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# Does the UK population suffer with symptoms related to Gluten Sensitivity?

**December 2012**

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Consultant Gastroenterologist  
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Jessica Ennes  
Gold Medal in Heptathlon

**What percentage of the UK population suffer with symptoms related to Gluten Sensitivity?**

**A:**

**1%**

**B:**

**5%**

**C:**

**10%**

**D:**

**15%**

# 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

SUPERMARKETS are cashing in on the celebrity trend for wheat-free diets with products that can be up to three times the price of standard foods and contain more than three times the fat.

High profile stars such as Gwyneth Paltrow, Rachel Weisz and Victoria Beckham have been linked with a gluten-free diet, which cuts out the protein found in wheat, barley and rye. Many consumers are also adopting the diet, believing it to be a healthier option.

However, a Sunday Times survey of gluten-free products from four big supermarkets found that most were considerably higher in fat than the equivalent standard product. A bowl of gluten-free granola from Sainsbury's contained more fat than a Mars bar.

"People assume that by cutting out gluten they are going to lose weight. It's a myth," said Tanya Thomas, a dietician and member of the British Dietetic Association.

Gluten-free foods have nonetheless become big business. Marks & Spencer recently reported that sales of its "made without wheat" range had soared 41% over the past year, while Sainsbury's and Tesco have seen a 30% rise. The global gluten-free industry could be worth \$4.3 billion (£2.7 billion) by 2015, according to Datamonitor, the research firm.

Cutting out gluten is a medical necessity for the estimated 200,000 people in Britain with coeliac disease, an autoimmune

disease of the small intestine. Yet the growth in supermarket sales far exceeds the rise in the number of people diagnosed with the disease, according to Coeliac UK, suggesting many people are adopting the diet for lifestyle reasons.

"Undoubtedly there has been a big rise in diagnosis of coeliac disease, but it can't explain the explosion in gluten-free products. Many people are choosing to go gluten-free because they simply want to reduce their wheat intake," said Sarah Sleet, chief executive of Coeliac UK.

However, the Sunday Times study, which assessed the nutritional content of about 30 wheat-free foods and their standard equivalents, found that shoppers who believe gluten-free diets are a low-fat option may have been misled.

Sainsbury's "free from" multi-seed pitta, for example, contains 5.2g of fat per 100g compared with only 1.5g for its standard wholemeal pitta — 247% more.

The supermarket's "free from" oatly granola has 27.4g of fat per 100g compared with 16.8g for its standard granola. A portion of the gluten-free cereal with milk contains 15.7g of fat compared with 9.9g in a Mars bar.

Sainsbury's said its "free from" granola was higher in fat than standard granola because it had a higher proportion of nuts and seeds, but that the majority was "good" mono- and polyunsaturated fat. The saturated fat content is lower than for its standard granola.



**ON THE MENU**

	Fat Per 100g
Sainsbury's "free from" multi-seed pitta	5.2g
Sainsbury's wholemeal pitta	1.5g
Sainsbury's "free from" oatly granola	27.4g
Sainsbury's granola	16.8g
M&S "made without wheat" brown seeded loaf	9.7g
M&S soft granary farmhouse bread	3.7g
M&S "made without wheat" crumpets	2.7g
M&S classic crumpets	0.9g
Waitrose "love life" g/f seeded sliced loaf	9.7g
Waitrose wholemeal & pumpkin farmhouse	6.9g
Waitrose "love life" g/f hot cross buns	7.7g
Waitrose essential hot cross buns	6.9g
Mars bar	17g

Although the figures relate to fat, gluten-free products are also generally higher in calories.

Sainsbury's said that in order to achieve parity with gluten-based products "a certain amount of fat is required in free-from products for technical reasons".

This is at odds with the image of gluten-free as a weight-loss diet. The pop star Lady Gaga was recently reported to have cut gluten from her diet in order to lose weight, while the singer Miley Cyrus has also credited her weight

loss to gluten-free eating. The tennis star Novak Djokovic switched to a gluten-free diet two years ago and went on to win Wimbledon and the US Open, which he said was down to his dietary change.

However, Sleet said the industry acknowledged there was a problem with higher fat in gluten-free bread and bakery products. M&S "made without wheat" brown seeded loaf has 9.7g of fat per 100g compared

with 3.7g for M&S soft granary farmhouse bread — 162% more — while M&S "made without wheat" crumpets have 2.7g of fat per 100g compared with 0.9g for classic crumpets.

"In order to produce gluten-free products which don't compromise on taste or texture, fat is needed to provide texture, and this can result in a product being slightly higher in calories," said M&S.

Shoppers are also paying up to three times as much for gluten-free products. M&S's gluten-free white loaf costs £2.99 compared with 99p for its standard crusty white loaf, while its gluten-free crumpets cost £1.79 compared with 89p for the standard version.

The company said some gluten-free items were more expensive because of the "complexity of the ingredients". Four out of six gluten-free products tested from Waitrose

# House price rise gathers pace

Kathryn Cooper  
Economics  
Correspondent

HOUSE prices have increased at their fastest annual rate for almost two years, raising further hopes that the economy has turned a corner.

According to the Land Registry, the price of an average property in England and Wales rose 1.1% to £162,561 in the year to September, the biggest year-on-year rise since November 2010.

London was the region with the strongest growth — prices rose 5.5% over the year to £363,802. The southeast also saw buoyant growth, with the average property up 2.3% to £210,301.

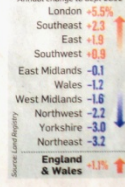
However, six out of 10 house-price regions suffered falls over the past year. The northeast had the biggest annual drop, with the average price down 3.2% to £98,163.

In towns, Hartlepool experienced the biggest annual price rise in the year to September with an increase of 5.7%, while Blaenau Gwent in south Wales suffered the biggest fall, with a drop of 8.3%.

Sales of homes in the £1.5m-£2m band rose by 31%, but those priced over £2m recorded no change. The property data follows news that Britain emerged from its double-dip recession in the third quarter of this year when the economy grew by 1%.

**Mixed fortunes**

Annual change to Sept 2012

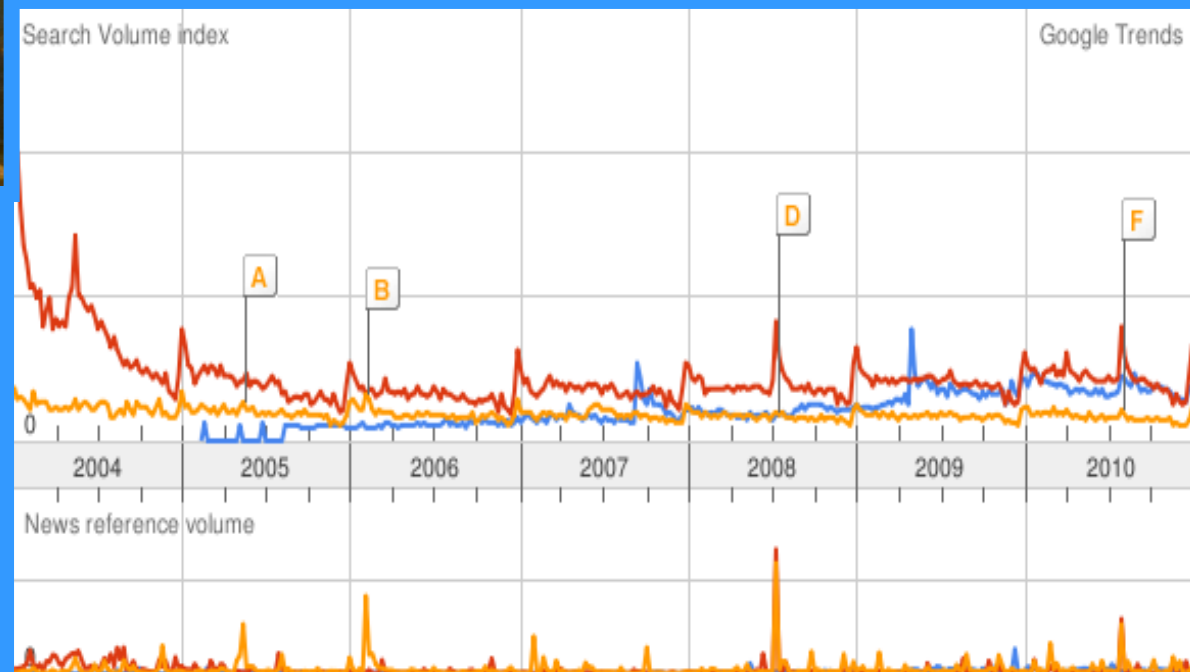


Source: Land Registry



The U.S. market for gluten-free food and beverage products grew at a compound annual growth rate of 28 percent from 2004 to 2008, to finish with almost \$1.6 billion in retail sales

- Gluten Free diet
- Low Carb diet
- Low Fat diet



The UK retail market is worth £125 million\* - when you consider the healthcare market is only worth around £37 million\*\* and that there are only around 120,000 diagnosed coeliac patients in the UK then this may suggest other individuals opting for a gluten-free diet

\* Kantar Worldpanel, April 2011

\*\* IMS data



## What is the prevalence of Gluten Sensitivity?

Any clues from secondary care?

- Center for Celiac Research University of Maryland
- 2004-2010
- 347/5896 ~ 6% or 1:7
- Secondary Care Referral Pattern
- Referral Bias or Ascertainment Bias?

Sapone A et al *BMC* 2012



## What is the prevalence of Gluten Sensitivity?

Any clues from secondary care?

- Department of Clinical Medicine of St Orsola-Malpighi Hospital (Italy)
- January 2009 and June 2011
- N=78 included in present study (symptoms on ingestion of gluten)
- negative for EMA and TTG
- Negative for Wheat (specific IgE and skin prick tests)
- Normal duodenal mucosa or 33/78 (42%) IEL's
- 36/78 (46%) HLA DQ2 Or DQ8

*Volta U et al J Clin Gastroenterol 2012*





## SELF REPORTING OF GLUTEN SENSITIVITY: SECONDARY CARE EXPERIENCE IN THE UK



- All patients were referred to a dedicated coeliac or gluten sensitivity clinic by GPs
- The referral criteria were "GI symptoms attributed to gluten ingestion"
- 140 patients were investigated over a 5 year period. 80% were women and the median age of presentation was 37 yrs (range 16-88).

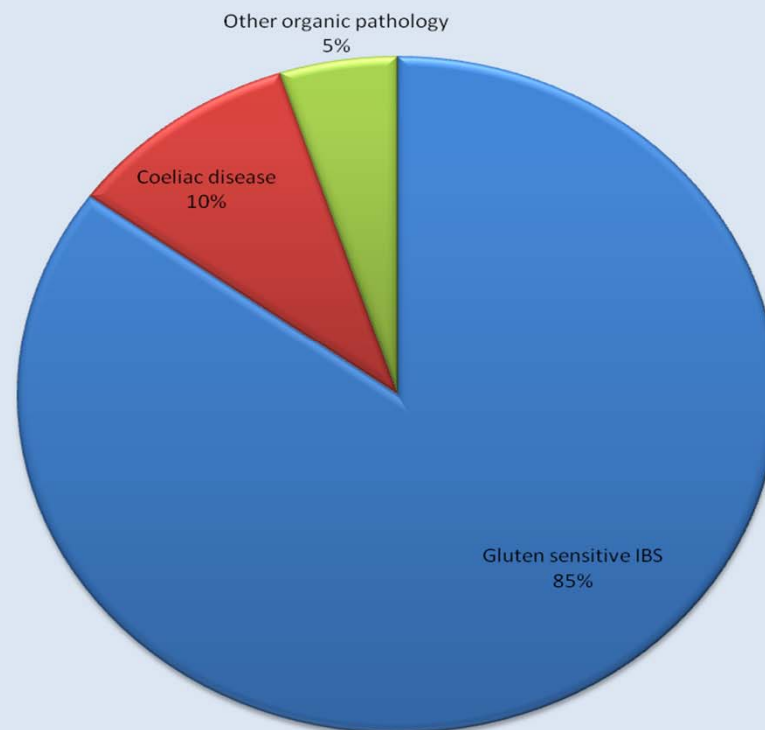


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## SELF REPORTING OF GLUTEN SENSITIVITY: SECONDARY CARE EXPERIENCE IN THE UK



Diagnostic yield of patients referred with gluten induced gastrointestinal symptoms





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## SELF REPORTING OF GLUTEN SENSITIVITY: SECONDARY CARE EXPERIENCE IN THE UK



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- A positive coeliac serology ( $p < 0.0001$ ) was significantly associated with coeliac disease
- All patients with coeliac disease were HLA DQ2 or DQ 8 compared to 44% of GS-IBS cases
- There was statistically no significant difference in gender, clinical symptoms or baseline bloods (haemoglobin, vitamin B12, folate, ferritin, calcium or albumin) between the groups, ( $p > 0.05$ )

**Does the UK population suffer with symptoms related to  
Gluten Sensitivity?**



**Meadowhall**

8th largest  
Shopping  
centre in the  
UK

1,500,000 sq ft  
(139,355 m<sup>2</sup>)

280 shopping  
outlets

# Does the UK population suffer with symptoms related to Gluten Sensitivity?



## Medical Questionnaire On Gastrointestinal Symptoms

Dear Sir/Madam

We would be grateful if you would kindly complete this 1-5 minute questionnaire survey as part of a research project being undertaken by the Gastroenterology department at the Royal Hallamshire Hospital, Sheffield. There are two parts to this questionnaire and although it asks about your bowel symptoms and past medical history, it is anonymous and the results are confidential and will be used only for research purposes. This questionnaire has been registered with the Sheffield Teaching Hospitals. You may find parts of this questionnaire repetitive but please try and answer all the appropriate questions tailored for you. Should you have any queries or difficulties completing this survey, please ask our helpful young student doctors!

Thank you for your co-operation and time in completing this questionnaire

### Part 1: This asks for basic information about yourself, any abdominal symptoms and your general state of health

- Q1) Age \_\_\_\_\_ D.O.B \_\_\_\_\_
- Q2) Male  or Female
- Q3) Employed , Unemployed , Disabled , Retired
- Q4) Single , In a relationship , Divorced , Widowed
- Q5) Race : White , Black , Asian , Other  (please state \_\_\_\_\_)
- Q6) Post code \_\_\_\_\_
- Q7) Have you suffered with episodes of abdominal pains or discomfort for the last 6 months or more? Yes  No  - - if No, please go to Q16
- Q8) If yes, how many days in a month do you approximately experience these abdominal pains or discomfort?
- |                    |                          |                           |                          |
|--------------------|--------------------------|---------------------------|--------------------------|
| One day a month    | <input type="checkbox"/> | Four days a month         | <input type="checkbox"/> |
| Two days a month   | <input type="checkbox"/> | 5-10 days a month         | <input type="checkbox"/> |
| Three days a month | <input type="checkbox"/> | More than 10 days a month | <input type="checkbox"/> |
- Q9) Do you suffer from abdominal bloating (feeling full of gas)? Yes  No

# Does the UK population suffer with symptoms related to Gluten Sensitivity?



Q10) Do you feel an improvement in your abdominal pains or discomfort after you have emptied your bowels? Yes  No

Q11) Was the start of your abdominal pains or discomfort associated with a change in your bowel frequency? Yes  No

Q12) If yes to Q11, how would you best describe the predominant change in bowel habit?

Diarrhoea  , Constipation  , Alternates between Diarrhoea & Constipation

Q13) Was the start of your abdominal pains or discomfort associated with a change in stool consistency? Yes  No

Q14) If yes to Q13, how best would you describe your stool motions?

Loose, watery or sloppy  Hard, pellet like   
Combination of loose at times and hard other times

Q15) Do your abdominal and bowel symptoms get worse with stress? Yes  No

Q16) Are you known to suffer from any of the following? (tick as many that apply)

- |  |                          |                            |                          |
|--|--------------------------|----------------------------|--------------------------|
| Anxiety  | <input type="checkbox"/> | Chronic headaches          | <input type="checkbox"/> |
| Depression                                       | <input type="checkbox"/> | Nut allergy                | <input type="checkbox"/> |
| Bipolar disorder                                 | <input type="checkbox"/> | Egg allergy                | <input type="checkbox"/> |
| Schizophrenia                                    | <input type="checkbox"/> | Dairy product intolerance  | <input type="checkbox"/> |
| Thyroid disease                                  | <input type="checkbox"/> | Bowel cancer               | <input type="checkbox"/> |
| Young onset diabetes (childhood/early adulthood) | <input type="checkbox"/> | Stomach cancer             | <input type="checkbox"/> |
| Pernicious anaemia (low vitamin B12)             | <input type="checkbox"/> | Irritable bowel syndrome   | <input type="checkbox"/> |
| Chronic fatigue                                  | <input type="checkbox"/> | Coeliac disease            | <input type="checkbox"/> |
| Fibromyalgia                                     | <input type="checkbox"/> | Inflammatory bowel disease | <input type="checkbox"/> |
| ME   | <input type="checkbox"/> | Heartburn/reflux           | <input type="checkbox"/> |

# Does the UK population suffer with symptoms related to Gluten Sensitivity?



## Part 2 – Gluten related symptoms

This part of the questionnaire focuses on whether you develop problems when you eat gluten. Gluten is a product found in wheat, barley or rye. Therefore, it is found in common everyday diets such as cereal, bread, cakes, biscuits, pasta, pizza etc. Should you have any queries or difficulties completing this survey, please ask our helpful young student doctors!

Q1) Do you experience any of the following symptoms which you relate to eating gluten based products? (tick as many that apply)

Bloating (feel full of air)	<input type="checkbox"/>	Headaches	<input type="checkbox"/>
Abdominal Pain	<input type="checkbox"/>	Mental confusion	<input type="checkbox"/>
Abdominal discomfort	<input type="checkbox"/>	Lack of co-ordination	<input type="checkbox"/>
Diarrhoea	<input type="checkbox"/>	Numbness/pins & needles	<input type="checkbox"/>
Constipation	<input type="checkbox"/>	Lack of energy	<input type="checkbox"/>
Belching	<input type="checkbox"/>	Skin Rash	<input type="checkbox"/>
Flatulence	<input type="checkbox"/>	Joint Pains	<input type="checkbox"/>
Sickness	<input type="checkbox"/>	Anaemia	<input type="checkbox"/>
Others (please specify) _____			

If you do not suffer from any gluten related symptoms there are no further questions – thank you.

Q2) If yes, how often do you experience symptoms after eating gluten products?

Every time I eat gluten products	<input type="checkbox"/>	Few times a month	<input type="checkbox"/>
On most occasions/days	<input type="checkbox"/>	Few times a year	<input type="checkbox"/>
Few days a week	<input type="checkbox"/>		

Q3) How soon after eating gluten products do you develop symptoms?

Almost immediately (less than one hour)	<input type="checkbox"/>	The next day	<input type="checkbox"/>
1-6 hours later	<input type="checkbox"/>	A few days later	<input type="checkbox"/>
6-24 hrs later	<input type="checkbox"/>		

Q4) How long do your symptoms generally last for?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

# Does the UK population suffer with symptoms related to Gluten Sensitivity?



Q5) Which gluten product(s) seems to cause problems? (tick as many that apply)

- Bread       Pizza       Cakes   
 Cereal       Pasta       Biscuits   
 Porridge       Others (please state) \_\_\_\_\_

Q6) How long have you had a problem related to gluten?

(state approximate number) \_\_\_\_\_ months or \_\_\_\_\_ years

Q7) Have you ever seen a healthcare professional due to problems related to gluten? Yes  No

Q8) If yes, please state whom you have seen? (tick as many that apply)

GP , Hospital doctor , dietician  other  (please state) \_\_\_\_\_

Q9) If yes, have you undergone any of the following tests to look specifically for a cause as to why you have problems related to gluten? (tick as many that apply)

- Coeliac blood test      Yes       No       Not sure   
 Skin prick allergy test      Yes       No       Not sure   
 Endoscopy (camera into stomach)      Yes       No       Not sure   
 You have had no tests at all      Yes

Other tests (please state) \_\_\_\_\_

Q10) If yes to Q7, Q8, Q9 have you been given any of the following diagnosis? (please ask the student doctor to explain the different conditions in more detail)

- Coeliac disease , Wheat allergy , Coeliac disease has been excluded   
 No explanation given , You are not sure , other  \_\_\_\_\_

Q11) Have you ever tried a gluten free diet?      Yes       No

Q12) If yes, was it beneficial for your symptoms?      Yes       No       Not sure

Q13) If yes to Q11, Are you still on a gluten free diet?      Yes       No



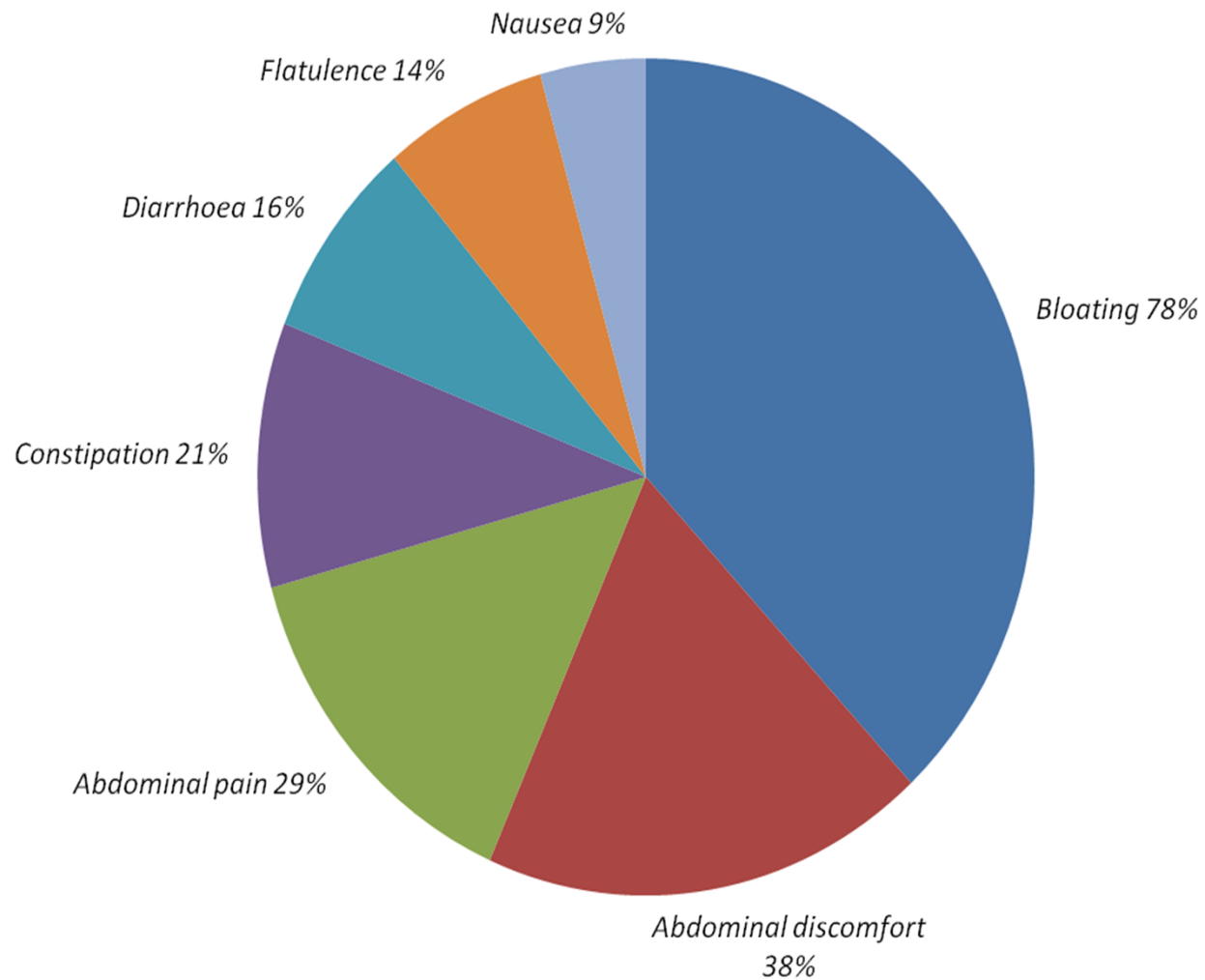
## Does the UK population suffer with symptoms related to Gluten Sensitivity?

### Overall Demographics:

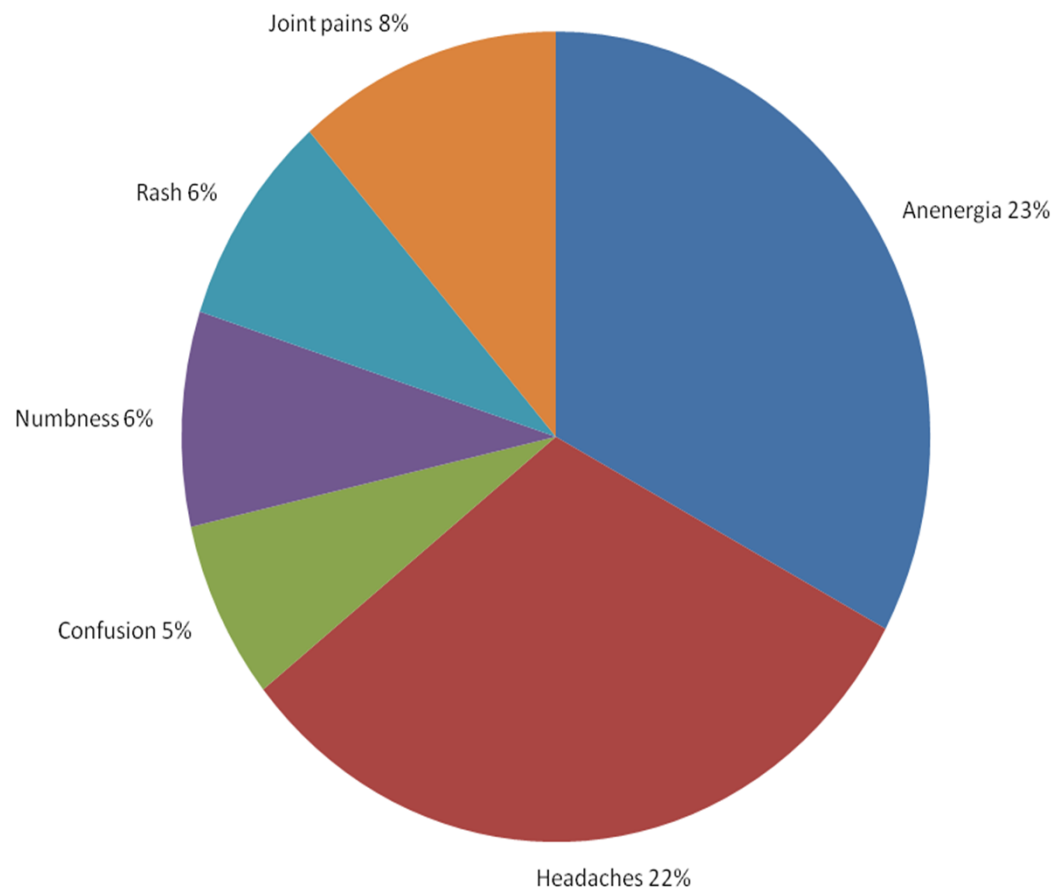
- 1002 adults completed the population based questionnaire
- 55% female, age range 16-93, mean age 39 years
- Prevalence of individuals fulfilling the ROME III criteria for IBS was 6% with up to 80% being female ( $p < 0.0001$ )

**The prevalence of gluten related symptoms was 13% (129/1002), female 80% ( $P < 0.0001$ )**

## Gastrointestinal gluten sensitive symptoms reported (Sheffield, UK)



## Extraintestinal gluten sensitive symptoms reported (Sheffield, UK)



### Compared with Maryland Data

eczema and/or rash (40%)

headache (35%)

'foggy mind' (34%)

fatigue (33%)

depression (22%)

numbness in legs/arms/fingers  
20%

joint pain (11%)

Sapone A et al *BMC* 2012

**Does the UK population suffer with symptoms related to  
Gluten Sensitivity?**

Basic information	Never tried GFD (n 92)	Tried GFD (n 37)	P-value
Age	Mean 40 Median 39 Range 18-75	Mean 37 Median 36 Range 19-69	0.4
Females	76 % (70F, 22M)	86% (32F, 5M)	0.2
Employed	55%	57%	1.0
Duration of symptoms	Mean 54 months, Median 36 Range 2-240	Mean 96 months, Median 60 Range 3-480	0.01
Seen doctor	6.5% (6 yes, 86 no)	78% (29 yes, 8 no)	< 0.0001 OR 52

## Does the UK population suffer with symptoms related to Gluten Sensitivity?

Patients with IBS were more likely to report sensitivity to gluten based products than non-IBS patients (35% versus 11%,  $p < 0.0001$ )

Symptoms due to gluten ingestion	Never tried GFD (n 92)	Tried GFD (n 37)	P- value
Bloating	75% (69y, 23n)	86% (32y, 5n)	0.2368
Abdominal pain	15% (14y, 78n)	64% (24y, 13n)	< 0.0001*
Abdo discomfort	30% (28y, 64n)	56% (21y, 16n)	0.0086*
Diarrhoea	4% (4y, 88n)	43% (16y, 21n)	<0.0001*
Constipation	15% (14y, 78n)	35% (13y, 24n)	0.0168*
Belching	6.5% (6y, 86n)	24% (9y, 28n)	0.0116*
Flatulence	13% (12y, 80n)	24% (9y, 28n)	0.1233
Sickness	4% (4y, 88n)	22% (8y, 29y)	0.0048
Headaches	15% (14y, 78n)	38% (14y, 23n)	0.0085*
Confusion	2% (2y, 90n)	13.5% (5y, 32n)	0.0205*
In-coordination	0% (92n)	8% (3y, 34n)	0.0222*
Numbness	4% (4y, 88n)	11% (4y, 33n)	0.2251
Anenergia	17% (16y, 76n)	38% (14y, 23n)	0.0202*
Rash	4% (4y, 88n)	11% (4y, 33n)	0.2251
Joint pains	6.5% (6y, 86n)	11% (4y, 33n)	0.4711

Confusion, Confusion, Confusion!



## 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.

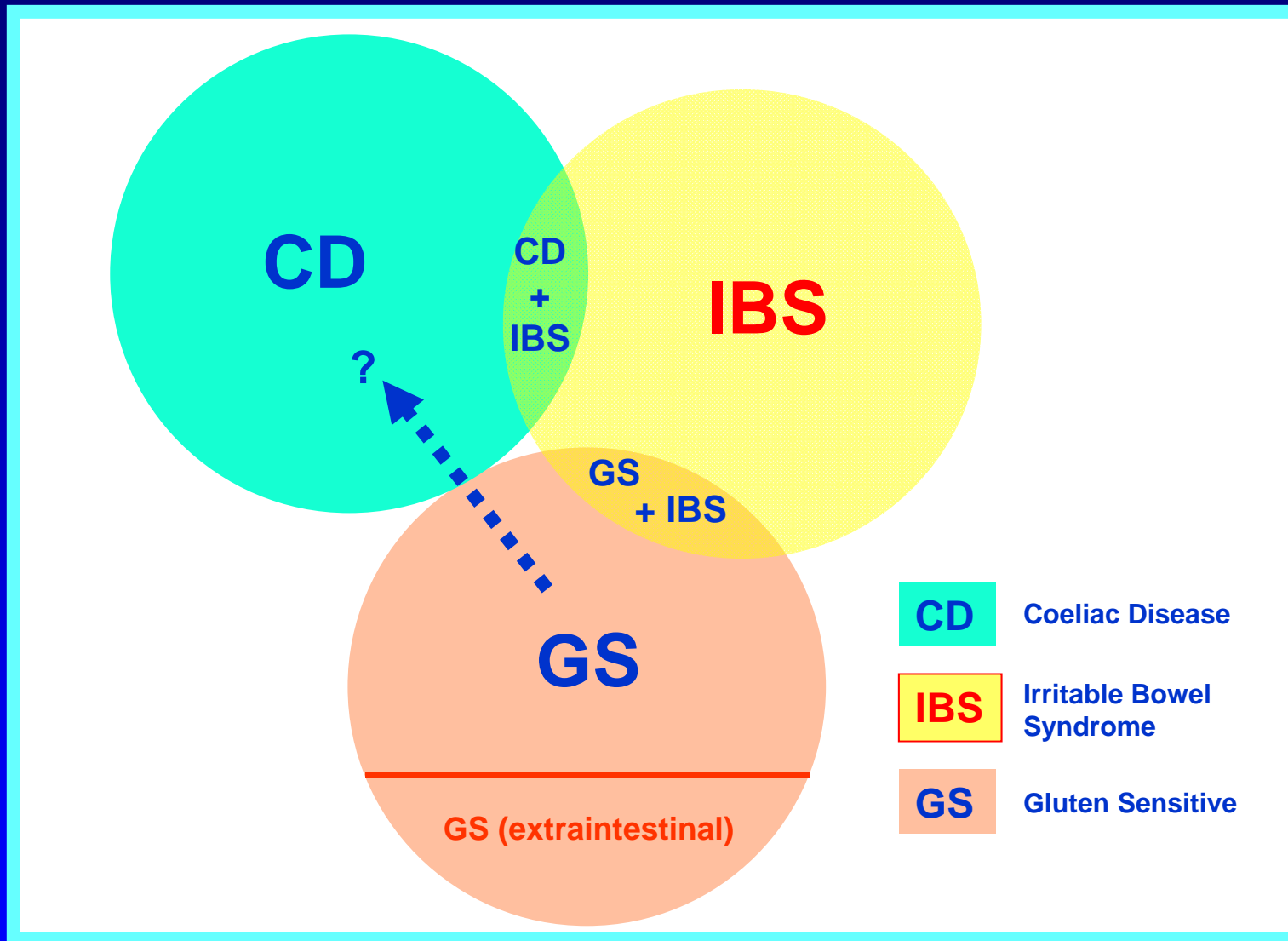
\*\*Also one case of coeliac disease diagnosed coincidentally having been referred to secondary care for investigation of irritable bowel syndrome.

	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	1	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



**A Model for the relationship between coeliac disease, IBS and gluten sensitivity?**

Ball A and Sanders DS *Am J Gastroenterol* 2010;105:222-3





## Non-Celiac Wheat Sensitivity Diagnosed by Double-Blind Placebo-Controlled Challenge: Exploring a New Clinical Entity

Antonio Carroccio, MD<sup>1</sup>, Pasquale Mansueto, MD<sup>2</sup>, Giuseppe Iacono, MD<sup>3</sup>, Maurizio Soresi, MD<sup>2</sup>, Alberto D'Alcamo, MD<sup>2</sup>, Francesca Cavataio, MD<sup>3</sup>, Ignazio Brusca, MD<sup>4</sup>, Ada M. Florena, MD<sup>5</sup>, Giuseppe Ambrosiano, MD<sup>2</sup>, Aurelio Seidita, MD<sup>2</sup>, Giuseppe Pirrone, MD<sup>2</sup> and Giovanni Battista Rini, MD<sup>2</sup>



# Does the UK population suffer with symptoms related to Gluten Sensitivity?

## Conclusion

This is the first UK population prevalence survey of gluten related symptoms

The prevalence self-reported gluten related symptoms was ~13% (129/1002), female 80% (P <0.0001)

3.7% are on a GFD for gluten related symptoms

Patients with IBS were more likely to report sensitivity to gluten based products than non-IBS patients (35% versus 11%, p<0.0001)

Gluten sensitivity was more common if the symptom duration was long or the individual had consulted a doctor

## PRACTICE

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### UNCERTAINTIES PAGE

# Does gluten sensitivity in the absence of coeliac disease exist?

Imran Aziz *clinical research fellow in gastroenterology*<sup>1</sup>, Marios Hadjivassiliou *consultant neurologist*<sup>2</sup>, David S Sanders *professor of gastroenterology*<sup>1</sup>

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

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**Marios Hadjivassiliou**