLQ	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3) ^b
		BLQ (×3) ^b			
		BLQ (×3) ^b			
		BLQ (×3) ^b			
		BLQ (×3) ^b			
TRAD	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3)
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3)
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3)
	11.0; BLQ (×2)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3) ^b
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3) ^b
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b	BLQ (×3)	BLQ (×3) ^b
		BLQ (×3) ^b			
DED	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b		
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b		
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b		
	17.6; 5.6; BLQ	BLQ (×3)	BLQ (×3) ^b		
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b		
	BLQ (×3)	BLQ (×3)	BLQ (×3) ^b		
		BLQ (×3) ^b			

^a ALT, alternating; BLQ, below limit of quantification; TRAD, traditional shared; DED, dedicated. Three samples were obtained from each slice homogenate and were analyzed for gluten content by R5 ELISA. Each value of these three measurements is reported. Values higher than 5 ppm are reported in the table; results below the ELISA limit of quantification (5 ppm according to manufacturer's instruction) are shown as BLQ.

^b Wheat flour was used to roll out wheat pizzas.

Recommendation:

- Do not eat cheese or other toppings from a gluten-containing pizza.
- Clean, GF toppings and utensils should be used for GF pizza.
- Cook GF pizza on its own clean, separate tray in a shared oven.



**All GF baked goods are safe
if marked GF.**

Evidence for GFD Recommendations

Airborne

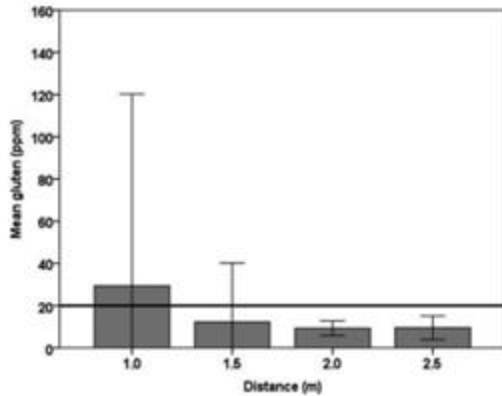


FIGURE 3. Pilot study results showing mean gluten concentration of samples placed at increasing distance from the site of wheat flour use. Error bars ± 3 standard deviations.

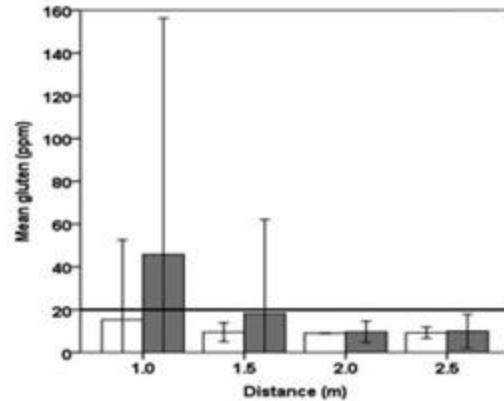


FIGURE 4. Pilot study results showing mean gluten concentration of samples placed at increasing distance from the site of wheat flour use, for different times of exposure to wheat flour use. Open bars, 0.5 h; shaded bars, 4.0 h; error bars ± 3 standard deviations.

- A stand mixer used to aerosolize wheat flour over 10 minutes
 - Distance: <20ppm detected for all samples 5-10 ft away
 - Quantity:
 - At 1 ft from the mixer, 37.5% of samples exposed to $\frac{1}{2}$ cup aerosolized flour had >20ppm gluten while 100% of samples exposed to 2 cups had >20ppm
 - With 1 tbsp flour, gluten was undetectable at all distances
- Air quality returned to baseline rapidly, within 17.5-41 minutes
- Duration of exposure: not significant (1hr, 3hrs, 6hrs, 12hrs)

Recommendation: Shared baking spaces are OK as long as there is a distance of 5-10 ft between GF and gluten-containing prep areas or between the person and the mixer. If that's not possible, masks may be a good option. In a bakery setting, dedicated GF bakeries (or bakeries with dedicated GF prep areas) are preferred due to the high risk of airborne gluten exposure.

The background features several overlapping circles in light blue and light green. A large, faint, red watermark with the word 'MYTH' in a stylized font is oriented diagonally across the center. The text 'All fries are GF.' is centered in the foreground.

All fries are GF.

Evidence for GFD Recommendations

Fryers

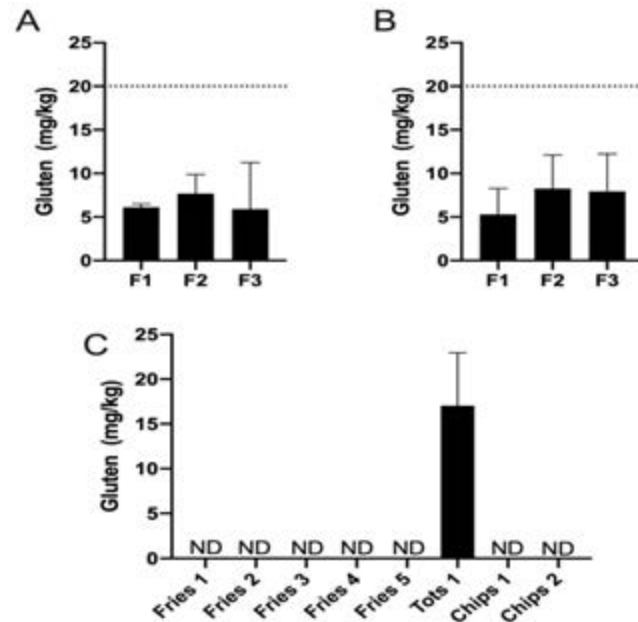


Fig. 1. Gluten-free french fry samples were fried in clean oil (control) and after gluten-containing chicken nuggets for three rounds (F1, F2, and F3): RIDASCREEN Glutelin Test Kit (A) ALLER-TEK ELISA Test Kit (B) Fried food samples from fast food restaurants (C). Samples were labeled as ND (not detected) when the values fell below the limit of detection of 2.5 mg/kg when tested with ALLER-TEK ELISA and 5 mg/kg when tested with RIDASCREEN GLUTELIN. * indicates samples that were significant ($p < 0.05$) relative to their undried control.



1 oz. of restaurant fries
@ 20 ppm $\cong$ 0.5 mg gluten
@ 40 ppm $\cong$ 1.0 mg gluten
@ 60 ppm $\cong$ 1.5 mg gluten
@ 80 ppm $\cong$ 2.0 mg gluten



5 ½ oz. of restaurant fries
@ 20 ppm $\cong$ 3 mg gluten
@ 40 ppm $\cong$ 6 mg gluten
@ 60 ppm $\cong$ 9 mg gluten
@ 80 ppm $\cong$ 12 mg gluten

Results: 25% of the fry samples measured above 20ppm

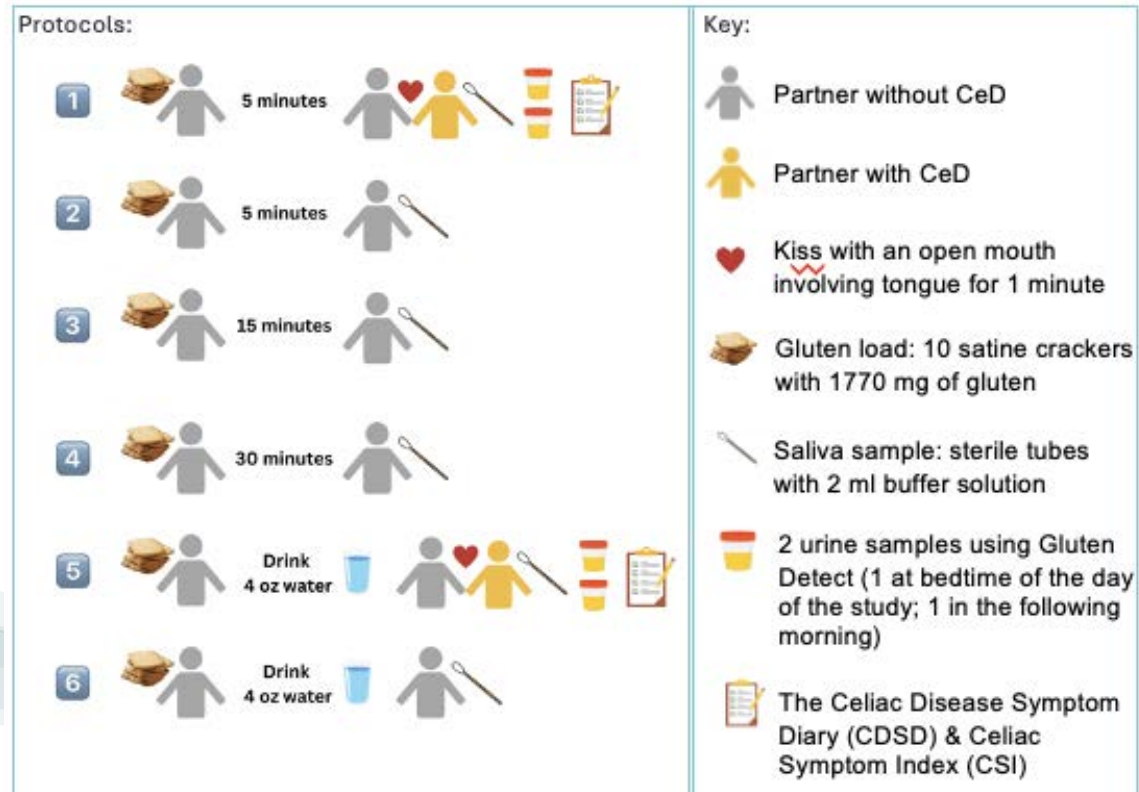
Recommendation: Ensure fried foods are not coated with gluten-containing flour, sauces, or seasonings. Given the significant variability in restaurants and other food production facilities, avoid fryers shared with GF foods.

The background features several overlapping circles in light blue, green, and purple. A large, semi-transparent red 'X' watermark is oriented diagonally across the center. The text is centered within this area.

**Kissing poses a high risk for
gluten exposure.**

Evidence for GFD Recommendations

Kissing



Recommendation:

Be mindful that kissing poses a minimal risk of cross-contact, but partners drinking 4 oz of water after gluten intake significantly reduce the risk of any gluten transfer.





All oats are safe.

Evidence for GFD Recommendations

Oats

- **Avenin**
 - While there is a group who react to the protein avenin present in oats, it's a very small portion of individuals with celiac disease
- **Timing of (re)introduction**
 - Some gastroenterologists will suggest waiting until celiac disease is well-controlled, while others will only suggest removing them if clinically indicated
- **Lack of consensus**
 - At this time, there is no consensus on a standard recommendation for the type or portion of GF oats and when to introduce them

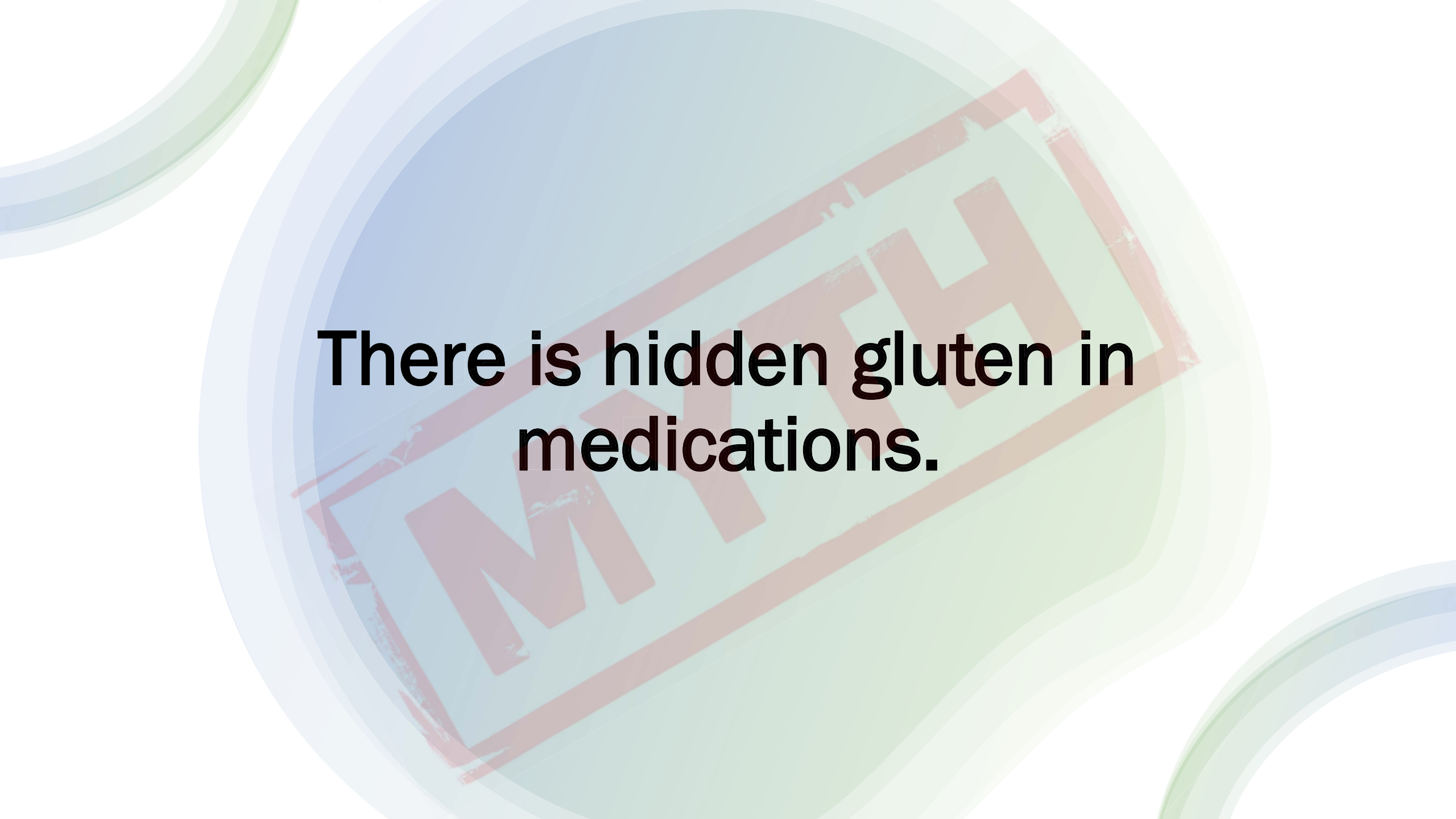
Recommendation: The recommendation on oats should be **individualized** to each patient. Oats and oat products with no GF label on the product are NOT recommended for celiac disease and should be avoided.

Evidence for GFD Recommendations

Oats

- Given the current state of oat processing:
 - Factor in **frequency and amount** desired
 - Is the patient interested in **single ingredient** oat products (i.e. oatmeal) or **multiple ingredient** oat products (i.e. oat flour cookies)?
 - Consider food security and religious practices
 - Consider current symptoms and disease severity
 - Consider recommending alternatives to oats to **diversify choices**
 - **Follow up** regularly
- Recommend **trusted brands**.
 - **Gluten Free Watchdog**

Recommendation: Advise patients on ensuring adequate hydration when adding fiber sources to the diet. Additionally, consider recommending other grain alternatives to oat products to diversify diet choices. Encourage regular follow-up with patients who choose to consume single-ingredient oat products to track their progress. Consider recommending more trusted brands for these products.

The background features several overlapping circles in light blue, green, and yellow. A large, semi-transparent red 'X' is superimposed over the center. The text is centered within this 'X'.

**There is hidden gluten in
medications.**

Evidence for GFD Recommendations

Medications, Vitamins, Supplements

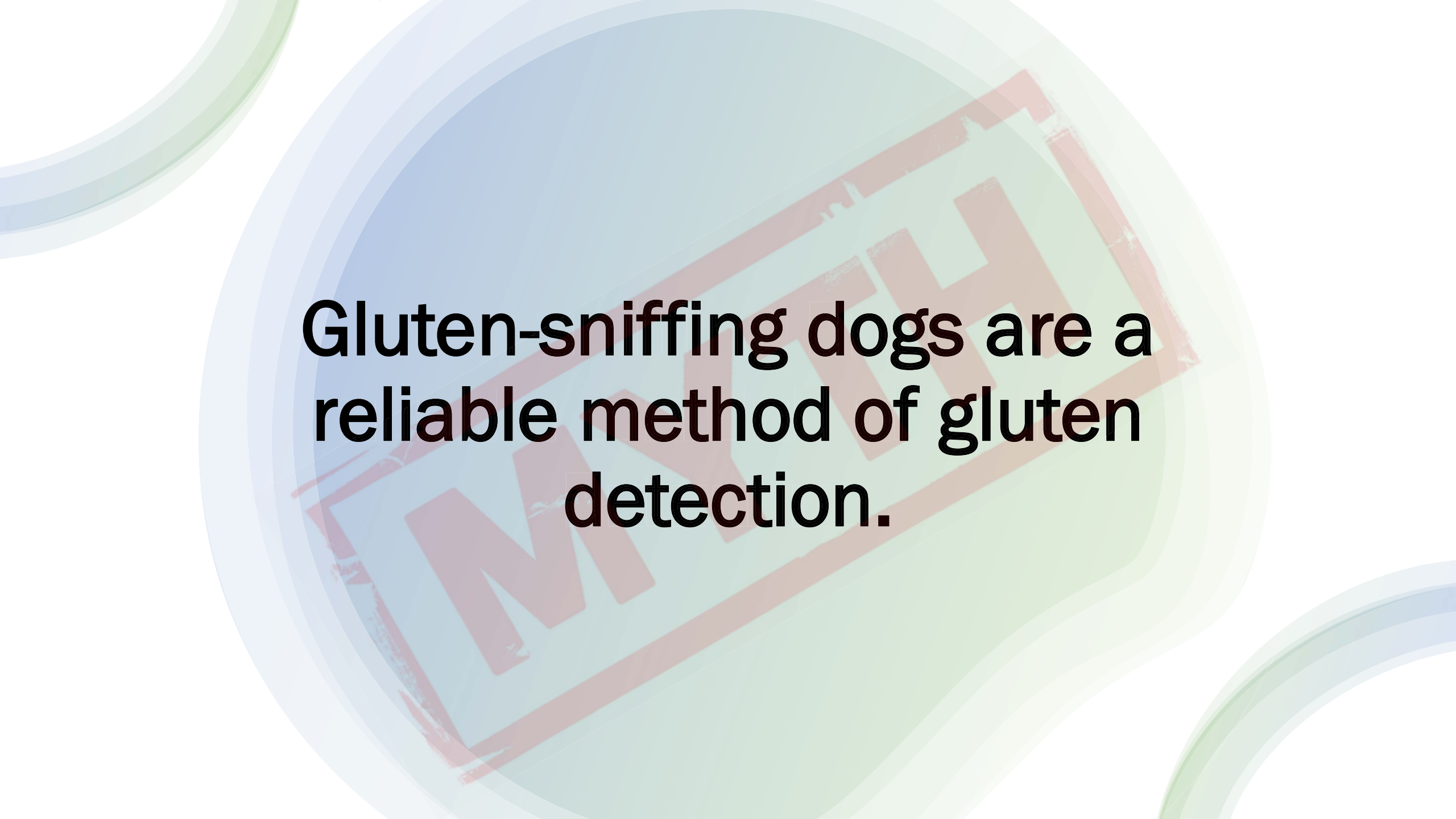
Medications rarely contain gluten.

- Check ingredient list
- Confirm: Glutenfreedrugs.com, manufacturer, pharmacist

Supplements are not regulated by the FDA like medications, but are required to have <20ppm gluten if labeled GF.

- Manufacturers do not have to prove their efficacy or safety prior to market entry
- Individual supplement companies responsible for evaluating the safety and labeling of their products

Recommendation: Ensure medications don't contain any substantial gluten ingredients. Choose supplements labeled GF.

The background features several overlapping circles in light blue, green, and purple. A large, semi-transparent red 'X' watermark is centered over the image. The text is positioned in the center, overlaid on the 'X' and the circles.

Gluten-sniffing dogs are a reliable method of gluten detection.

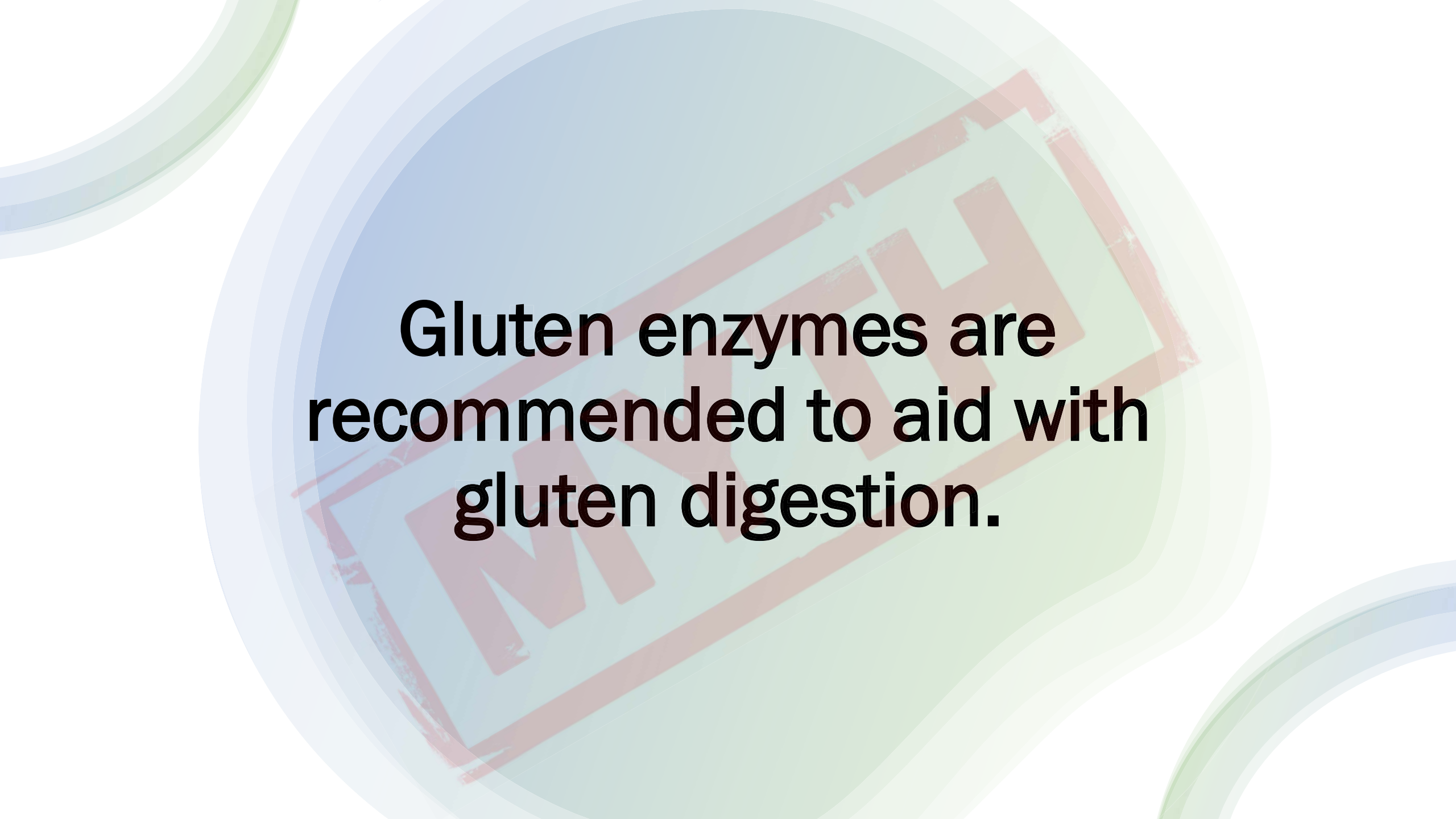
Evidence for GFD Recommendations

Gluten-Detection/Gluten-Sniffing Dogs

- Service animals task-trained to identify the scent of gluten
- Extremely time-intensive, costly
- Gluten-detection dogs may detect gluten in products the FDA would deem safe (<20ppm)
 - Even products “certified” gluten-free could be flagged
 - The dog’s level of detection does not correlate with any validated level of gluten detection
- May cause more fear and anxiety
- No validated studies that prove a gluten detection dog is able to accurately detect gluten at a safe level



Recommendations: Gluten-detection dogs are not recommended.

The background features several overlapping, semi-transparent circles in shades of light blue, green, and yellow. A large, red, stylized watermark, possibly reading 'MATH', is oriented diagonally across the center of the image. The text is centered within this graphic.

**Gluten enzymes are
recommended to aid with
gluten digestion.**

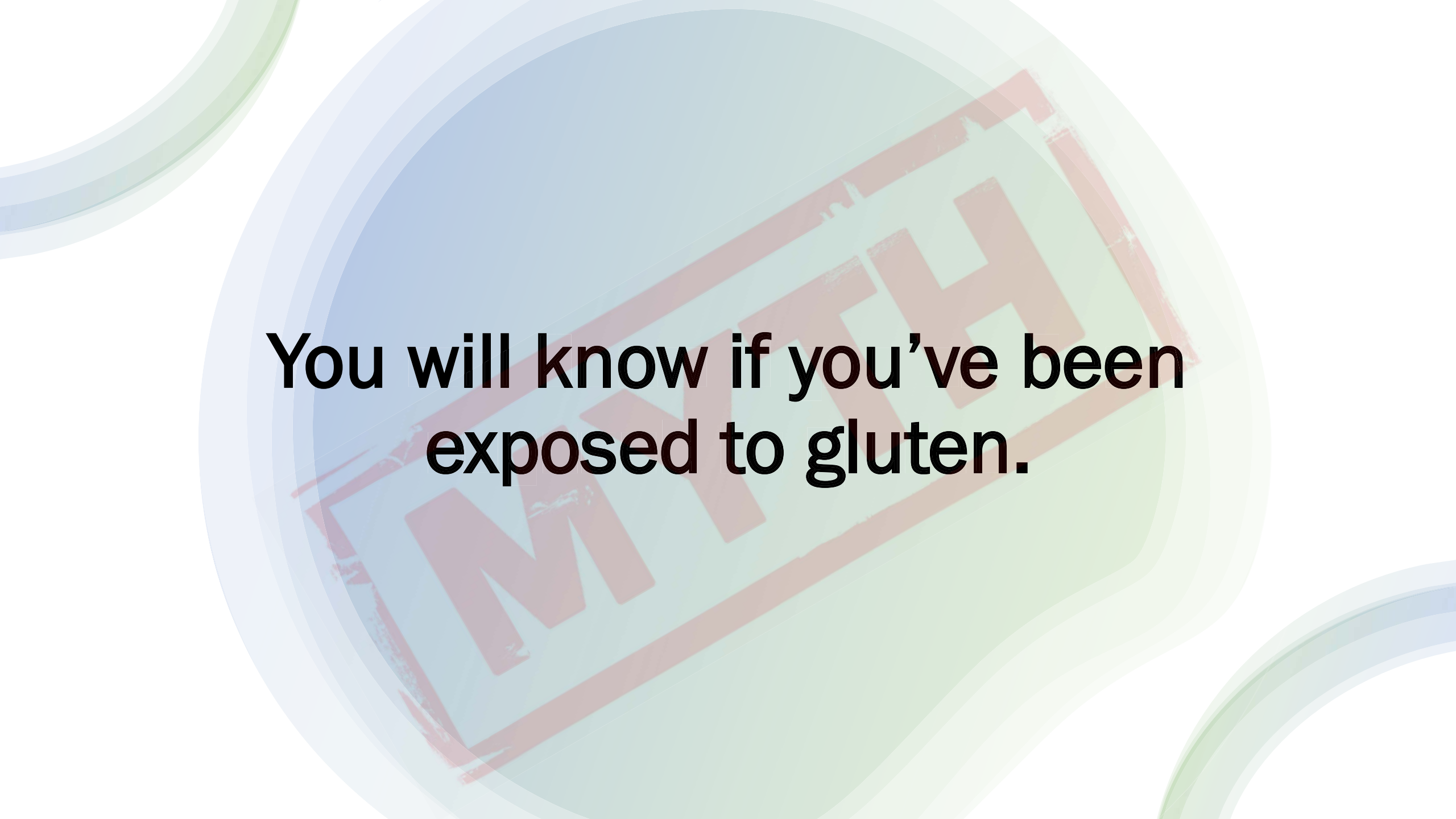
Evidence for GFD Recommendations

Gluten Enzymes

Products on the market:

- Digestive Enzymes:
 - Gluten enzymes: various options on the market
 - Does not prevent immunogenic effect of gluten
 - Fodzyme: fructan hydrolyase digests fructans in wheat, not designed to break down gluten
- Celiac disease gluten enzymes completed phase 2 clinical trials: Digest gluten or bind gliadin and prevent exposure to mucosa
 - Latiglutenase
 - TAK-062

Recommendation:
Gluten enzymes currently on the market are not recommended for celiac disease. We are hopeful there will be FDA-approved gluten enzymes in the future.



**You will know if you've been
exposed to gluten.**

Individualized Care

Symptoms Don't Correlate with Gluten Exposure

DOGGIE Bag Study:

- Patients who did not think they were exposed to gluten often had a positive sample
- Patients who believed they were exposed often incorrectly identified their exposure
- Positive samples indicating gluten exposure didn't necessarily show damage on biopsy



**The GFD is the same for
everyone.**

Individualized Care

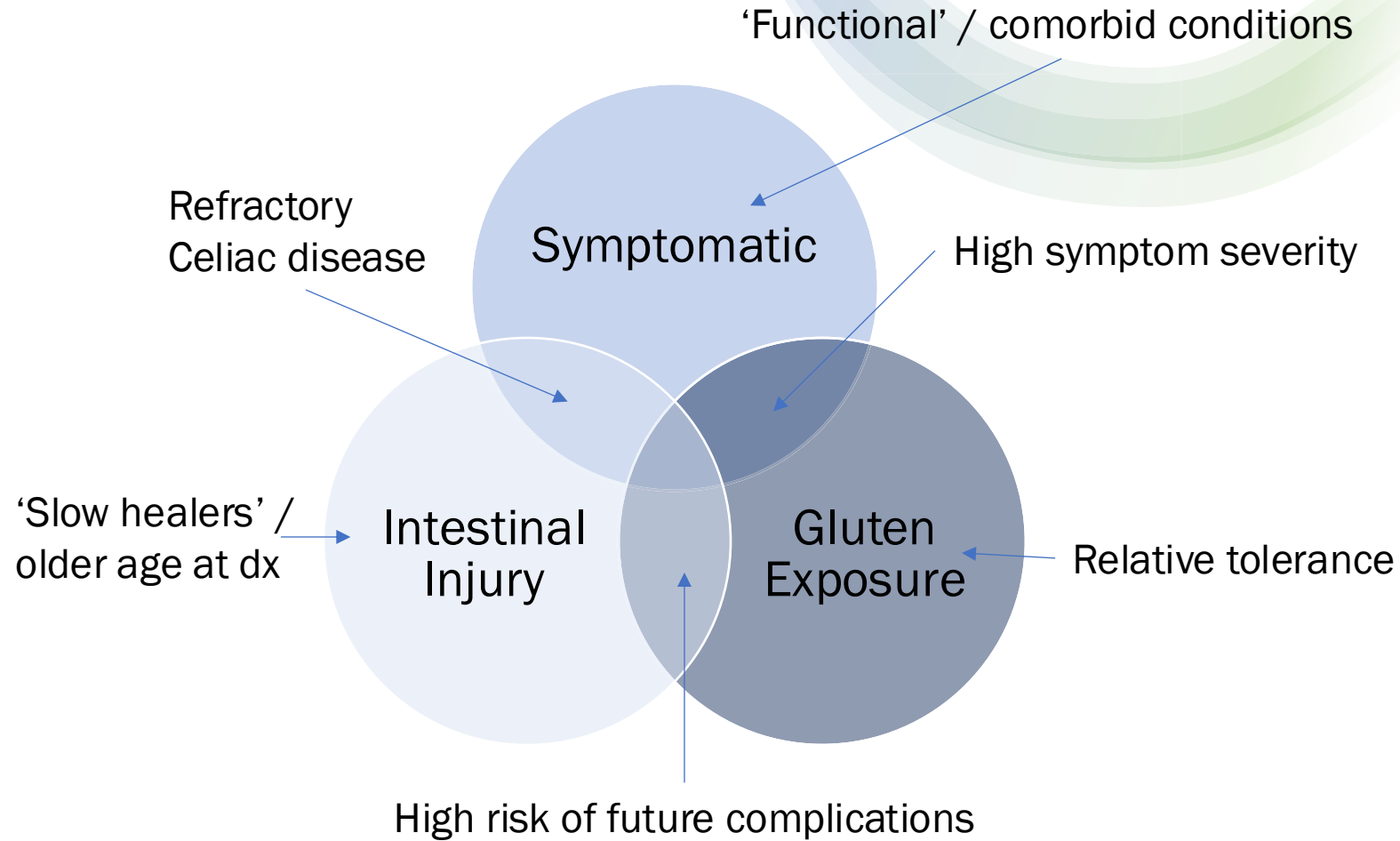
One Size Does Not Fit All

Celiac disease is highly heterogeneous

- How strict does each patient really need to be?
- Different patients can have highly variable gluten sensitivity

In clinical trials, 2 patients exposed to the same gluten exposure:

- One can feel well with no damage
- The other can develop severe symptoms after the 1st exposure and induce severe damage





Key Takeaways

- Refer for proper testing prior to recommending a GFD
- There is harm in following a GFD unnecessarily
- Hypervigilance reduces QOL
- Provide guidance on the GFD based on the available evidence
- Cite studies to confidently dispel gluten myths and misinformation
- The GFD should be individualized

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