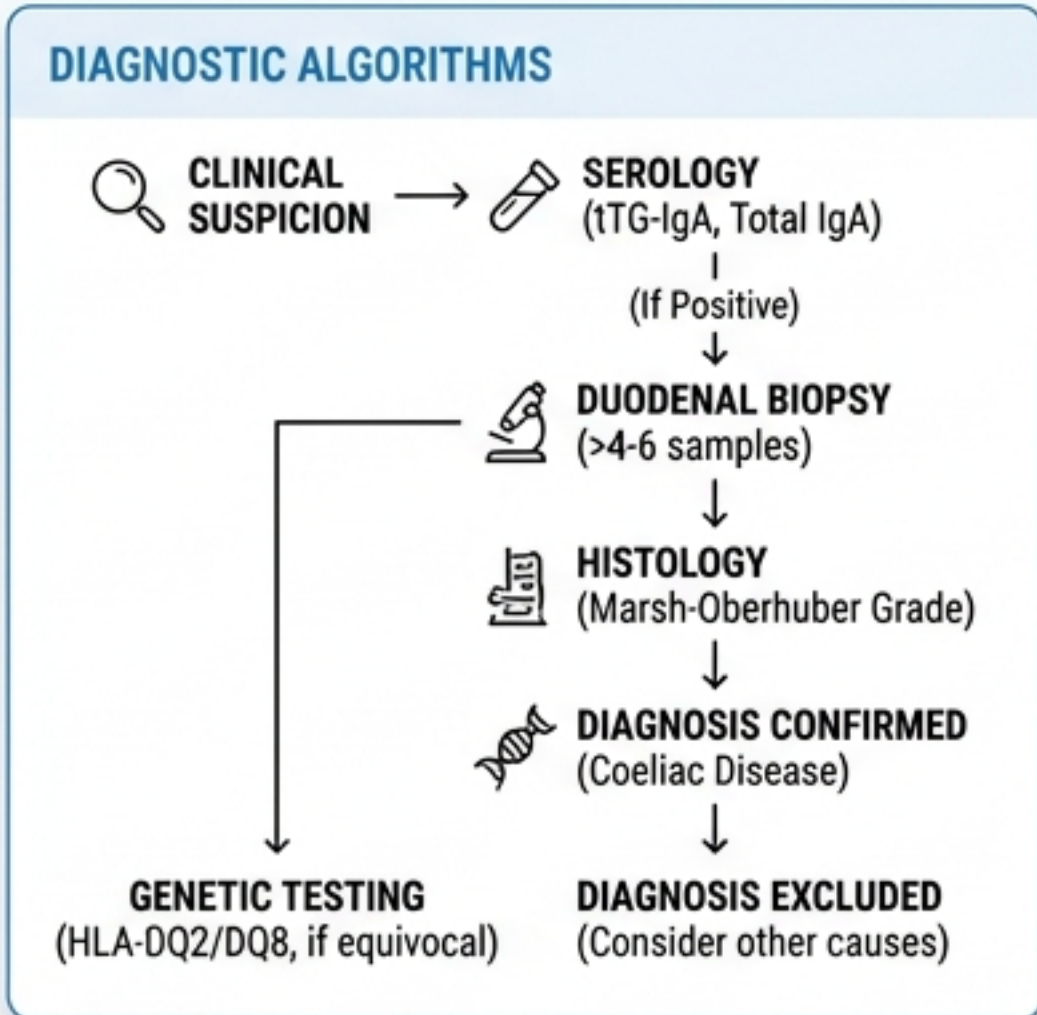


Precision Diagnosis and Management of Coeliac Disease

Clinical Decision Support Interface & Med2Date Guideline Synthesis

DIAGNOSTIC PATHWAYS: ACTIVE



CLINICAL ALERTS: MONITORED

- ### CLINICAL ALERTS
- IRON DEFICIENCY ANEMIA:** Monitor Ferritin. Investigate unexplained iron deficiency, especially in refractory cases. Screen for malabsorption.
 - OSTEOPOROSIS:** DEXA scan recommended at diagnosis. Ensure adequate Vitamin D and Calcium intake. Monitor bone density.
 - AUTOIMMUNE CONDITIONS:** Increased risk for Type 1 Diabetes, Autoimmune Thyroid Disease, Sjogren's Syndrome. Symptom-guided screening.
 - REFRACTORY COELIAC DISEASE:** Consider if symptoms persist after 6-12 months strict GFD. Investigate for other causes, consider repeat biopsy, and refer to specialist.

LONG-TERM MANAGEMENT: OPERATIONAL

- ### MANAGEMENT & DIETARY PROTOCOLS
- STRICT GLUTEN-FREE DIET (GFD):** Essential treatment. Eliminate wheat, barley, rye. Educate on cross-contamination and hidden sources.
 - NUTRITIONAL SUPPORT:** Screen for deficiencies: Iron, Folate, Vitamin B12, Vitamin D, Zinc. Supplement as indicated.
 - DIETETIC CONSULTATION:** Mandatory at diagnosis and for ongoing support. Personalized meal plans, education, and symptom management.
 - LONG-TERM MONITORING:** Regular follow-up (e.g., annual). Serology to assess GFD adherence (tTG-IgA). Monitor symptoms, growth, and associated conditions.

Target Audience: Australian Primary Care, Gastroenterology & Dietetics

80% OF AUSTRALIAN CASES REMAIN SUBMERGED IN A 6–13 YEAR DIAGNOSTIC DELAY.

THE DIAGNOSED

Prevalence: ~1 in 70 Australians (~1.4%)

Ratio: Diagnosed to undiagnosed sits roughly at 1:5 to 1:8.

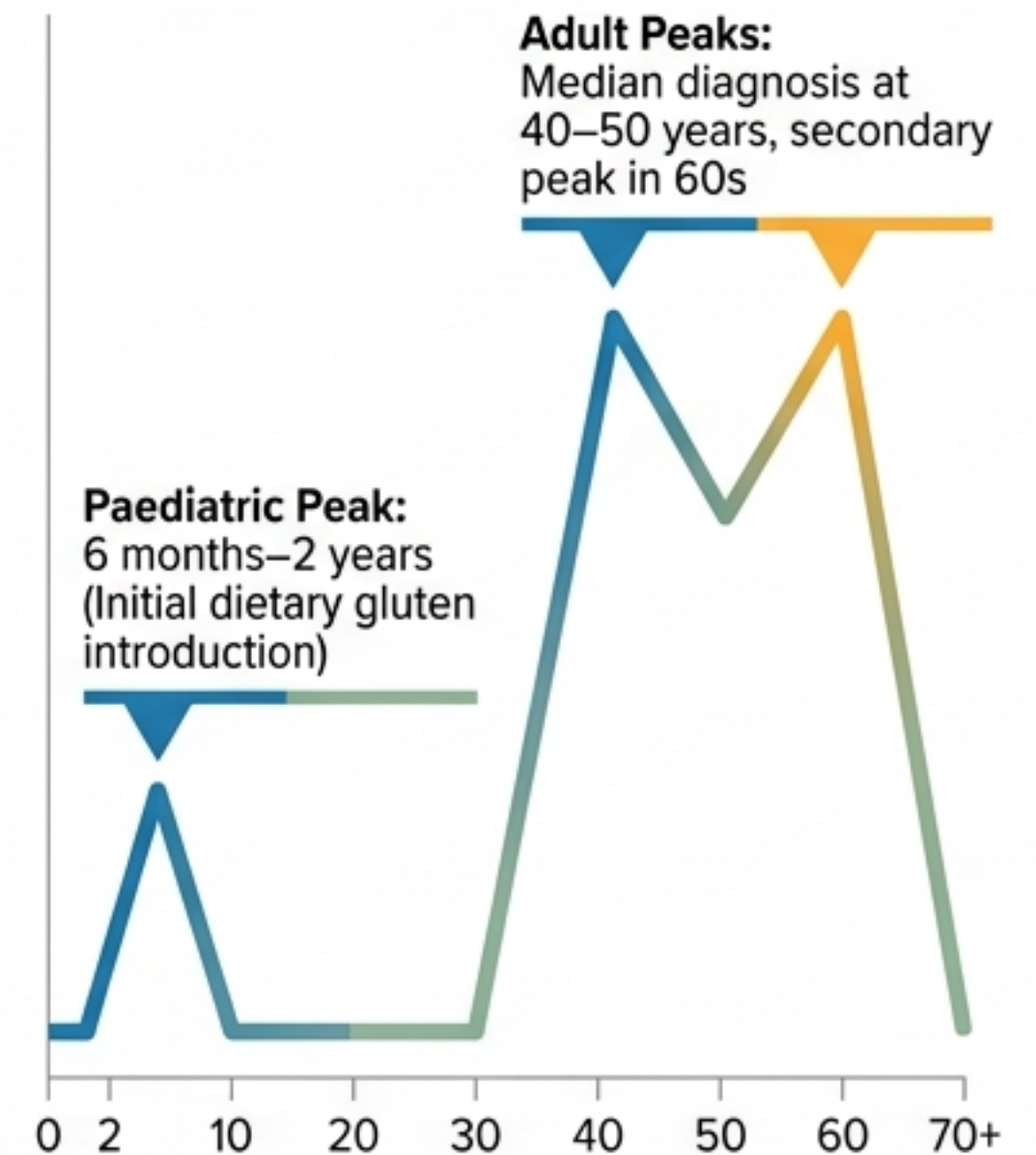
THE UNDIAGNOSED

Diagnostic Delay: Average 6–13 years from symptom onset.

Misdiagnosis Trap: Many patients carry an incorrect Irritable Bowel Syndrome (IBS) label prior to true diagnosis.



THE DEMOGRAPHIC CURVE





DIAGNOSTIC VALIDITY REQUIRES ONGOING GLUTEN EXPOSURE. **DO NOT INITIATE A GLUTEN-FREE DIET (GFD) BEFORE TESTING.**

THE CLINICAL RULE



CONDITION:
Patient must consume **≥2 g gluten/day**.



DURATION:
For a minimum of **≥6 weeks** prior to both serology and biopsy.



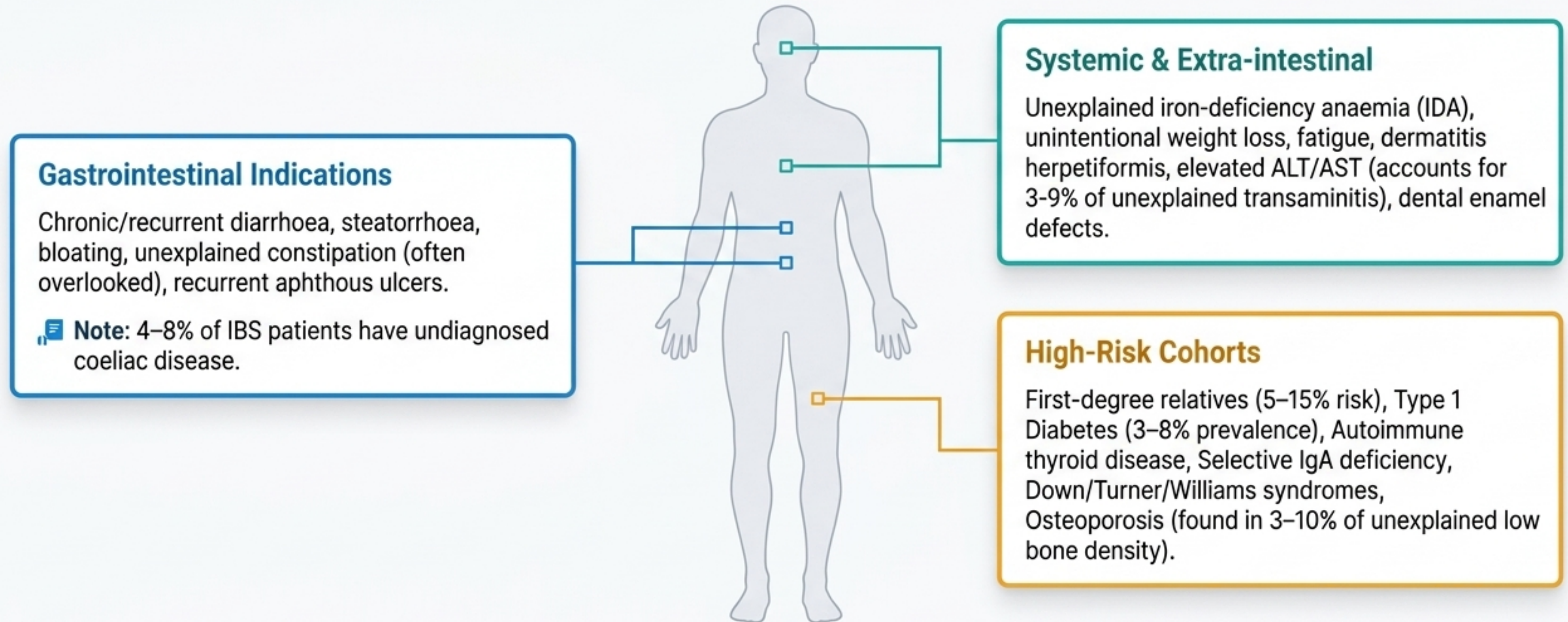
PRACTICAL EQUIVALENT:
≈4 slices of standard wheat bread daily.


CONSEQUENCE OF PREMATURE GFD



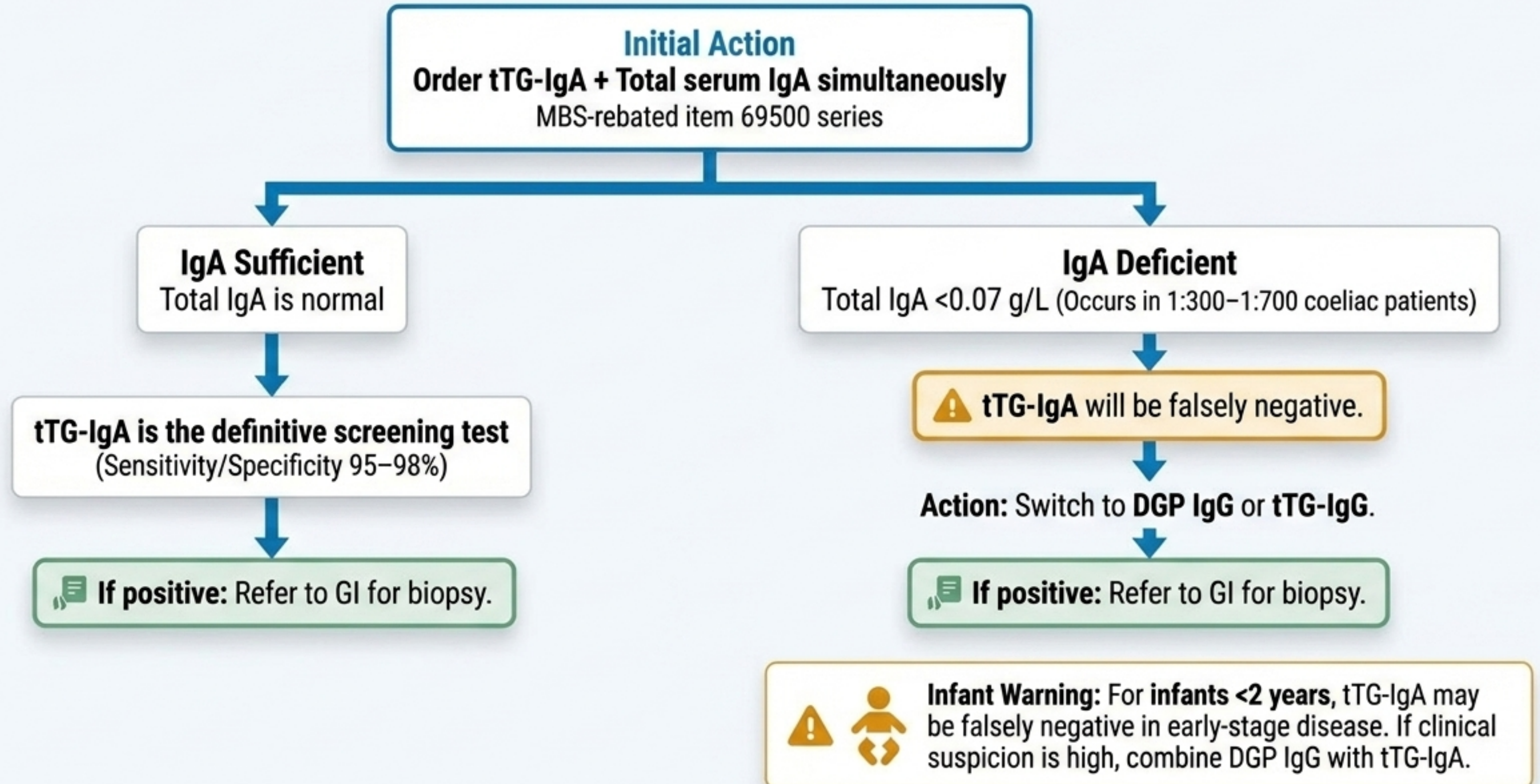
Initiating a GFD prior to testing yields **false-negative serology and histology**, completely breaking the diagnostic pathway and potentially delaying true diagnosis by years. If self-initiated, a **supervised gluten challenge** is strictly required before testing.

Broadening the threshold for opportunistic case-finding.



Protocol: Routine population screening is NOT recommended. Targeted case-finding in these symptomatic/high-risk groups is strongly endorsed. 

First-line serology depends strictly on Total IgA status.



Resolving diagnostic uncertainty with secondary biomarkers.

Biomarker Arsenal: Two secondary tests for difficult cases.

EMA IgA (Endomysial Antibody)



MECHANISM

Immunofluorescence-based; highly operator-dependent.



UTILITY

Used as a confirmatory second-line test.



PERFORMANCE

Boasts **near 100% specificity**. Highly valuable when tTG-IgA is only weakly positive.

HLA-DQ2 / DQ8 Genotyping



MECHANISM

Genetic susceptibility testing (MBS-rebated).



UTILITY

Diagnostic exclusion.



PERFORMANCE

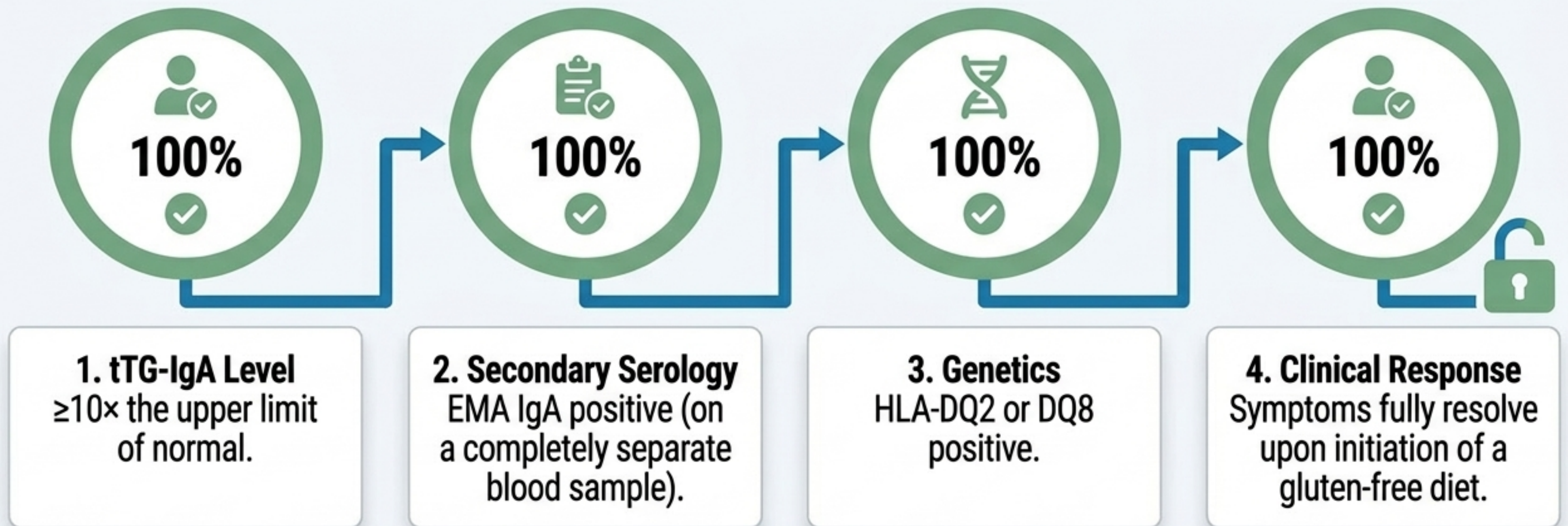
High negative predictive value (~99%). A negative result **effectively rules out** coeliac disease. Used when histology and serology are discordant.



Clinical Absolute: Never exclude coeliac disease on a single negative serology if symptoms are compelling. Consider EMA IgA, repeat testing in 3–6 months, or proceed directly to biopsy.

The Paediatric Bypass: ESPGHAN 2020 non-biopsy criteria.

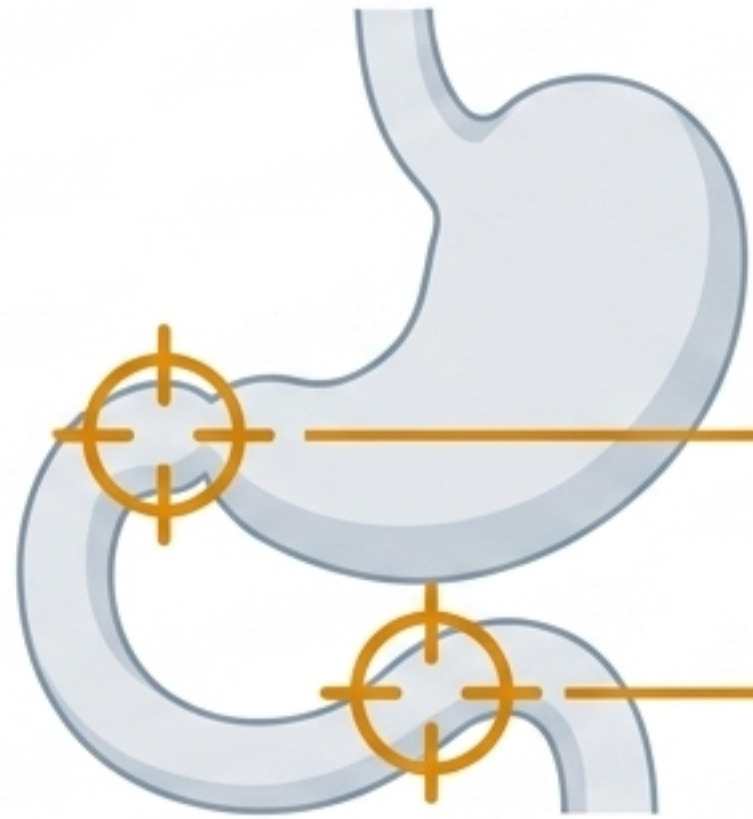
In symptomatic children, Australian paediatric practice increasingly adopts the ESPGHAN criteria to allow a biopsy-free diagnosis, provided ALL four conditions are strictly met.



Action: Confirmation by a paediatric gastroenterologist is still recommended even when criteria are met.

Endoscopic confirmation requires precise anatomical targeting.

The Sampling Protocol: Upper GI endoscopy remains the gold standard in Australia. Villous atrophy can be patchy, and bulbar disease may be the sole site of involvement.



Target 1

≥2 biopsies from the duodenal bulb.

Target 2

≥2 biopsies from the distal descending (2nd part) duodenum.

Processing Requirements

Specimens must be oriented on filter paper and sent in formalin. CD3 immunohistochemistry is recommended for quantifying intraepithelial lymphocytes (IELs).

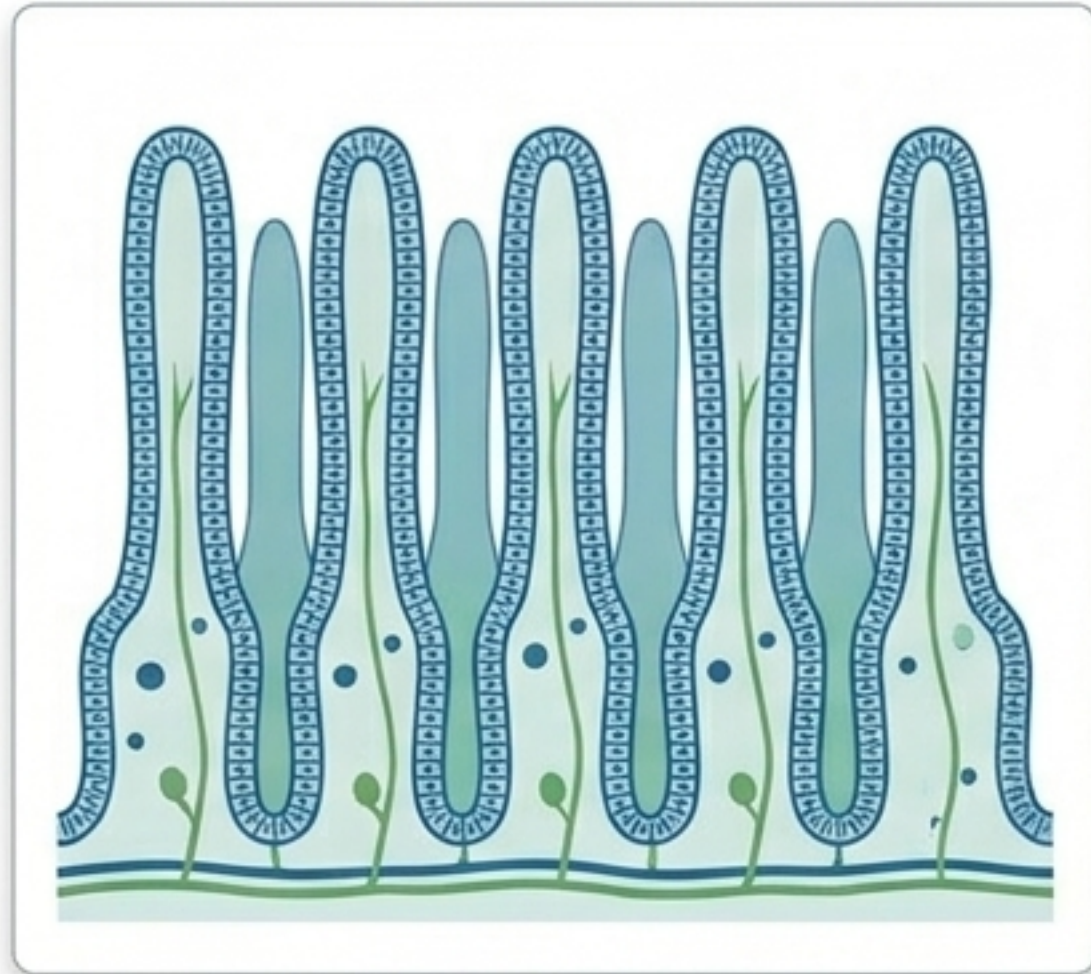
Total Biopsies:

Minimum ≥4 total.



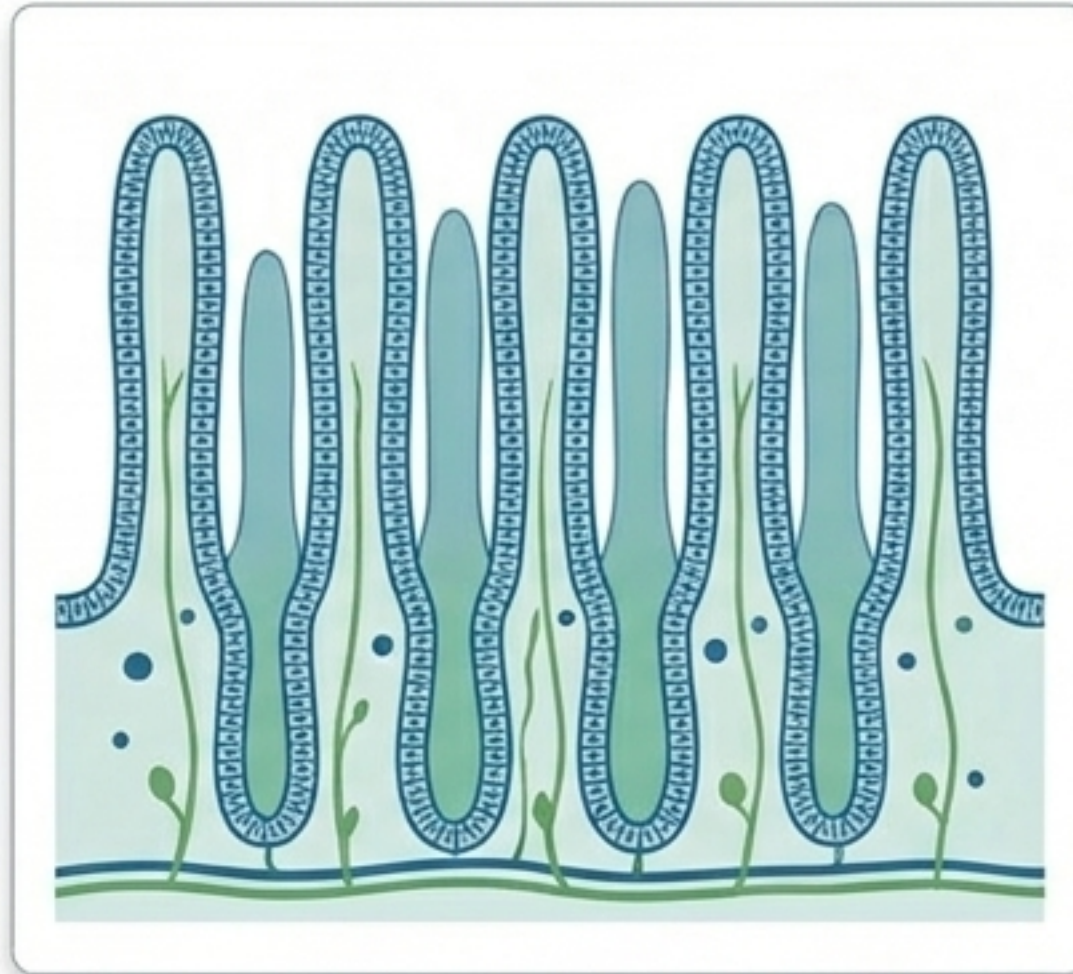
Clinical Reminder: Ongoing gluten intake strictly required up to the day of endoscopy.

The Marsh Classification: Quantifying mucosal damage.



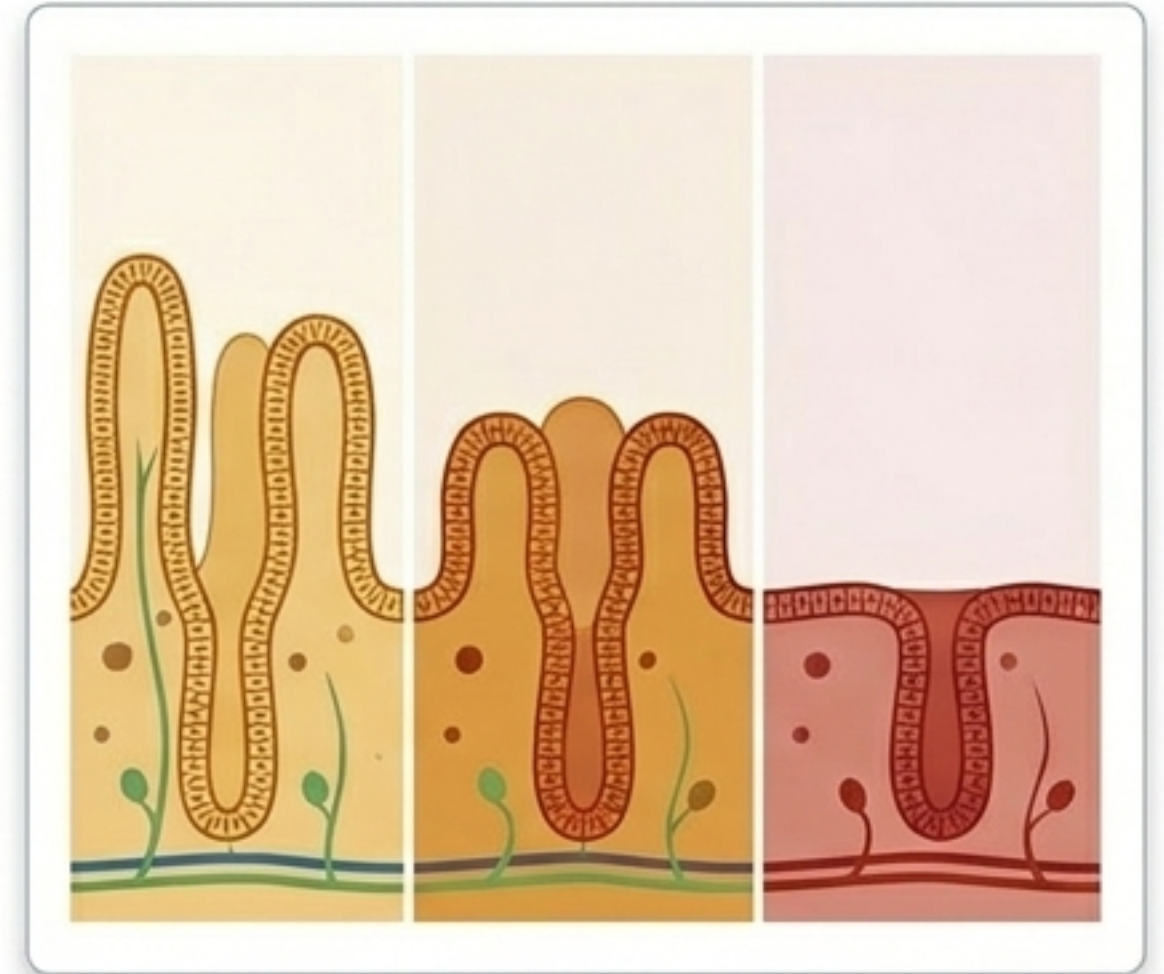
STAGE 1: NORMAL TO INFILTRATIVE

Marsh 0/1: Normal architecture, but increased IELs ($\geq 25/100$ enterocytes) in Marsh 1. Non-specific (could be *H. pylori*, NSAIDs).



STAGE 2: HYPERPLASTIC

Marsh 2: Infiltrative-hyperplastic. Consistent with coeliac when combined with serology.

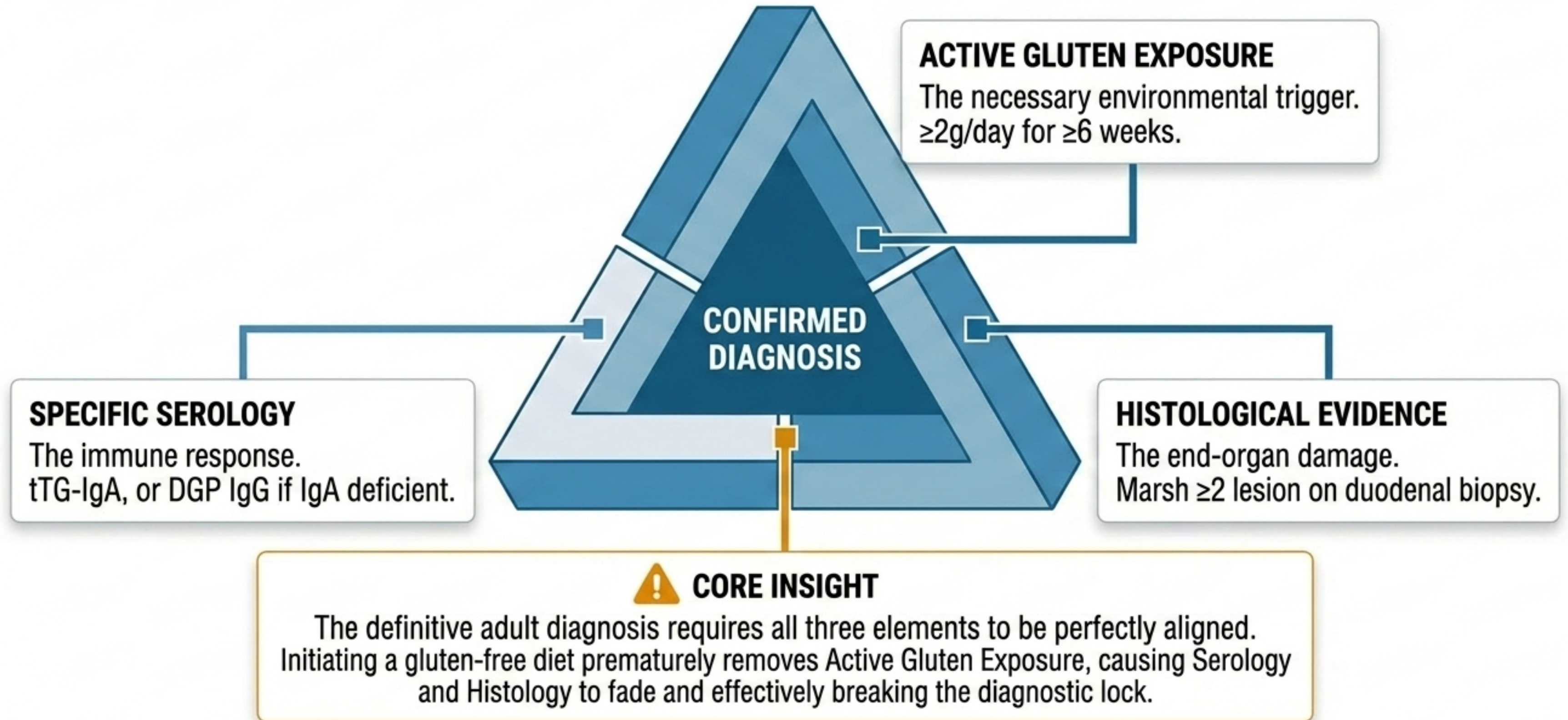


STAGE 3: ATROPHIC (DIAGNOSTIC LESIONS)

Marsh 3a: Mild partial villous atrophy.
Marsh 3b: Subtotal villous atrophy.
Marsh 3c: Total villous atrophy (completely flat mucosa). Diagnostic and severe.

Synthesis: The Diagnostic Triangle for Coeliac Disease.

A structured framework for confirming the diagnosis in adults.



Strict lifelong elimination: The only effective management.

Dietary Management Matrix

ELIMINATE



Wheat, barley, rye, spelt, kamut, triticale.

Crucial Note: Standard oats are excluded in Australia due to high cross-contamination risk.

SAFE GRAINS



Rice, corn (maize), potato, quinoa, buckwheat, millet, sorghum, amaranth, tapioca.

HIDDEN SOURCES



Soy sauce (use tamari), beer, stock cubes, processed meats, starch excipients in some medications, communion wafers.

Allied Health Module

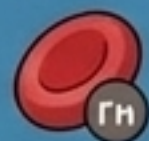


Dietitian Referral is Essential. All newly diagnosed patients require Accredited Practising Dietitian (APD) review. MBS-rebated under GP Management Plan (GPMP) and Team Care Arrangement (TCA) – up to 5 visits per calendar year.

Correcting baseline malabsorption deficits.

Targeted protocols for addressing nutritional deficiencies in newly diagnosed patients.


IRON REPLACEMENT



FERROUS SULPHATE

Dose: 325 mg PO daily–BD.

Target: Ferritin >30 $\mu\text{g/L}$ and normalized Hb.

 **Note:** Iron deficiency may persist for 3–6 months despite a strict GFD.


VITAMIN D3



CHOLECALCIFEROL

Loading: 3,000–5,000 IU PO daily for 6–8 weeks if severely deficient (<25 nmol/L).

Maintenance: 1,000–2,000 IU PO daily.

 **Note:** Highly prevalent deficiency in Australian coeliac patients.


CALCIUM



CALCIUM CARBONATE

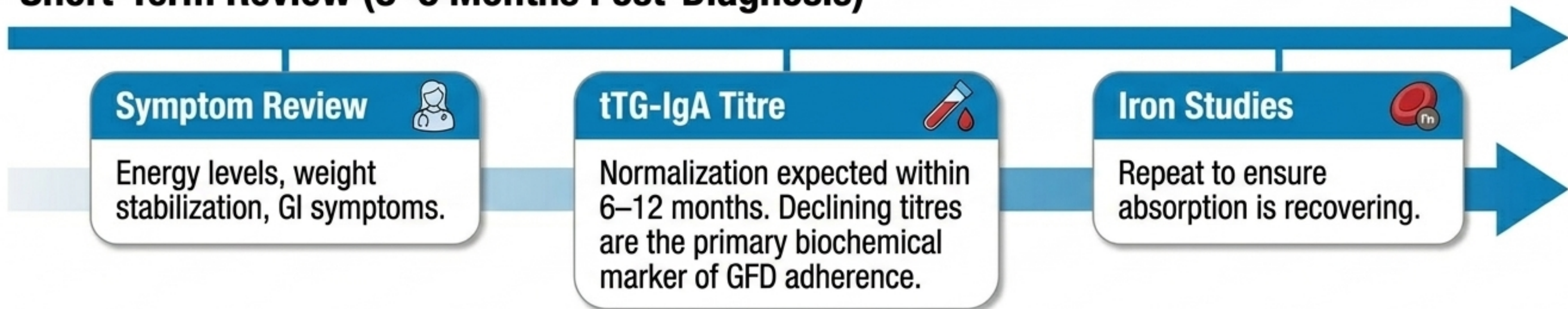
Dose: 500–600 mg elemental PO BD (with food).

Dietary Target: 500–1,300 mg/day depending on age.

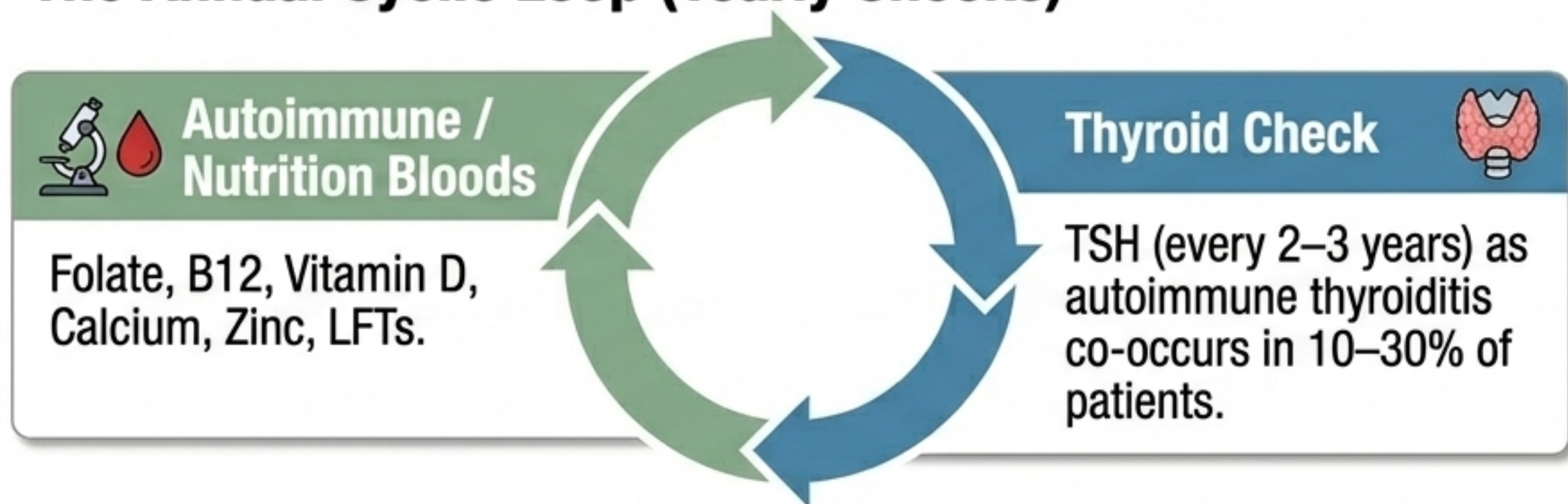
 **Note:** Prioritize dietary intake over OTC supplements where possible.

The Long-Term Surveillance Dashboard.

Short-Term Review (3–6 Months Post-Diagnosis)



The Annual Cyclic Loop (Yearly Checks)



Structural Marker Panel



DEXA (Bone Mineral Density) Scan.

- Mandatory at adult baseline (40-50% have osteoporosis/osteopenia at diagnosis).
- Repeat at 2 years if initially abnormal.


Investigating GFD non-response and Refractory Disease

Trigger: Up to 30% of patients experience persistent symptoms at 6–12 months on a GFD.

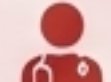

Step 1: The Most Common Culprits (Filter Out)

-  1. **Inadvertent gluten exposure** (requires APD dietary review).
-  2. **Overlapping GI conditions:** IBS, SIBO, Microscopic Colitis, Lactose Intolerance.

Step 2: True Refractory Coeliac Disease (RCD)

 **Definition:** Persistent symptoms and villous atrophy despite strict GFD for ≥ 12 months.

Step 3: Specialist Escalation

-  Requires urgent gastroenterology referral for repeat biopsy, HLA typing, and CT/PET imaging.
-  **Clinical Risk:** RCD carries a significantly increased risk of **Enteropathy-Associated T-cell Lymphoma (EATL)**. Requires T-cell clonality testing (TCR gene rearrangement).

Adapting management for specific clinical populations



PREGNANCY

High risk of miscarriage/IUGR if uncontrolled.

Serology is unreliable due to immunomodulation (defer testing to post-partum).

Ensure optimal folate (500 µg to 5 mg/day).



ELDERLY

Often present atypically (fractures, anaemia, cognitive decline rather than GI).

High risk of severe nutritional deficit.

Adherence complicated in residential aged care.



RENAL IMPAIRMENT

Risk of **hyperkalaemia** due to potassium-rich rice-based GFD alternatives.

Use **calcitriol** (active Vit D) instead of cholecalciferol in advanced CKD.

Watch for associated **IgA nephropathy**.



HEPATIC IMPAIRMENT

Associated with **autoimmune hepatitis** and **PBC**.

Screen with **autoantibodies** if LFTs remain elevated after GFD adherence.

THE CLINICAL MASKING EFFECT



Chronic diarrhoea and iron deficiency anaemia (IDA) are common in remote communities due to multiple causes (infections, nutrition).



Coeliac disease exists but is often masked and under-diagnosed.

CULTURAL & PRACTICAL SOLUTIONS



BUSH TUCKER: Traditional foods (kangaroo, wattleseed, native fruits) are naturally gluten-free and culturally safe to promote.



OPPORTUNISTIC SCREENING: Integrate coeliac screening into the annual MBS Item 715 health check for unexplained IDA or growth faltering.

GEOGRAPHIC & SYSTEMIC BARRIERS



DIAGNOSTIC ACCESS: Endoscopy is rare in remote areas. Rely on telehealth and Specialist Outreach programs.



THE FOOD DESERT EFFECT: GF foods are expensive and scarce in remote community stores. NT Nutrition Subsidy Scheme does not explicitly cover GF items.

CLINICAL QUICK-REFERENCE SUMMARY

SCREEN



PREREQUISITE

Patient on ≥ 2 g
gluten/day for 6 weeks



FIRST LINE

tTG-IgA + Total IgA



IF IGA DEFICIENT

DGP IgG

CONFIRM



ADULTS

Endoscopy + ≥ 4
biopsies.
Target Marsh ≥ 2



PAEDIATRICS

Consider ESPGHAN
criteria (tTG-IgA ≥ 10 x
ULN, +EMA, +HLA) to
avoid biopsy

MANAGE & MONITOR



ACTION

Strict lifelong GFD +
Dietitian referral
(GPMP/TCA)



ANNUAL REVIEW

tTG-IgA (declining
titres = adherence),
Iron, B12, Folate, Vit D



BASELINE SCAN

DEXA for bone health
at diagnosis