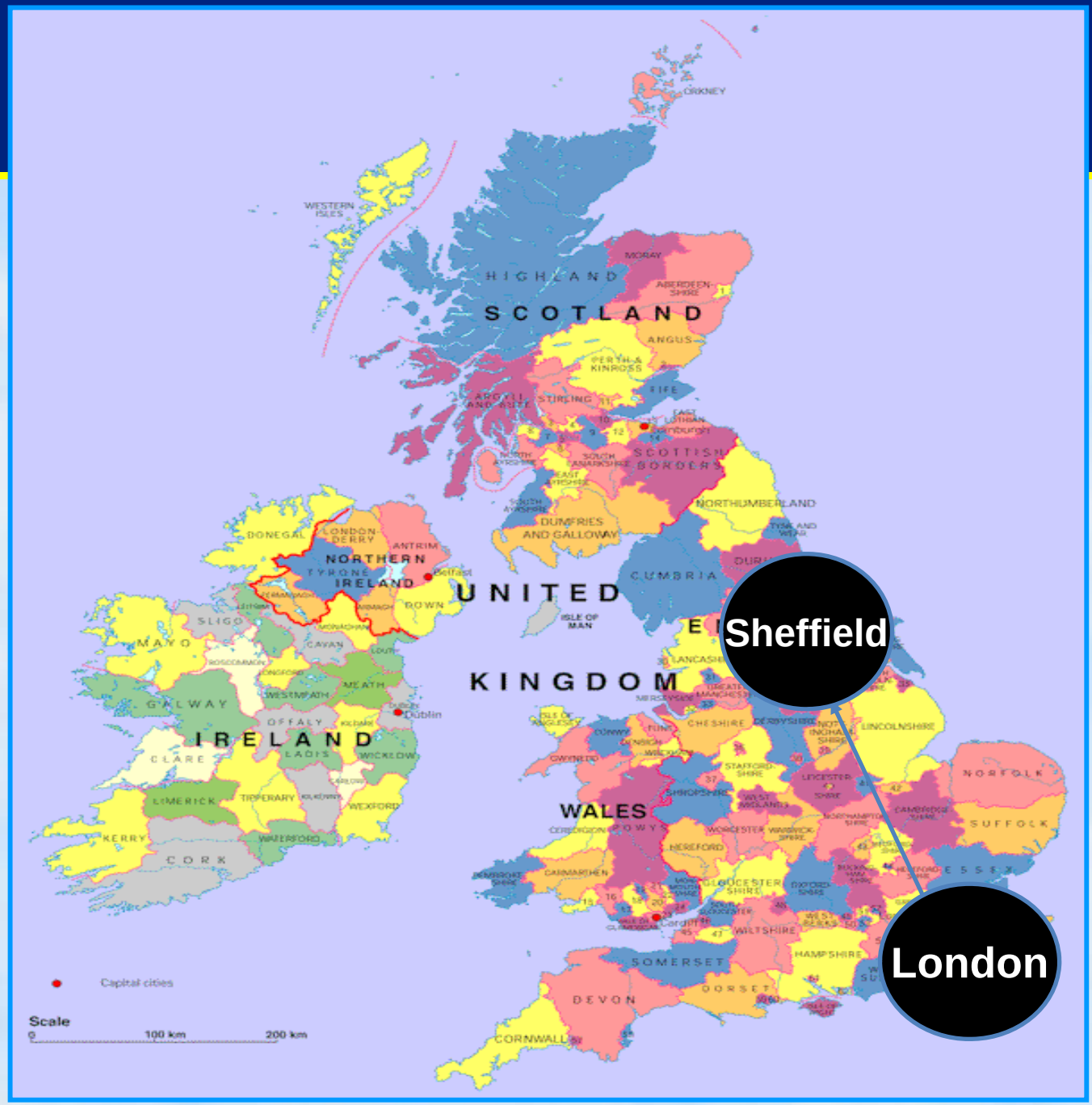
# Optimal diagnosis and treatment of coeliac disease

## March 2015

**Professor David S Sanders**
**Consultant Gastroenterologist**
**Royal Hallamshire Hospital & University of Sheffield**

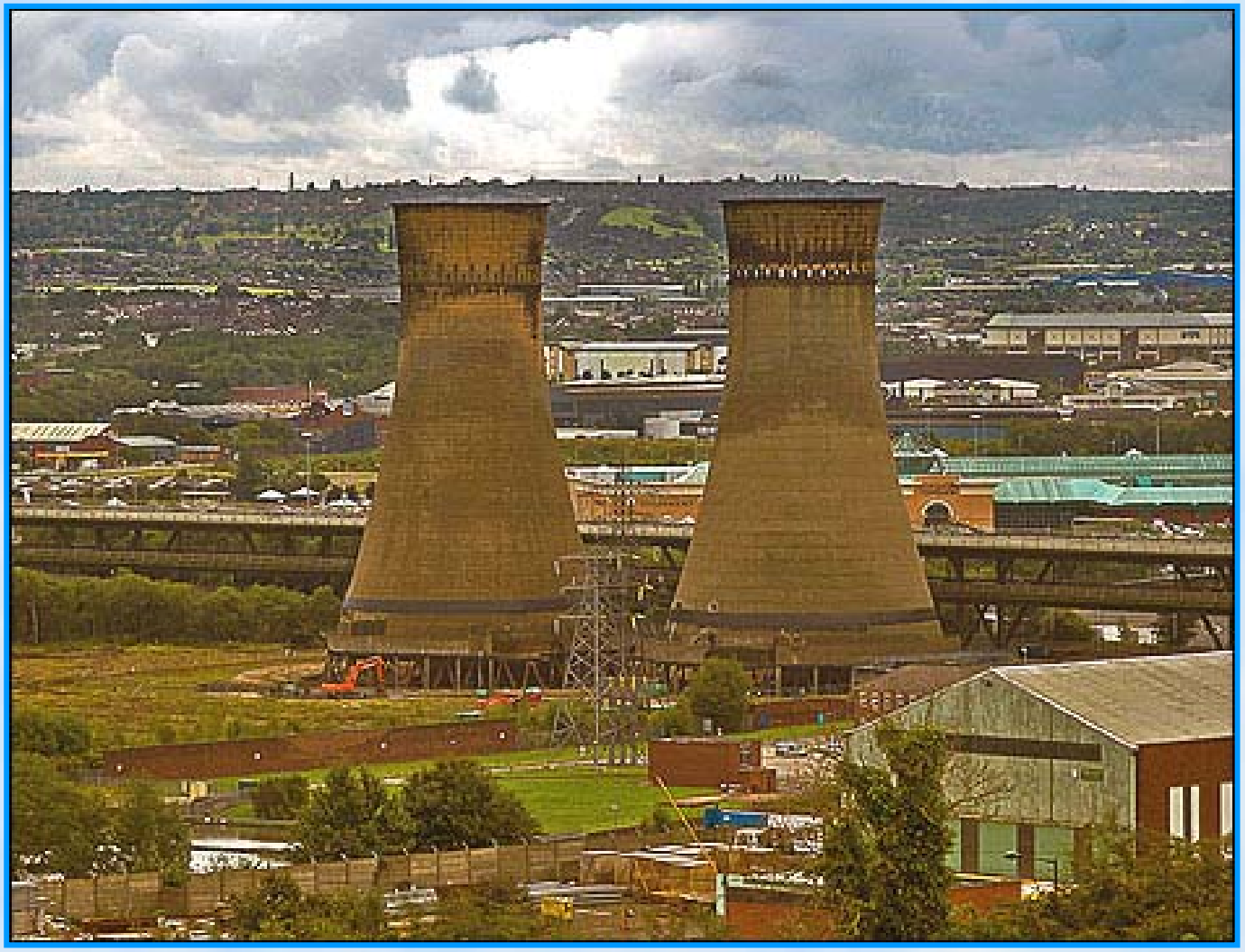
The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust



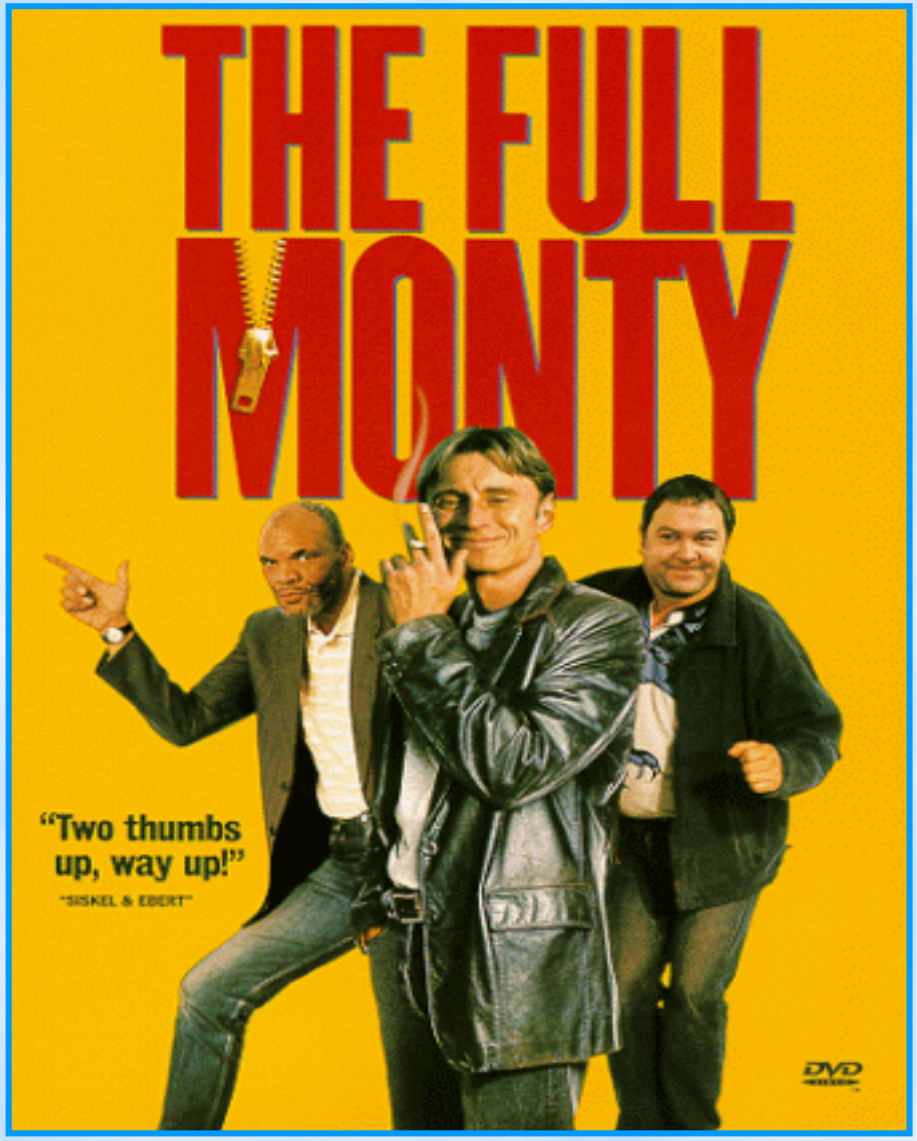
The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust



The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust



The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust

The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust

- Population >6-700,000
- 4th largest city in the UK
- Largest student population
- Cinemas and sport!
- Greenest city in England

The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust


# Jessica Ennis
# Gold Medal in Heptathlon

The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust

The University Of Sheffield.

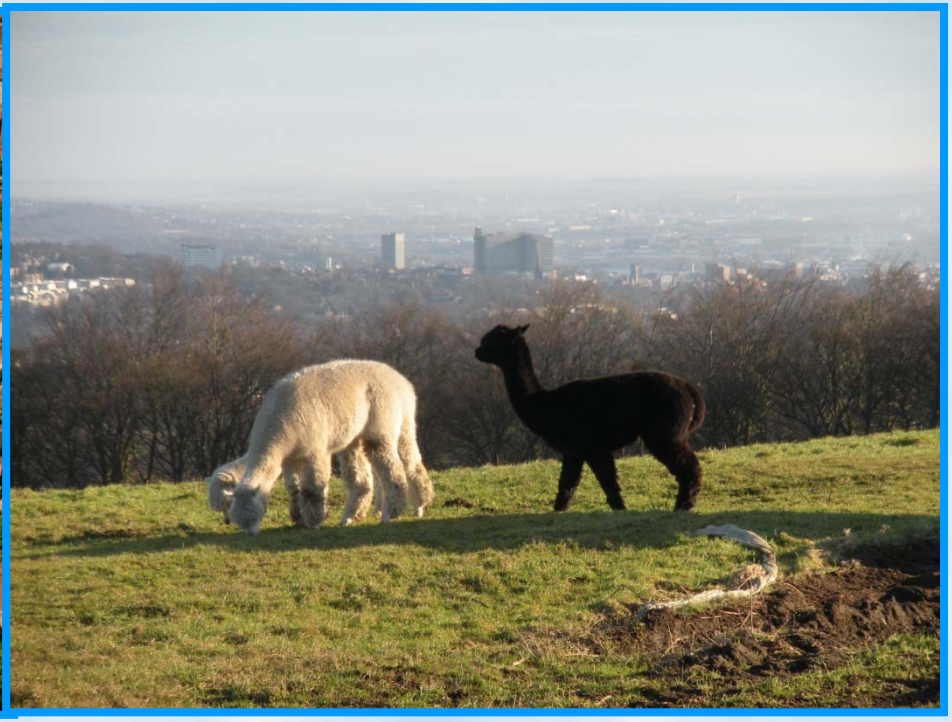
Sheffield Teaching Hospitals NHS
NHS Foundation Trust

The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust

The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust



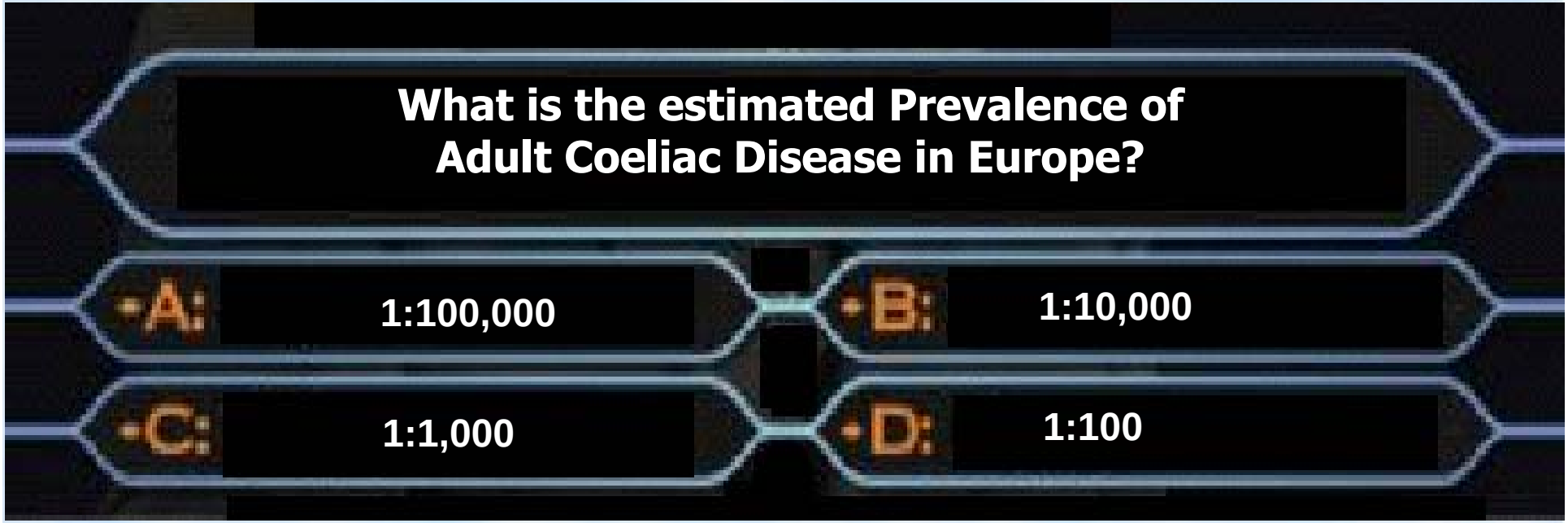
# Questions or misconceptions????!

## Part 1:

- Coeliac Disease is uncommon?
- I don’t really see coeliac disease
- When I see coeliac disease it is at Endoscopy
- What is the point of diagnosing Coeliac Disease?

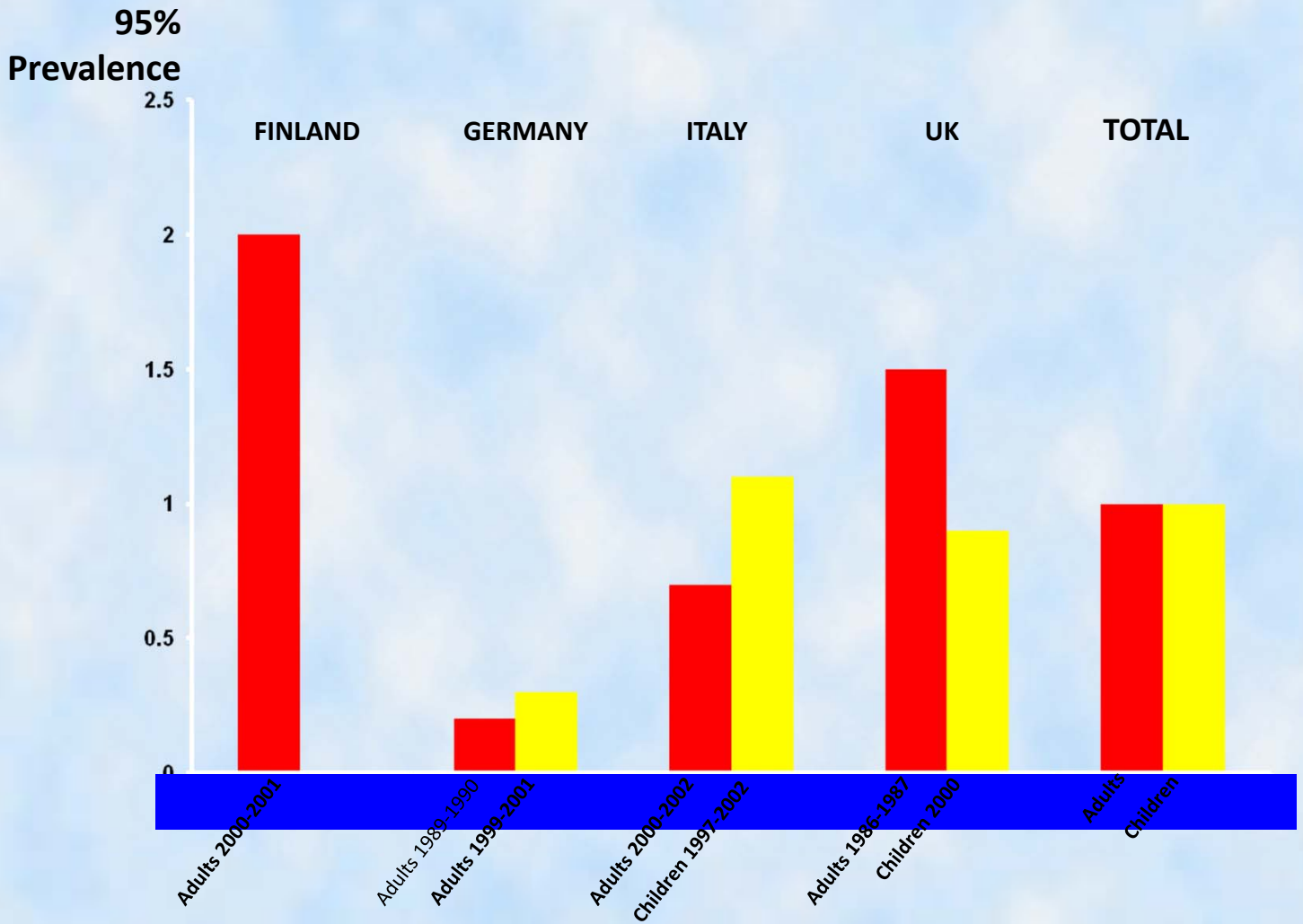
## Part 2:

- What is NCGS?

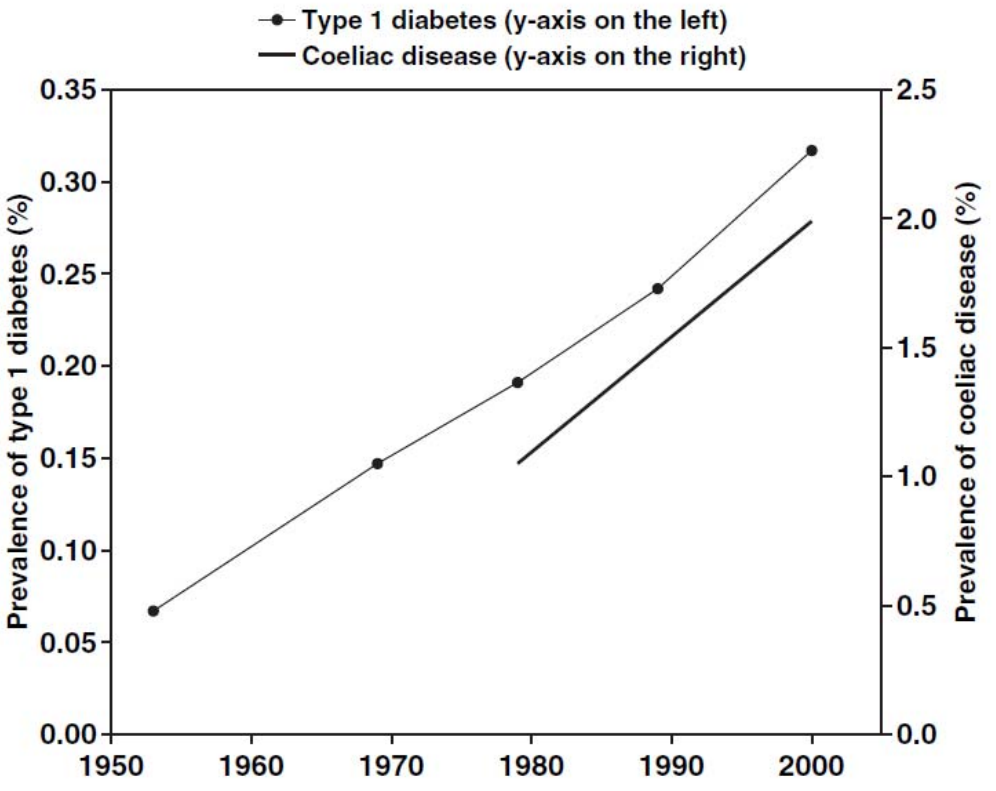

What is the estimated Prevalence of Adult Coeliac Disease in Europe?
A: 1:100,000
B: 1:10,000
C: 1:1,000
D: 1:100

# The prevalence of celiac disease in Europe: Results of a centralised, international mass screening project =1%!

Mustalahti K. *et al Annals of Medicine* 2010; 42: 587-595



# Why is the prevalence increasing?




Lohi S et al *Aliment Pharmacol Ther* 2007;26(9):1217-25

Rubio-Tapia A et al *Gastroenterology* 2009;137(1):88-93

Catassi C et al *Ann Med* 2010;42(7):530-8

Online Submissions: wjg.wjgnet.com
wjg@wjgnet.com
doi:10.3748/wjg.15.6028

*World J Gastroenterol* 2009 December 28; 15(48): 6028-6033
*World Journal of Gastroenterology* ISSN 1007-9327


*EDITORIAL*

**Indian task force for celiac disease: Current status**

Rajesh Gupta, Duvvuru Nageshwar Reddy, Govind K Makharia, Ajit Sood, Balakrishnan S Ramakrishna, Surender Kumar Yachha, Babu Ram Thapa, Rupa Banerjee, Sekaran Anuradha, Usha Dutta, Amarender Singh Puri, Ajay Kumar Jain, Chris JJ Mulder, Ajay Kumar, Sesikeran Boindala

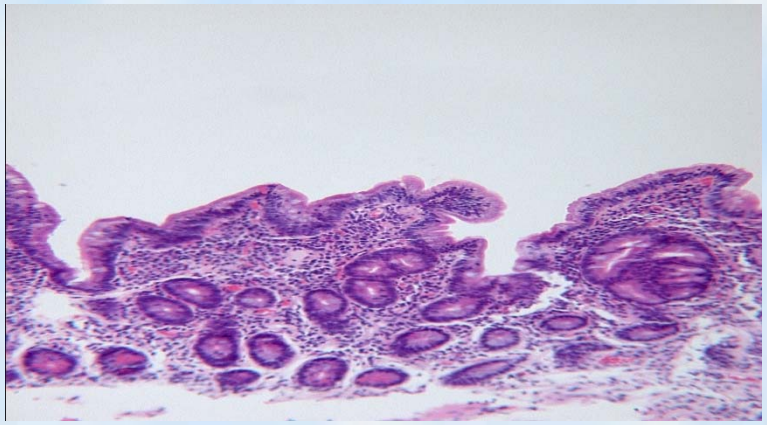
Coeliac disease: emerging in China?

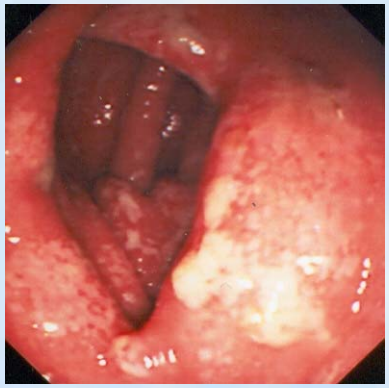
Wu J et al *Gut* 2010;59(3):418-9

# Coeliac Disease affects ~ 1% of the adult population


- The commonest age for presentation is between the 4th to 6th Decade
- For every paediatric case diagnosed there are 9 adult cases
- **Coeliac disease affects 1% of the adult population!**
- For every adult case diagnosed there are 7 cases still not recognised
- People with undiagnosed adult coeliac disease generally have a normal BMI and may even be overweight

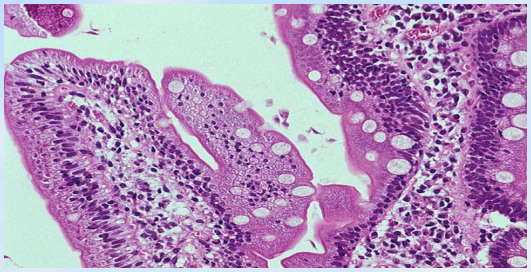
# What would you do with this case?





- 25 year old girl presents with abdominal pain and diarrhoea
- Weak positive EMA
- Symptoms don't respond on a GFD and losing weight after 6/52

# Antibody negative coeliac disease accounts for 5-10% of all cases – but beware antibody negative villous atrophy



- Review the clinical case with a completely open mind
- Ask for histological review
- Inferred evidence: family history, HLA pattern, functional hyposplenism, previous antibody status

O'Mahony S et al *Aliment Pharmacol Ther* 1996;10:671-80

Evans KE et al *Proc Nutr Soc* 2009;68(3):242-8

| |
|---|
| **Tropical sprue** |
| **Allergies to proteins other than gluten (cow's milk/soya)** |
| **Autoimmune enteropathy** |
| **Collagenous'sprue** |
| **Common variable immunodeficiency/AIDS** |
| **Drug-induced/radiation enteritis** |
| **Hypogammaglobulinaemic sprue** |
| **Ischaemia** |
| **Inflammatory bowel disease** |
| **Kwashiorkor** |
| **Helminth infestation/Giardia** |
| **Whipple's/Tuberculosis** |
| **Zollinger-Ellison syndrome** |

# Recognising coeliac disease in your gastroenterology clinics

- Dyspepsia/Reflux

Bardella MT et al *Arch Intern Med* 2000;160:1489-91

- Endoscopy

Dickey W et al *Am J Gastroenterol* 1999;94:218

- IBS

Sanders DS et al *Lancet* 200

Sanders DS *Gastroent*

- NSAP (

inal pain)

San

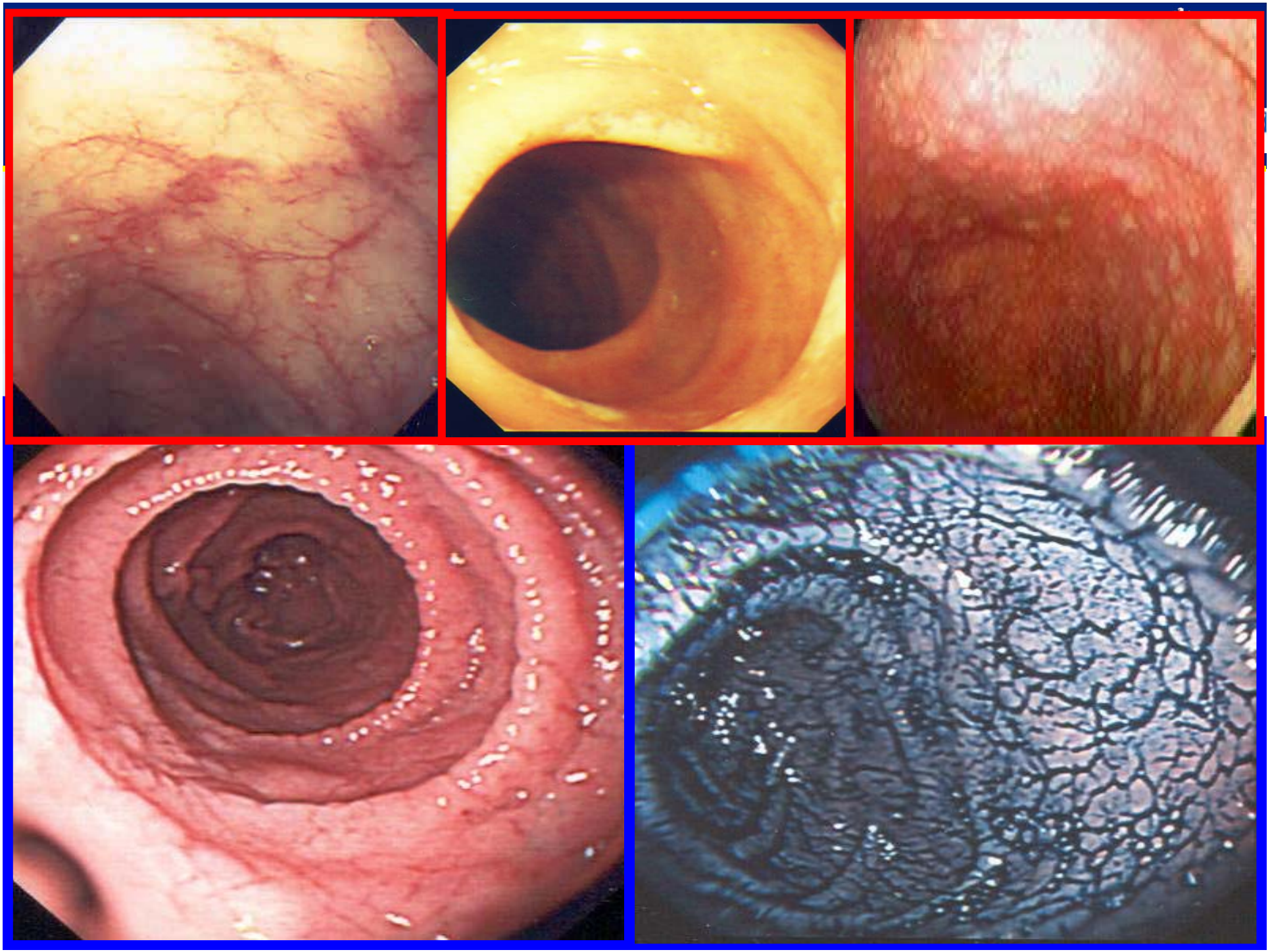
42:201-7

- , Vitamin B12 and Folate)
- history (1st degree relative) ~ 10% risk

**coeliac disease = VA in the presence of EMA or TTG positive!**

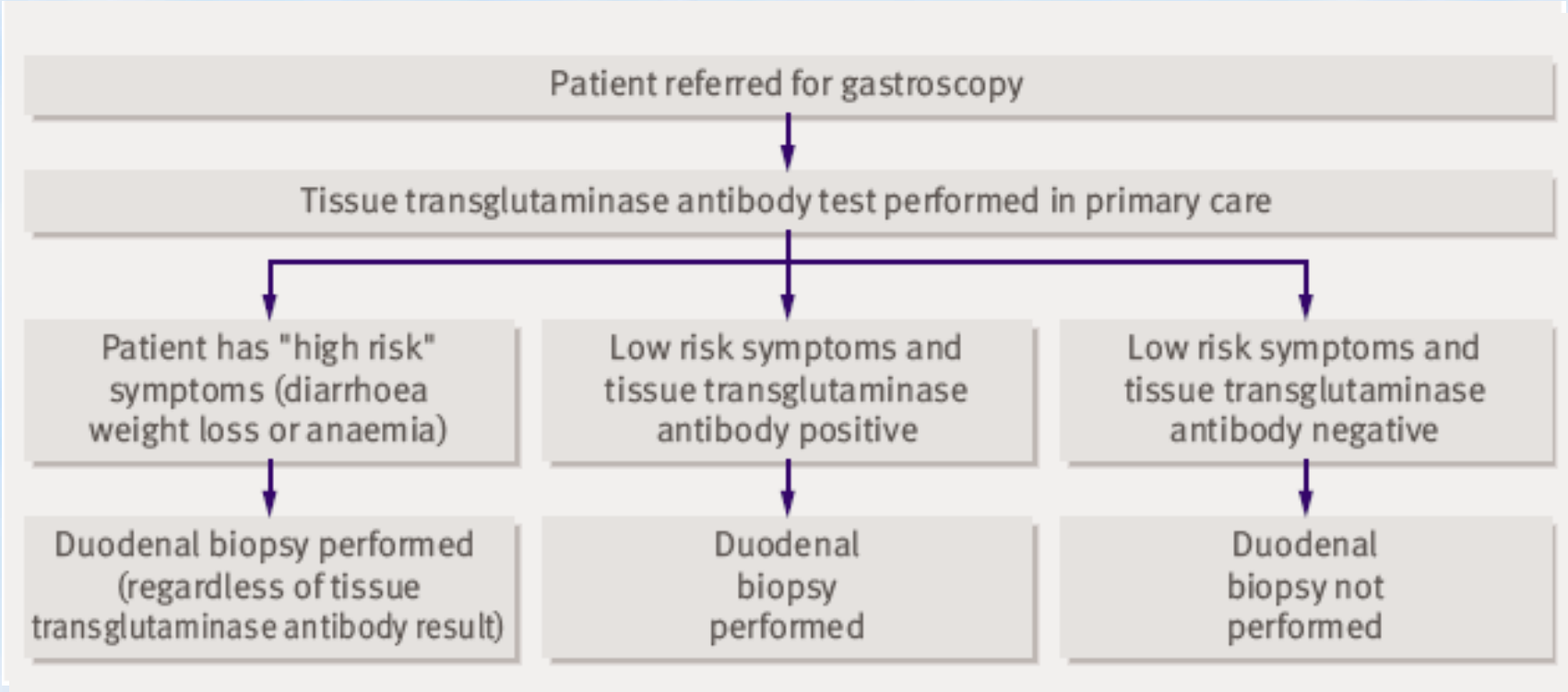
- 1 in 33 patients (n=129/4089) in clinic

Mooney PD et al *Dig Dis Liv* 2014;46:32-5



# Who needs a duodenal biopsy?

- Retrospective analysis TTG negative coeliac patients all presented to endoscopy with symptoms of anaemia, diarrhoea or weight loss
- Prospective analysis




Hopper AD, et al. *BMJ*. 2007 7;334(7596):729-33.

# Who needs a duodenal biopsy?

- No symptoms of anaemia, diarrhoea or weight loss & negative TTG =100% NPV. ie: no biopsy
- Pre-endoscopy serological testing and biopsy of “high risk” cases has a 100% sensitivity
- All patients referred for gastroscopy with high risk symptoms should be biopsied irrespective of their antibody profile
- Previous series 2002: 13.6% of CD patients at diagnosis have had a previous OGD without duodenal biopsy

Hopper AD, et al. *BMJ* 2007 7;334(7596):729-33. .

# What's New! Point of Care Testing

# Point of Care Testing: Head to Head data

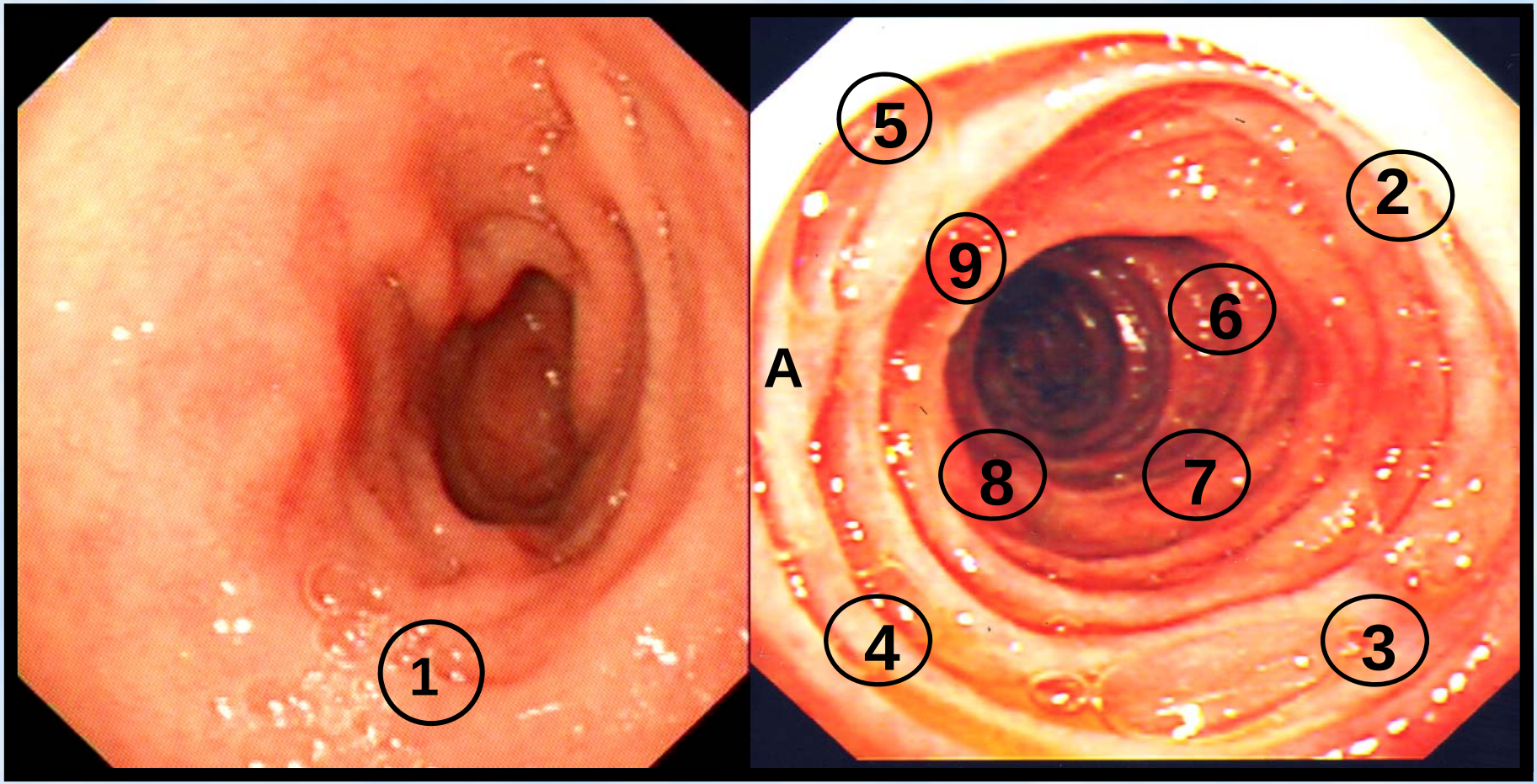
| Test | Sensitivity (%) | Specificity (%) | PPV (%) | NPV (%) |
|---|---|---|---|---|
| Serum tTG | 97 (81-99) | 41 (19-67) | 74 (58-86) | 88 (47-99) |
| Biocard | 63 (44-79) | 76 (50-92) | 83 (60-94) | 54 (33-74) |
| Coeliac Quick Test | 80 (61-92) | 59 (33-81) | 77 (58-90) | 63 (36-84) |
| Simtomax | 93 (76 -99) | 35 (15-61) | 72 (55-84) | 75 (36-96) |

In-press Clin Gastro Hep 2015

# Pitfalls in Biopsy

## 4 biopsies fron second part of duodenum and a further 5th biopsy from the duodenal bulb

Hopper AD et al *Endoscopy* 2008;40:219-24.



The University Of Sheffield.

# Cost effective?

- Cost of separate D1 specimen £30
- Cost of separate D1 biopsy for 100 patients
  - 100 x 30=£3000

- Cost of gastroscopy £450
- Cost of gastroscopy for 9/100 new coeliac patients with villous atrophy in the bulb only
  - 9 x 450=£4050

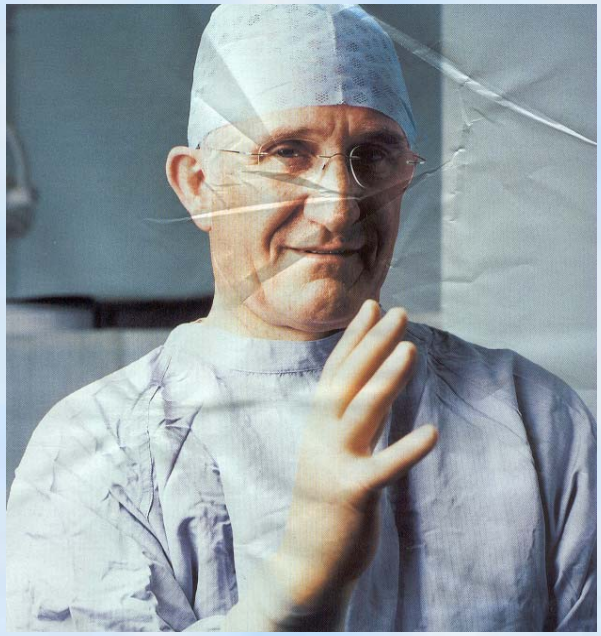
Think of the patient-diagnostic delay, inconvenience, repeated invasive testing

Evans KE et al *Am J Gastro* 2012

# Are we adhering to biopsy guidelines?

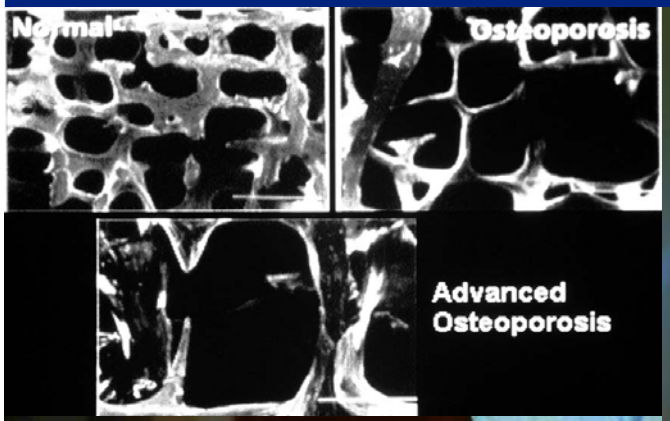
- N=1423
- 12.4% new patients with coeliac disease had a previous gastroscopy within 5 years and no duodenal biopsy taken
- Adherence to guidelines 40.2%
- Adherence to guidelines increases diagnostic yield from 4.6 to 10.1% (p<0.0001)
- Taking single bites per pass of biopsy forceps increases median biopsy rate from 3 to 4 (p=0.03)

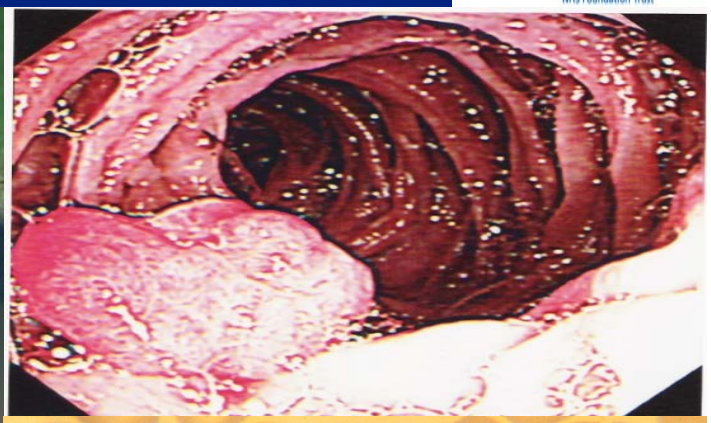
Mooney PD et al *Gut* suppl 2014

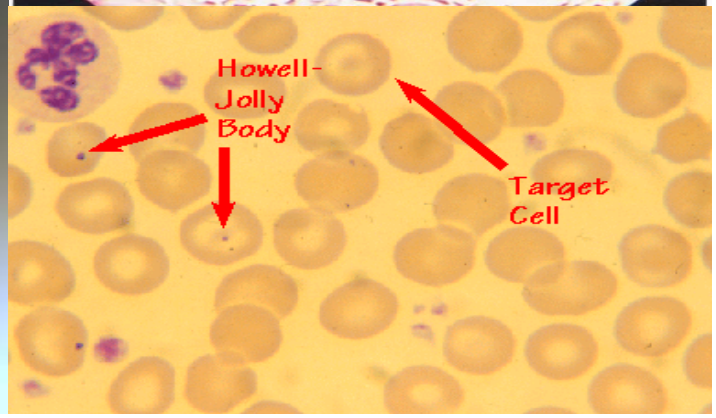


- Nurse endoscopists
  - Median biopsies = 4
  - Guideline adherence 51.2%
  - Diagnostic yield 6.7%
- Physicians
  - Median biopsies = 3
  - Guideline adherence 41.8%
  - Diagnostic yield 7.1%
- Surgeons
  - **Median biopsies = 2 (fewest p<0.0001)**
  - **Guideline adherence 18.2% (p<0.0001)**
  - Diagnostic yield 3.0%

# Why Bother Treating Coeliac Disease?!!
## 'the gluten-free diet is such a hassle'






Prevalence of Thyroid Disorders in Untreated Adult Celiac Disease Patients and Effect of Gluten Withdrawal: An Italian Multicenter Study

C. Sategna-Guidetti, M.D., Ph.D., U. Volta, M.D., C. Ciacci, M.D., P. Usai, A. Carlino, L. De Franceschi, M.D., A. Camera, M.D., A. Pelli, M.D., Ph.D., and C. Brossa, Ph.D.
*University of Torino, Torino; University of Bologna, Bologna; University of Napoli, Napoli; University of Cagliari, Cagliari; and University of Perugia, Perugia, Italy*

Causes of Death in People With Celiac Disease Spanning the Pre- and Post-Serology Era: A Population-Based Cohort Study From Derby, UK

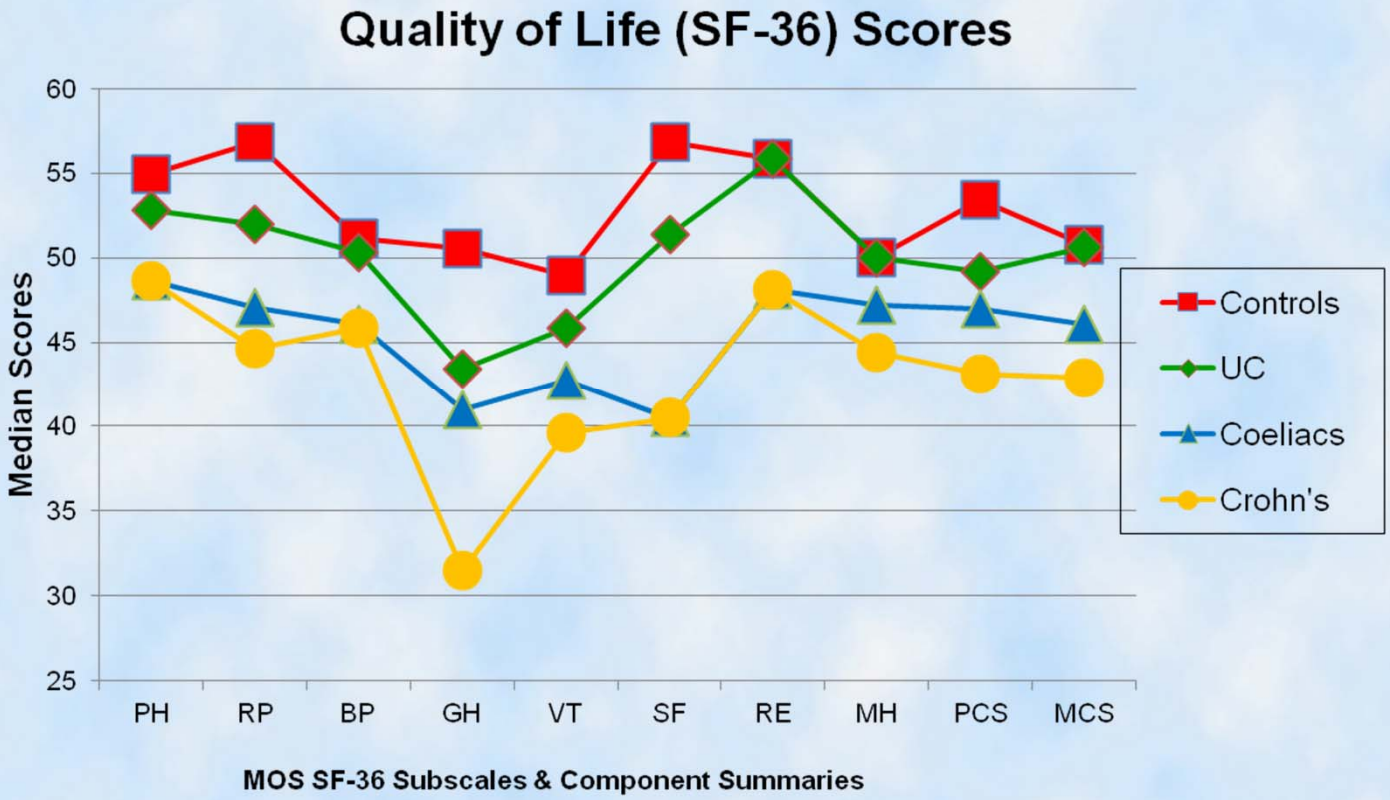
Matthew J. Grainge, PhD[1], Joe West, PhD, MRCP[1,2], Timothy R. Card, PhD, MRCP[1-3] and Geoffrey K.T. Holmes, MD, PhD, FRCP[4]

# Costs per 100,000 population- 'testing is cost effective from a QUALY perspective'

| Recommendations with significant incremental costs | Incremental costs (£ per year) |
|---|---|
| Gastrointestinal specialists | 6,812 |
| Obtaining samples for serological testing | 17,573 |
| Intestinal biopsies | 16,833 |
| Serological testing | 4,504 |
| **Estimated incremental cost of implementation** | **45,722** |

# Quality of life in coeliac disease is comparable to other gastrointestinal diseases

Barratt SM et al *Eur J Gastroenterol Hepatol* 2011

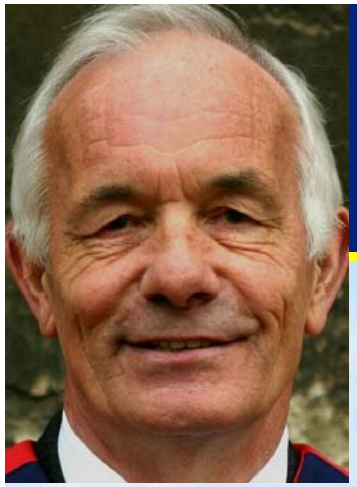


# Conclusion – Part 1

- Coeliac Disease affects 1% of the adult population
- Coeliac Disease is everywhere in our clinical practice, in clinic or out-patients, and at endoscopy
- Duodenal biopsies and bulb biopsies should be taken in patients with positive serology, anaemia, weight loss and diarrhoea
- There is emerging data that supports point of care testing and in particular Simtomax
- What is the point of diagnosing Coeliac Disease? – the patient gets better sometimes after years of being misdiagnosed or unrecognised

# Question: Non-coeliac Gluten Sensitivity or irritable bowel syndrome? How do we as clinicians distinguishing the two?!

**To do this we must first agree on our definition of coeliac disease!**

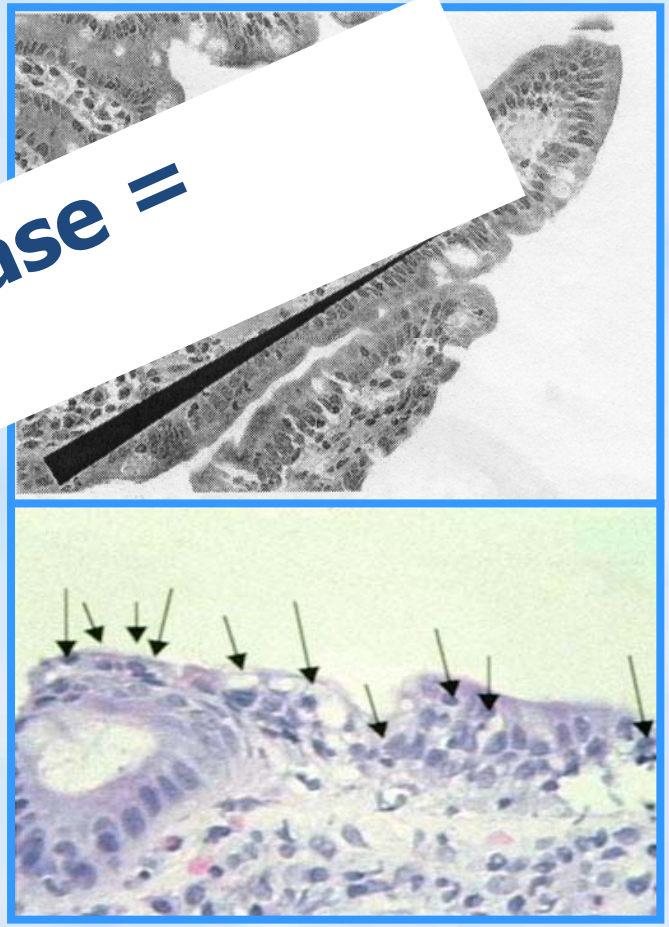



# What is potential coeliac disease?

**Potential**

- The presence of EMA (and perhaps now high levels of TTG?)
- High Intraepithelial Lymphocyte (I… counts
- In uncomplicated c… IEL's express C… suppres… th… …ells …n challenge!

**Potential coeliac disease = gluten sensitivity!**

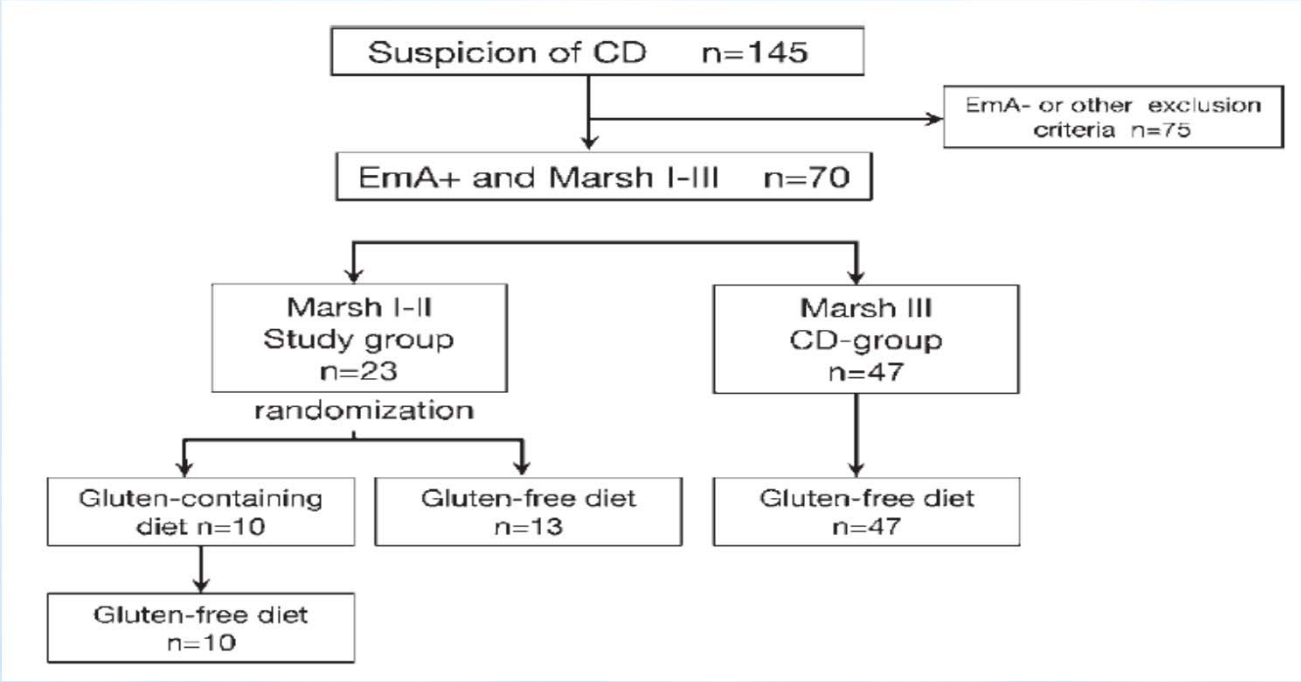


Fer… *Gut* 1993;34:150-1

Tron… R et al *Acta Paediatr Suppl* 1996;412:10-14

# What diagnostic criteria should we be using in 2015? = Should we reclassify mild enteropathy as coeliac disease?

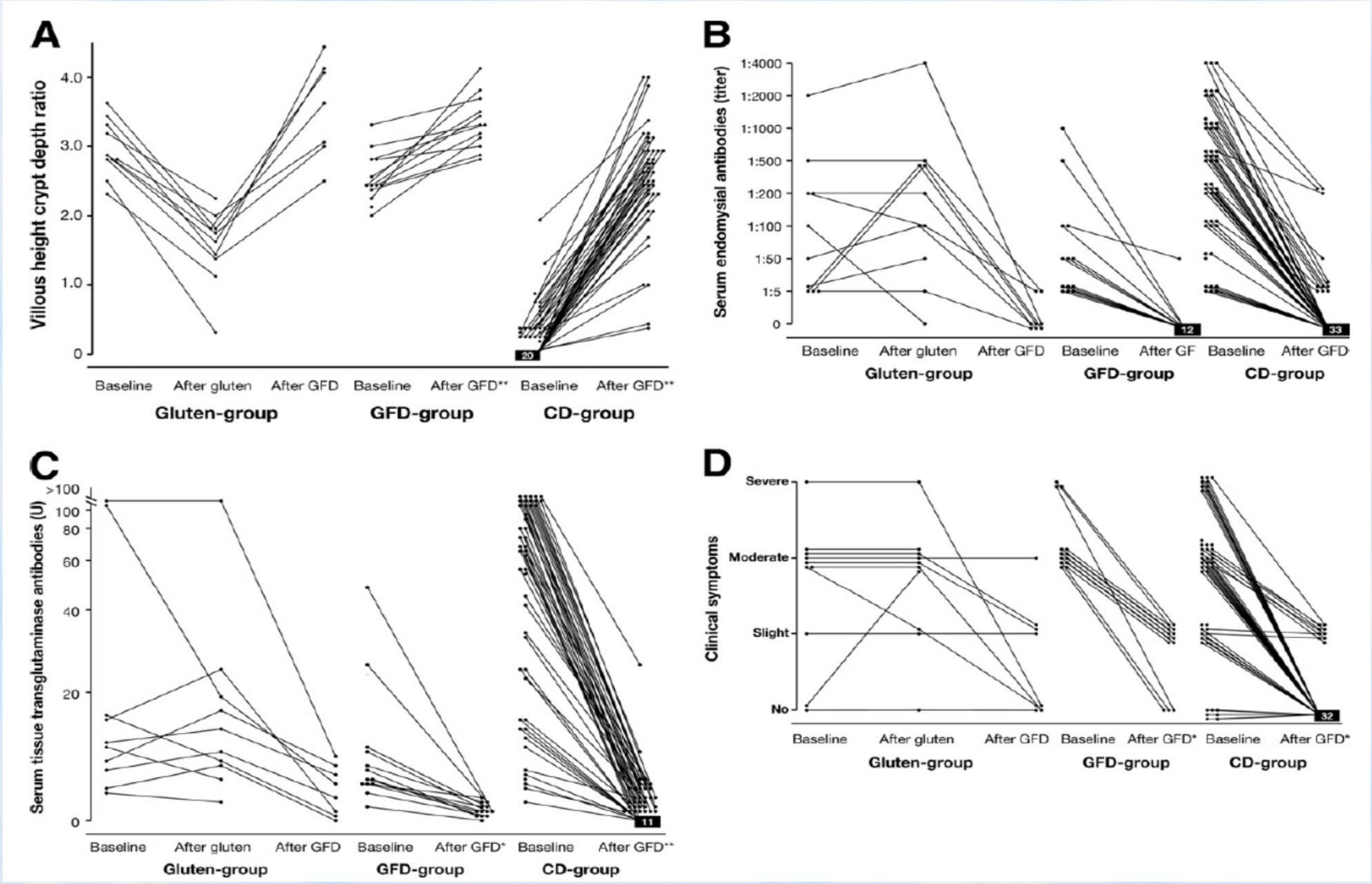
## Marsh 1 with +ve EMA




- Raised IELs with +ve EMA were all HLA +ve in this study

Kaukinen et al. Diagnosing mild enteropathy Coeliac disease: A randomised, controlled clinical study. *Gastroenterology* 2009;136: 816-823

# Marsh 1 with +ve EMA



The University Of Sheffield.

Sheffield Teaching Hospitals NHS
NHS Foundation Trust

# Hype?!

# Health?!

Daily Mail, Tuesday, October 1, 2013

Good Health

Feeling bloated? Always tired? You may be a victim of a hidden epidemic

**How one in ten could be wheat intolerant – but not even know**

THE SUNDAY TIMES thesundaytimes.co.uk/news 28.10.12 9

**Stars' diet is free of gluten but full of fat**

Celebrities claim to lose weight with wheat-free food, but it is often full of calories – and pricy, writes Kathryn Cooper

House price rise gathers pace

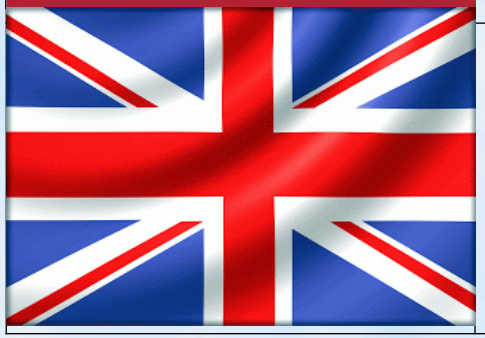
BMJ

15 December 2012 | bmj.com

Hand eczema in healthcare workers
Monoclonal antibodies: why so costly?
What's with personal health budgets?
Managing supraventricular tachycardia
BMJ GROUP AWARDS: VOTE NOW

THE CHALLENGE OF NON-COELIAC GLUTEN SENSITIVITY

# NCGS Prevalence

| Country | Year | Prevalence |
|---|---|---|
|  | 2012 | 5.9% - secondary care referrals |
|  | 2012 | ~4% of NZ children report gluten avoidance |
|  | 2013 | 0.5% - National Health and Nutrition Examination Survey |
|  | 2013 | 13% report symptoms related to gluten population survey but only 3.7% on GFD |

The University Of Sheffield.

# Population survey – 1002 adults, mean age 39 years, female 55%

*Aziz I et al Eur J Gastroenterol & Hepatol Oct 2013*

Sheffield Teaching Hospitals NHS

| Variable | Gluten sensitive n 129 (13%) | Not gluten sensitive n 873 (87%) | P-value |
|---|---|---|---|
| Mean age ± SD | 39.5 ± 17.7 | 39 ± 19.7 | NS |
| Sex | 79% female : 21% male | 51% female : 49% male | <0.0001* |
| White British | 94.6% | 94.8% | NS |
| Anxiety | 21% | 6.8% | <0.0001* |
| Depression | 13% | 6.3% | 0.0093* |
| Chronic fatigue syndrome | 3.1% | 0.9% | 0.0108* |
| Fibromyalgia | 0.8% | 0.3% | NS |
| Rome III criteria for irritable bowel syndrome | 20% | 3.89% | <0.0001* |
| Gastrointestinal cancers | 0.8% | 0.46% | NS |
| Heartburn/reflux | 8.5% | 4.5% | NS |
| Nut allergy | 3.1% | 1.0% | NS |
| Egg allergy | 3.1% | 0.1% | 0.0012* |
| Dairy intolerance | 3.9% | 0.9% | 0.0179* |

3.7% consuming GFD, with doctor-diagnosed CD being 0.8%

# Diagnostic yield in secondary care

- 200 adults with “gluten-related GI symptoms”
- 84% female
- Mean age 39.6 years
- Gluten challenge: CD 7% vs. NCGS 93%
- HLA DQ2/DQ8: CD 100% vs. 53% NCGS P 0.0003

# Comparison between CD and NCGS at baseline diagnosis

| Patient characteristics | Coeliac disease (CD) n 329 | Non-coeliac gluten sensitivity (NCGS) n 186 | P - value |
|---|---|---|---|
| Mean age ± SD | 49.8 ± 15.7 | 39.6 ± 15.2 | < 0.0001* |
| Sex | 71% female : 29% male | 84% female : 16% male | 0.0013* |
| Autoimmune history | 23.1% | 9.7% | 0.0001* |
| Family history of CD | 7.3% | 12.4% | NS 0.058 |
| Anaemia | 25.4% | 3.3% | < 0.0001* |
| Low Ferritin | 48.3% | 16.2% | < 0.0001* |
| Folate deficiency | 29.1% | 7.2% | < 0.0001* |
| Vitamin B12 deficiency | 13.3% | 3.9% | 0.0017* |
| Hypoalbuminaemia | 10.2% | 2.8% | 0.003* |
| Mean BMI ± SD | 23.7 ± 5.45 | 25.8 ± 5.59 | 0.001* |

# Emerging Data Pathophysiology: Non-Coeliac Gluten Sensitivity?

Sapone *et al. BMC Medicine* 2011, **9**:23
http://www.biomedcentral.com/1741-7015/9/23

BMC Medicine

RESEARCH ARTICLE Open Access

## Divergence of gut permeability and mucosal immune gene expression in two gluten-associated conditions: celiac disease and gluten sensitivity

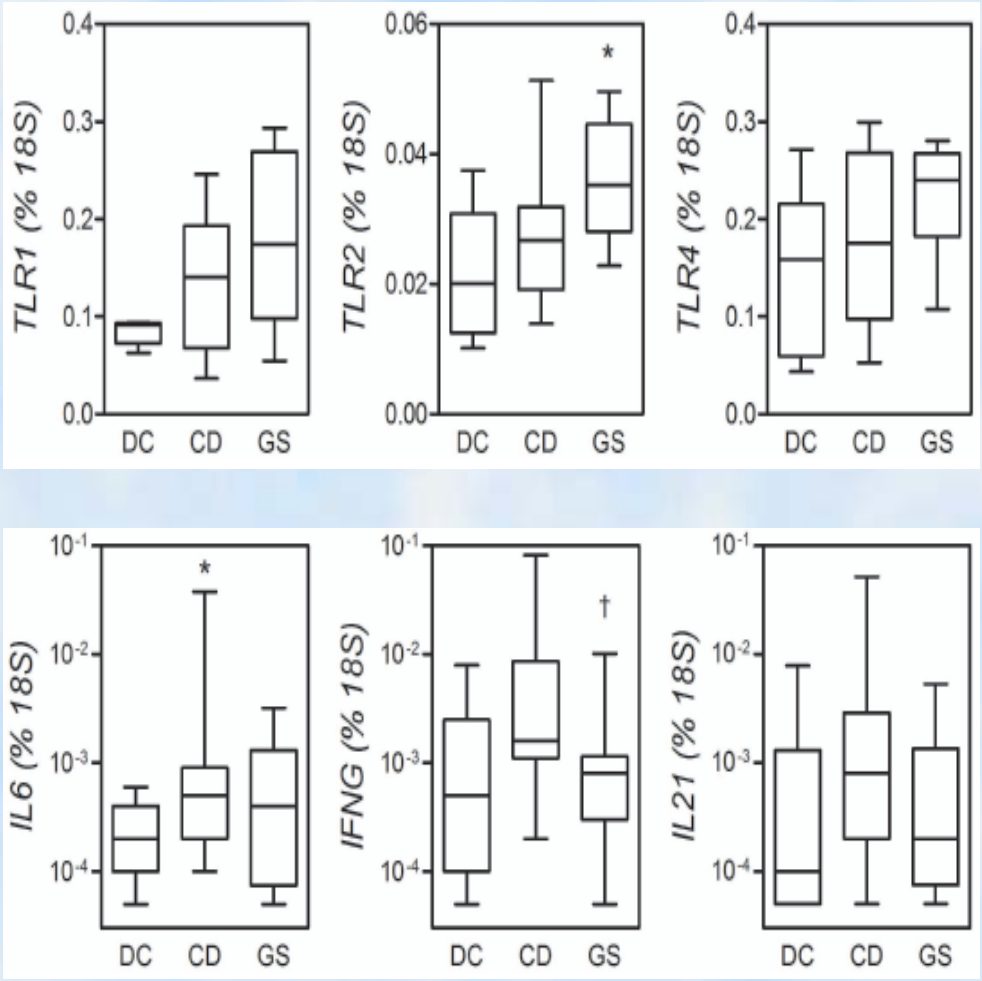
Anna Sapone[1,2], Karen M Lammers[2], Vincenzo Casolaro[2,3], Marcella Cammarota[4], Maria Teresa Giuliano[4], Mario De Rosa[4], Rosita Stefanile[5], Giuseppe Mazzarella[5], Carlo Tolone[6], Maria Itria Russo[7], Pasquale Esposito[7], Franca Ferraraccio[8], Maria Cartenì[4], Gabriele Riegler[1], Laura de Magistris[1], Alessio Fasano[2*]

## Differential Mucosal IL-17 Expression in Two Gliadin-Induced Disorders: Gluten Sensitivity and the Autoimmune Enteropathy Celiac Disease

Anna Sapone[a, b] Karen M. Lammers[b] Giuseppe Mazzarella[d] Irina Mikhailenko[c]
Maria Cartenì[a] Vincenzo Casolaro[b, e] Alessio Fasano[b]

[a]Sezione Biotecnologia e Biologia Molecolare, Dipartimento di Medicina Sperimentale, Seconda Università degli Studi di Napoli, Naples, Italy; [b]Mucosal Biology Research Center and [c]Center for Vascular and Inflammatory Diseases, University of Maryland School of Medicine, Baltimore, Md., USA; [d]Istituto Scienze Alimentari, CNR, Avellino, Italy; [e]Division of Allergy and Clinical Immunology, Johns Hopkins University School of Medicine, Baltimore, Md., USA

# NCGS: innate immune response?




- Innate markers
- Adaptive markers

Sapone *et al. BMC Medicine* 2011, **9**:23

# Emerging Data Pathophysiology: Non-Coeliac Gluten Sensitivity?

## PROINFLAMMATORY WHEAT ATTACKS ON THE INTESTINE: ALPHA-AMYLASE TRYPSIN INHIBITORS AS NEW PLAYERS

*Junker Y, Zeissig S, Kim SJ, et al.* Wheat amylase trypsin inhibitors drive intestinal inflammation via activation of Toll-like receptor 4. J Exp Med 2012;209:2395–2408.

Dietary factors play a major role in many gastrointestinal diseases such as celiac disease, inflammatory bowel diseases (IBD), or gastrointestinal cancers. Mechanisms of action have remained mostly unclear. It is believed that various dietary factors might exert either detrimental (ie, proinflammatory) or beneficial (ie, anti-inflammatory) effects on the gastrointestinal immune system. Consumption of wheat, barley, or rye causes small intestinal inflammation in celiac disease patients. It has long been assumed that certain wheat components might also affect innate immunity.

Junker et al of Schuppan's group now demonstrate that members of the non-gluten alpha-amylase/trypsin inhibitor (ATI) family, which are enriched in wheat and related cereals, are potent activators of various innate immune cells such as dendritic cells (DCs) and macrophages. In their studies, pepsin/trypsin (PT)-digested gliadin caused a dose-dependent secretion of interleukin (IL)-8, tumor necrosis factor, and monocyte-chemotactic protein-1 in the human monocytic cell lines THP-1 and U937. Cytokine production was

Junker et al of Schuppan's group now demonstrate that members of the non-gluten alpha-amylase/trypsin inhibitor (ATI) family, which are enriched in wheat and related cereals, are potent activators of various innate immune cells such as dendritic cells (DCs) and macrophages. In their studies, pepsin/trypsin (PT)-digested gliadin caused a dose-dependent secretion of interleukin (IL)-8, tumor necrosis factor, and monocyte-chemotactic protein-1 in the human monocytic cell lines THP-1 and U937. Cytokine production was

# Isolated gliadin antibodies are prevalent in the general population but more prevalent in IBS

Table 2 Coeliac antibody results

| | Antibody negative | IgG antigliadin antibody only | IgA antigliadin antibody only | IgG and IgA antigliadin antibodies | EMA only | EMA and IgG antigliadin antibody | All three antibodies |
|---|---|---|---|---|---|---|---|
| Volunteers ($n = 1200$) | 1038 | 139 | 10 | 4 (1 declined*) | 3 | 4 | 2 |
| Biopsy-proven coeliac disease | | 1** | 1 | 1 | 3 | 4 | 2 |
| Normal histology | | | 6 | 1 | | | |
| Intraepithelial lymphocytes | | | 3 | 1 | | | |

*A 79-year-old female declined biopsy due to recent stroke.
**Also one case of coeliac disease diagnosed coincidentally having been referred to secondary care for investigation of irritable bowel syndrome.

| | Antibody negative | IgG antigliadin only | IgA antigliadin only | IgG and IgA antigliadin | EMA only | EMA and IgG antigliadin | EMA and IgA antigliadin | All three antibodies |
|---|---|---|---|---|---|---|---|---|
| Study group (n=300) | 234 | 49 | 4 | 1 | 6 | 4 | 1 | 1 |
| Coeliac disease (n=14)* | .. | 1 | 1 | 1 | 5 | 4 | 1 | 1 |
| Controls (n=300) | 256 | 41 | 1 | .. | .. | 2 | .. | .. |
| Coeliac disease (n=2) | .. | .. | .. | .. | .. | 2 | .. | .. |

EMA=endomysial antibodies. *One patient refused to undergo biopsy.

Table 2: **Coeliac antibody results**



Sanders DS *EJGH 2003 & Lancet 2001*

# Summary of IBS and Gluten, Wheat or FODMAP studies

| Lead Author | Country | Year | Patients | Outcome |
|---|---|---|---|---|
| Wahnscaffe | Germany | 2001 | 102 IBS-D without CD | Stool frequency significantly improved in patients with HLA DQ2/DQ8 |
| Wahnscaffe | Germany | 2007 | 145 IBS-D without CD | HLA-DQ2 predicted response to GFD |
| Biesierski | Australia | 2010 | 34 self reported gluten sensitive IBS | Significant reduction in overall symptoms in GFD group |
| Carroccio | Italy | 2011 | 920 gluten sensitive patients with IBS | 70 patients **wheat** sensitive and 206 multiple food sensitivities including **wheat** |
| Vazquez-Roque | USA | 2012 | 45 IBS-D | Increased intestinal permeability in patients receiving gluten |
| Biesierski | Australia | 2013 | 37 self reported gluten sensitive patients with IBS on GFD | All patients responded to reduction in **FODMAPs** during run-in but no difference between GFD and gluten containing arms |
| Vazquez-Roque | USA | 2013 | 45 IBS-D | Reduction in stool frequency in patients on GFD |

# No Effects of Gluten in Patients With Self-Reported Non-Celiac Gluten Sensitivity After Dietary Reduction of Fermentable, Poorly Absorbed, Short-Chain Carbohydrates

JESSICA R. BIESIEKIERSKI,[1,2] SIMONE L. PETERS,[2] EVAN D. NEWNHAM,[1] OURANIA ROSELLA,[2] JANE G. MUIR,[2] and PETER R. GIBSON[2]

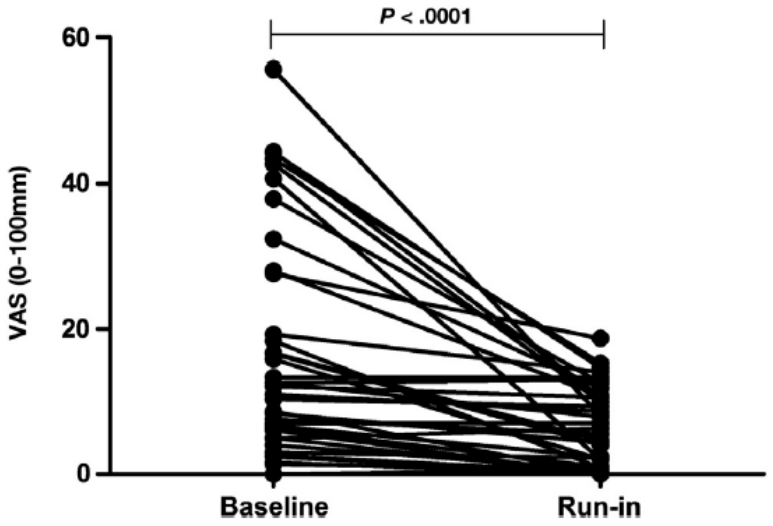
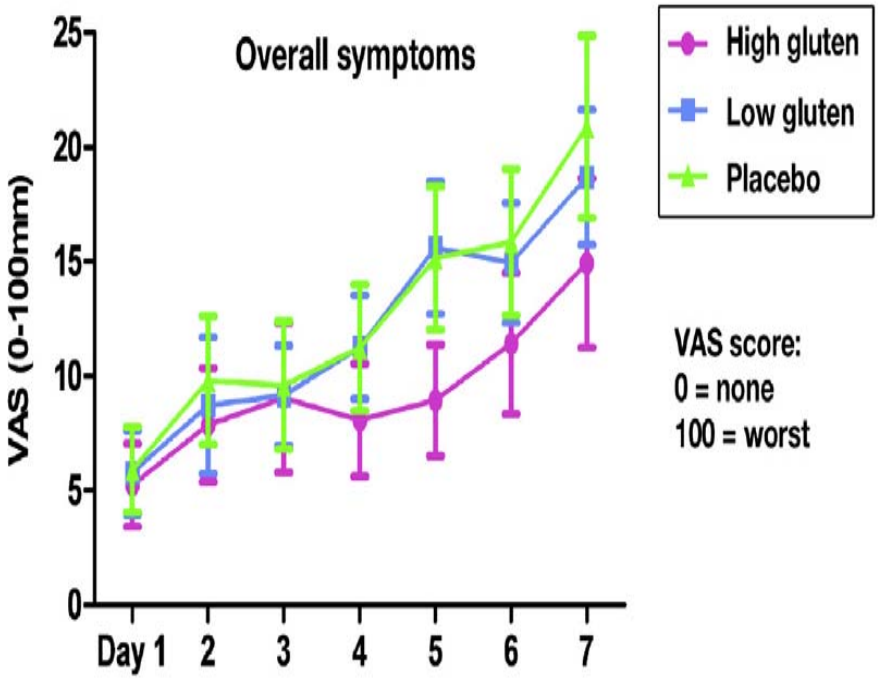
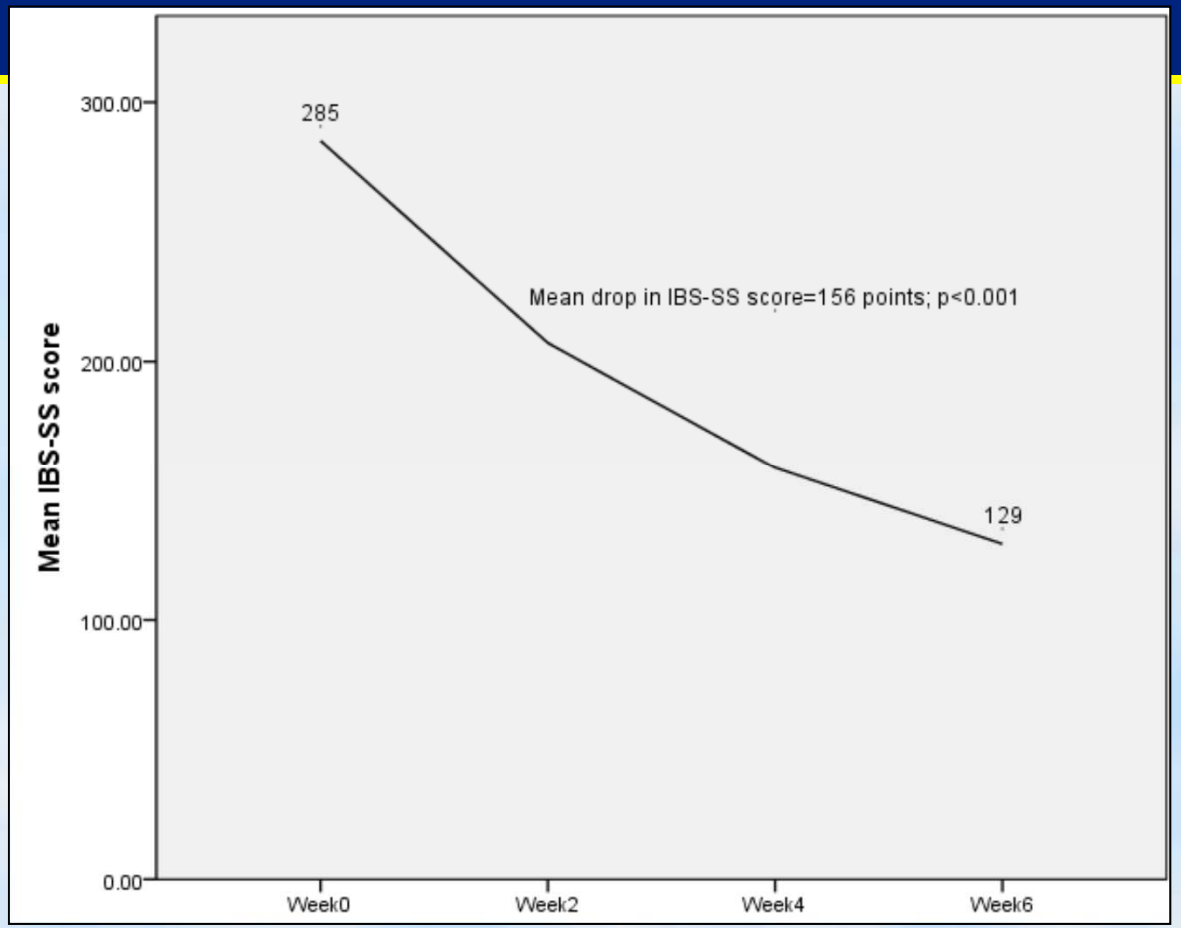



**Figure 1.** Individual responses in mean overall symptom severity score during the run-in period, where low FODMAP diet was commenced, compared with the baseline period, where participant's usual gluten-free diet was consumed during 7-day trial. Scores were significantly greater during the baseline period ($P < .0001$, Wilcoxon signed rank test).




GASTROENTEROLOGY 2013;145:320–328

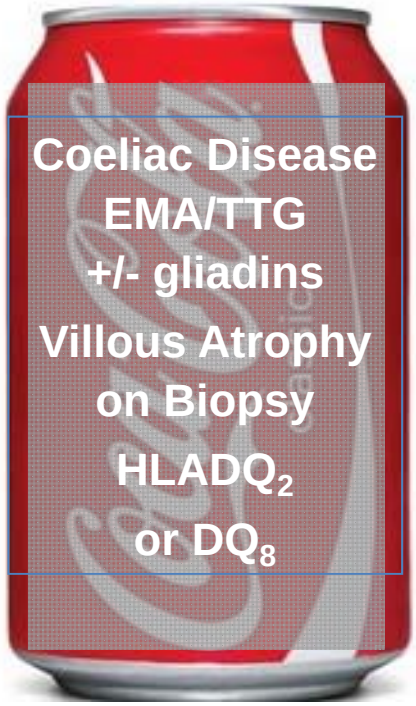
# Open-label response to a GFD in D-IBS (n=40)




| | |
|---|---|
| Mean-age (SD) | 40.4 (14.9) |
| Female (%) | 30 (75) |
| Mean GFD adherence score (SD) | 3.1 (0.7) |
| Clinical response: IBS-SS drop by ≥ 50 points | 28 (70) |
| Will continue GFD for the foreseeable future (%) | 24 (60) |
| Happy to be discharged to GP (%) | 36 (90) |

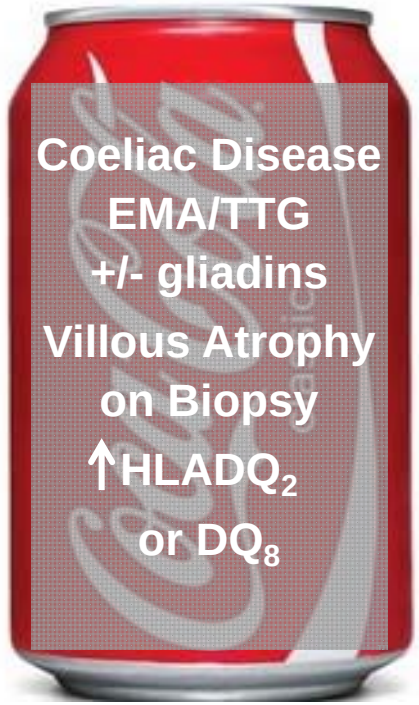
# Confusion, Confusion, Confusion!

# Gluten Related Disorders

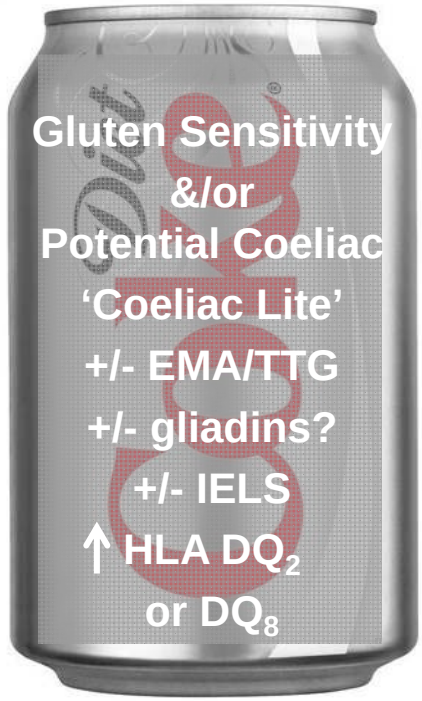



**Adaptive Immune Response**

# Gluten Related Disorders

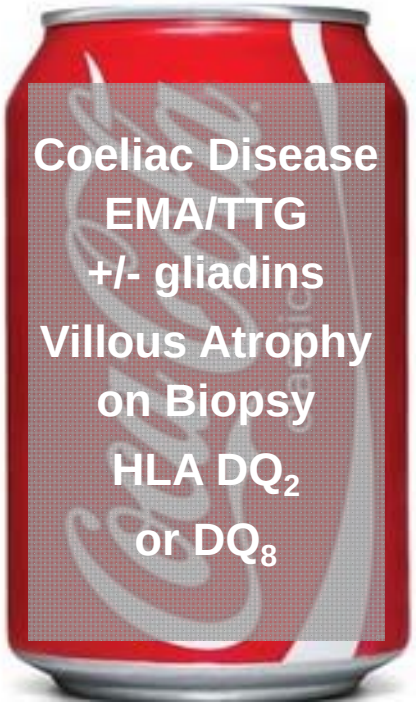



Adaptive Immune Response

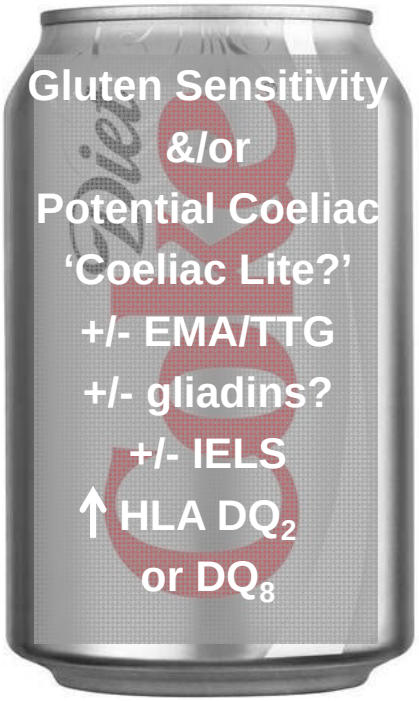



Adaptive Immune Response

# Gluten Related Disorders: but what about other wheat components and FODMAP's?




Adaptive Immune Response




Adaptive Immune Response?

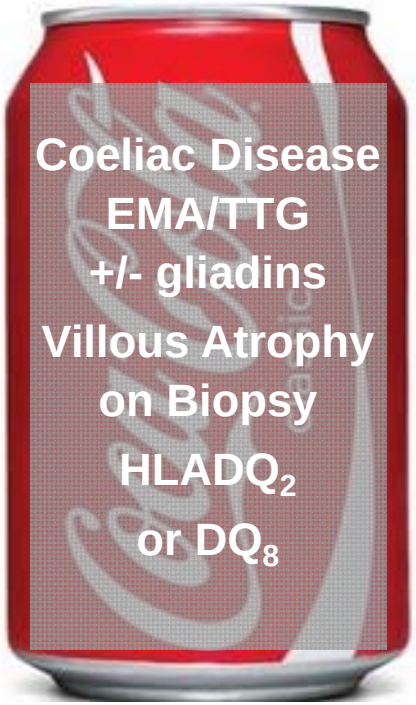

Innate Immune Response?

# Symptoms improve on withdrawal of gluten +/- other wheat components +/- FODMAP's

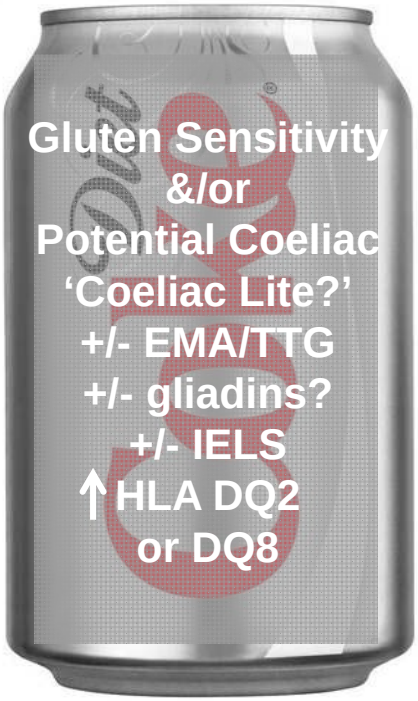
Mooney PM & Sanders DS *Neurogastroenterol Motil* 2013

## SPECTRUM

## GI & Extra Intestinal Symptoms




Adaptive Immune Response




Adaptive Immune Response?


Innate Immune Response?

# NCGS patients' interview

Vanessa

(right hand side of picture)

55 years old, Publican

Persisting diarrhoea, bloating, incontinence

Back pain

'Quality of life affected'

GP said 'IBS'

# Non-coeliac gluten sensitivity (Part 2)

- **Essential to diagnose or exclude coeliac disease prior to commencing a gluten free diet**
- **IgE Wheat Allergy should be excluded**
- **Consider treating the Coeliac 'like' or 'lite' group with a gluten free diet**
- **Consider a wheat free diet or low FODMAP's**
- **The public is choosing a gluten free diet irrespective of medical advice (self reporting of symptoms may be a clue)**
- **The scientific jury is still out (there is no clear biomarker – yet??!)**
- **The medical community is on a learning curve!**

# On-going Research at the Royal Hallamshire Hospital & International GI and Endoscopy Fellowships

Contact: **david.sanders@sth.nhs.uk**

**Imran Aziz**

**Nina Lewis**

**Mohammed Karajeh**

**John Leeds**

**Kate Evans**

**Dr Steve Barratt**


**Andrew Hopper & Reena Sidhu**

**Marios Hadjivassiliou**

The University Of Sheffield.

# Royal Hallamshire GI and Liver Unit

## Research

**BSG Hopkins Endoscopy Prize 2012**
**Small Bowel Endoscopy**

**Cuthbertson Medal 2011**
**Nutrition Society & BAPEN**
(British Association of Parenteral & Enteral Nutrition)

**European Rising Star Award 2010**
Association of National European & Mediterranean Societies of Gastroenterology

## Clinical

**BSG Clinical Care Award**
**2011** Small Bowel Endoscopy
**2014** Primary Care Services & GI Bleed Unit

**Health Service Journal Awards 2012**
Gastrostomy/PEG Feeding Service

**Coeliac UK 2010** Patient Healthcare Award

**Complete Nutrition 2013** Coeliac Healthcare Award

**Medipex Award 2013** Small Bowel Endoscopy