Global perspective of coeliac disease with a focus on Asia

Coeliac disease: Past, Present, Future;
50th years celebration
Coeliac UK

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Coeliac disease: Then

- Initially thought to be limited to the Western Europe
- Seen only/mainly by pediatricians
- Making a diagnosis was TEDIOUS

While the curative treatment was known, but making the diagnosis was a challenge

1980 - 2000

- Change in the diagnostic criteria: three biopsies to one biopsy
- Advent of serology
- Wider recognition: Pediatrician to Adults

Recognised in countries having Caucasian population

Coeliac disease: Now

Changing epidemiology globally

Clinical Gastroenterology and Hepatology 2017;■:■–■

Global Prevalence of Celiac Disease: Systematic Review and Meta-analysis

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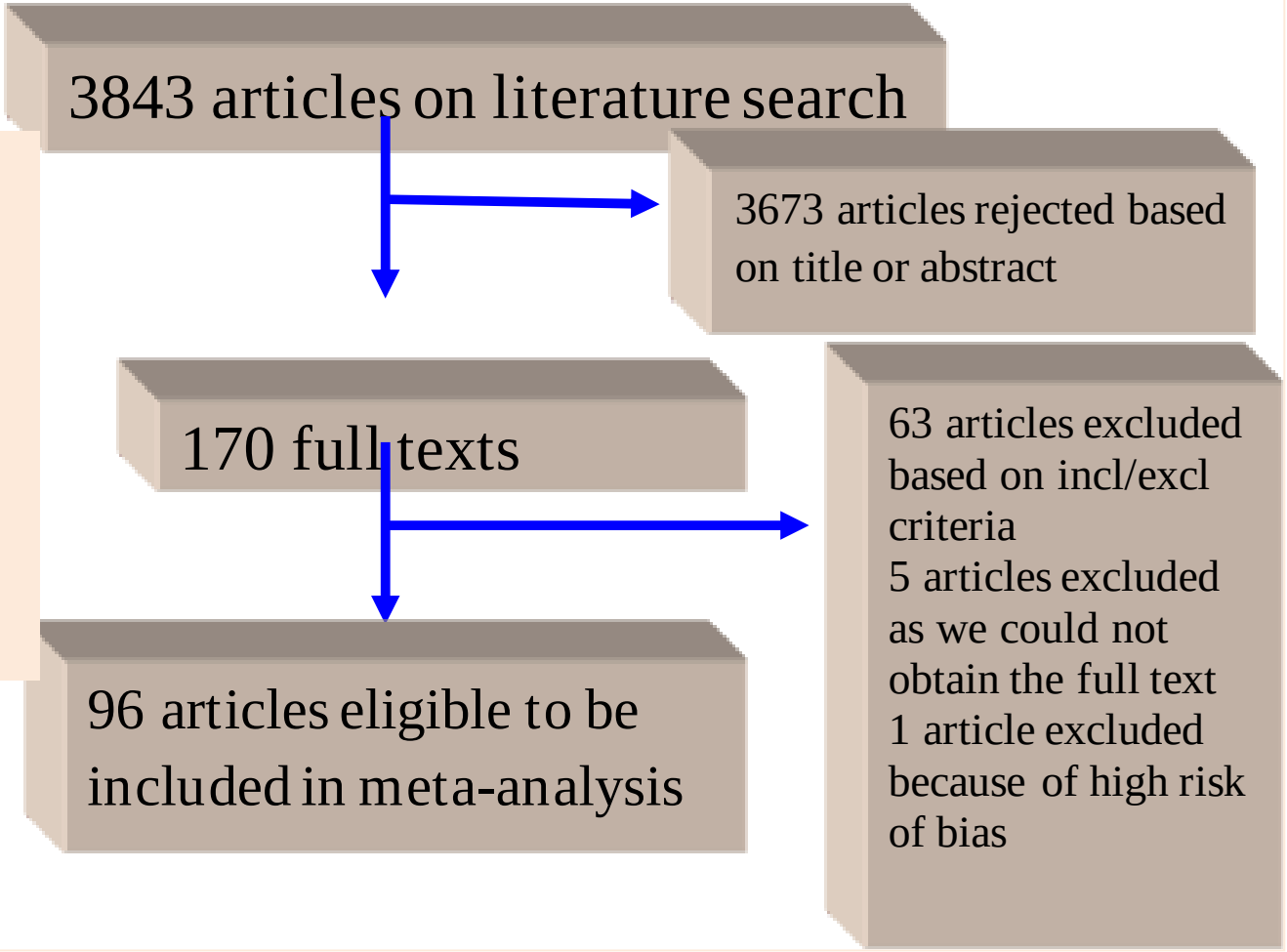
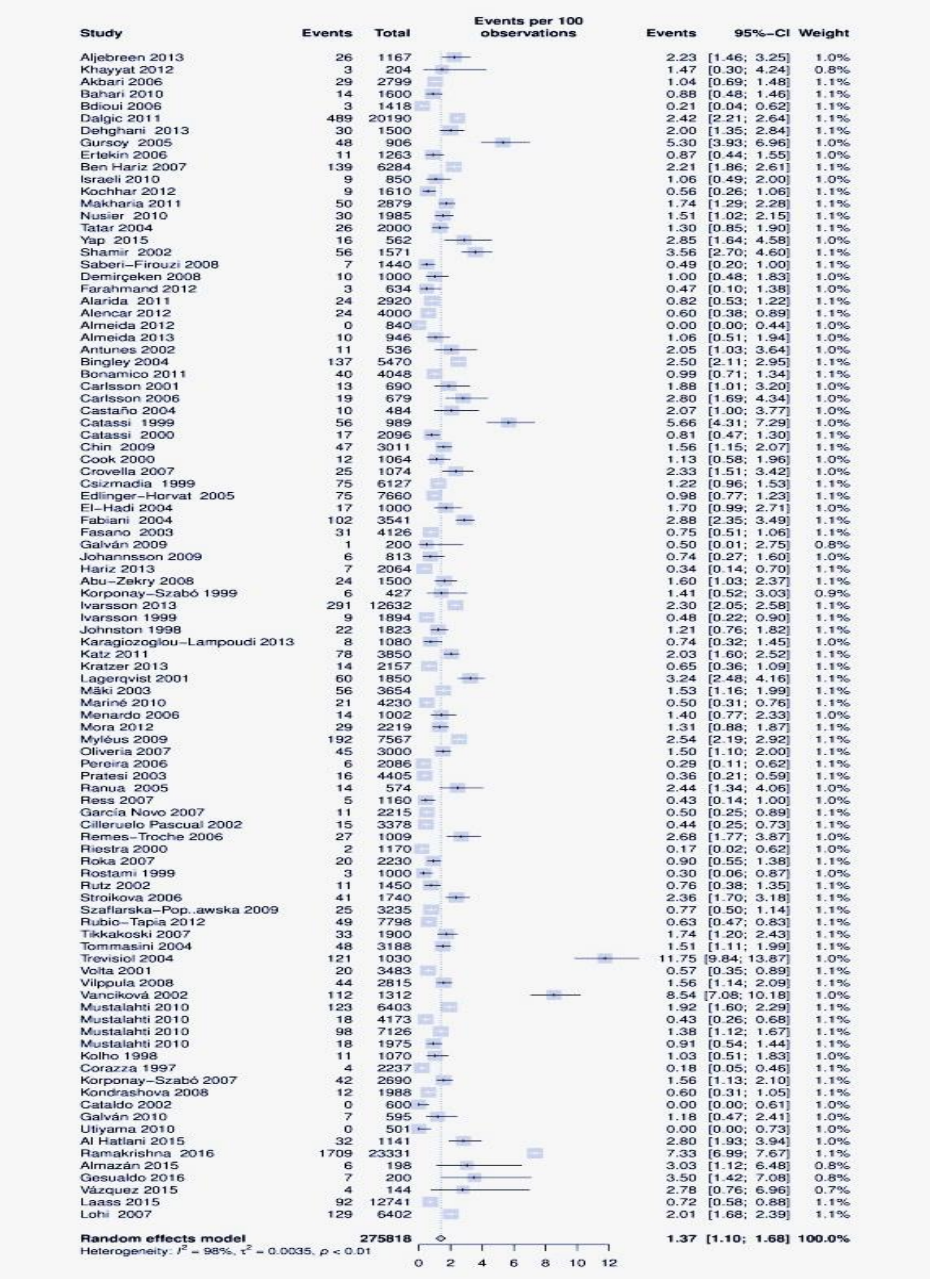
Global prevalence: systematic review and meta-analysis

Included studies in whom at least 50% of seropositive individuals were biopsied for calculation of prevalence of CD



Singh P, Clin Gastroenterol Hepatol, In press

Global seroprevalence of CeD



96 studies:275,818 subjects
5,571 positive for TG2/EMA

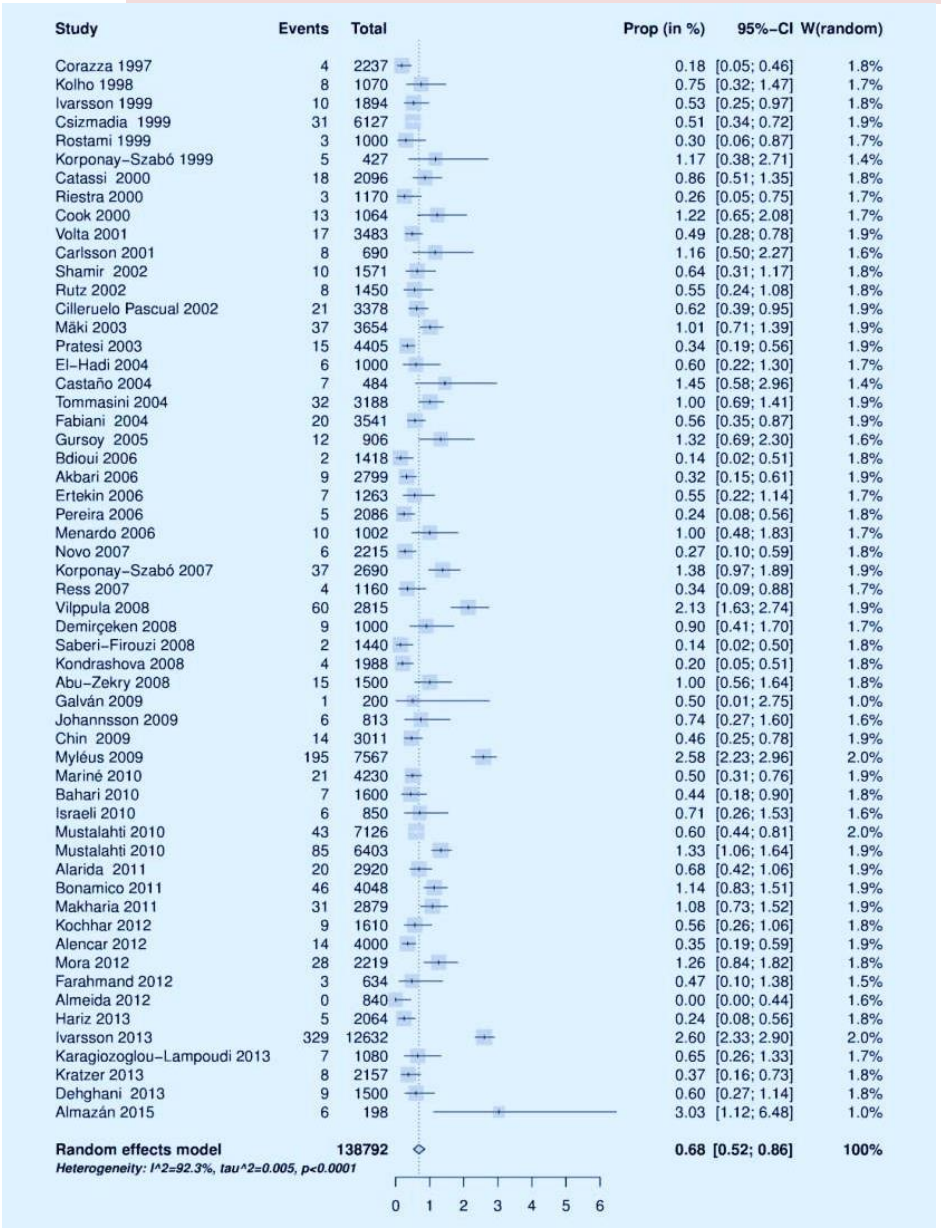
1·37% (95%CI 1·1%, 1·68%)

0% to 11.7%

Heterogeneity: 98%

Singh P, Clin Gastroenterol Hepatol, In press

Global prevalence of CeD



Study	Events	Total	Prop (in %)	95%–CI	W(random)
Corazza 1997	4	2237	0.18	[0.05; 0.46]	1.8%
Kolho 1998	8	1070	0.75	[0.32; 1.47]	1.7%
Ivarsson 1999	10	1894	0.53	[0.25; 0.97]	1.8%
Csizmadia 1999	31	6127	0.51	[0.34; 0.72]	1.9%
Rostami 1999	3	1000	0.30	[0.06; 0.87]	1.7%
Korponay–Szabó 1999	5	427	1.17	[0.38; 2.71]	1.4%
Catassi 2000	18	2096	0.86	[0.51; 1.35]	1.8%
Riestra 2000	3	1170	0.26	[0.05; 0.75]	1.7%
Cook 2000	13	1064	1.22	[0.65; 2.08]	1.7%
Volta 2001	17	3483	0.49	[0.28; 0.78]	1.9%
Carlsson 2001	8	690	1.16	[0.50; 2.27]	1.6%
Shamir 2002	10	1571	0.64	[0.31; 1.17]	1.8%
Rutz 2002	8	1450	0.55	[0.24; 1.08]	1.8%
Cilleruelo Pascual 2002	21	3378	0.62	[0.39; 0.95]	1.9%
Mäki 2003	37	3654	1.01	[0.71; 1.39]	1.9%
Pratesi 2003	15	4405	0.34	[0.19; 0.56]	1.9%
El–Hadi 2004	6	1000	0.60	[0.22; 1.30]	1.7%
Castaño 2004	7	484	1.45	[0.58; 2.96]	1.4%
Tommasini 2004	32	3188	1.00	[0.69; 1.41]	1.9%
Fabiani 2004	20	3541	0.56	[0.35; 0.87]	1.9%
Gursoy 2005	12	906	1.32	[0.69; 2.30]	1.6%
Bdioui 2006	2	1418	0.14	[0.02; 0.51]	1.8%
Akbari 2006	9	2799	0.32	[0.15; 0.61]	1.9%
Ertekin 2006	7	1263	0.55	[0.22; 1.14]	1.7%
Pereira 2006	5	2086	0.24	[0.08; 0.56]	1.8%
Menardo 2006	10	1002	1.00	[0.48; 1.83]	1.7%
Novo 2007	6	2215	0.27	[0.10; 0.59]	1.8%
Korponay–Szabó 2007	37	2690	1.38	[0.97; 1.89]	1.9%
Ress 2007	4	1160	0.34	[0.09; 0.88]	1.7%
Vilppula 2008	60	2815	2.13	[1.63; 2.74]	1.9%
Demirçeken 2008	9	1000	0.90	[0.41; 1.70]	1.7%
Saberi–Firouzi 2008	2	1440	0.14	[0.02; 0.50]	1.8%
Kondrashova 2008	4	1988	0.20	[0.05; 0.51]	1.8%
Abu–Zekry 2008	15	1500	1.00	[0.56; 1.64]	1.8%
Galván 2009	1	200	0.50	[0.01; 2.75]	1.0%
Johannsson 2009	6	813	0.74	[0.27; 1.60]	1.6%
Chin 2009	14	3011	0.46	[0.25; 0.78]	1.9%
Myléus 2009	195	7567	2.58	[2.23; 2.96]	2.0%
Mariné 2010	21	4230	0.50	[0.31; 0.76]	1.9%
Bahari 2010	7	1600	0.44	[0.18; 0.90]	1.8%
Israeli 2010	6	850	0.71	[0.26; 1.53]	1.6%
Mustalahti 2010	43	7126	0.60	[0.44; 0.81]	2.0%
Mustalahti 2010	85	6403	1.33	[1.06; 1.64]	1.9%
Alarida 2011	20	2920	0.68	[0.42; 1.06]	1.9%
Bonamico 2011	46	4048	1.14	[0.83; 1.51]	1.9%
Makharia 2011	31	2879	1.08	[0.73; 1.52]	1.9%
Kochhar 2012	9	1610	0.56	[0.26; 1.06]	1.8%
Alencar 2012	14	4000	0.35	[0.19; 0.59]	1.9%
Mora 2012	28	2219	1.26	[0.84; 1.82]	1.8%
Farahmand 2012	3	634	0.47	[0.10; 1.38]	1.5%
Almeida 2012	0	840	0.00	[0.00; 0.44]	1.6%
Hariz 2013	5	2064	0.24	[0.08; 0.56]	1.8%
Ivarsson 2013	329	12632	2.60	[2.33; 2.90]	2.0%
Karagiozoglou–Lampoudi 2013	7	1080	0.65	[0.26; 1.33]	1.7%
Kratzer 2013	8	2157	0.37	[0.16; 0.73]	1.8%
Dehghani 2013	9	1500	0.60	[0.27; 1.14]	1.8%
Almazán 2015	6	198	3.03	[1.12; 6.48]	1.0%
Random effects model		**138792**	**0.68**	**[0.52; 0.86]**	**100%**

Heterogeneity: I^2=92.3%, tau^2=0.005, p<0.0001

0 1 2 3 4 5 6

57 studies, 138, 792 patients

0.68%, 95% CI: 0.52-0.86

Singh P, Clin Gastroenterol Hepatol, In press

Differences between pooled global sero-prevalence and prevalence of biopsy-confirmed CeD?

Sero-prevalence: 1.37%
Prevalence of CeD: 0.68%

Biopsy rate ranged from 51·2 to 100%

Under-estimation of actual CeD prevalence

Potential coeliac
False positive

Estimated number of patients with CeD globally

- Pooled prevalence of biopsy confirmed CeD: 0.68% (95% CI 0.5%, 0.9%)
- Global population 7.4 billion,
  - 37 million to 59 million individuals are likely to have CeD around the world

- Globally, majority of patients (83%-95%)
- Still remain undiagnosed

Singh P, Clin Gastroenterol Hepatol, In press

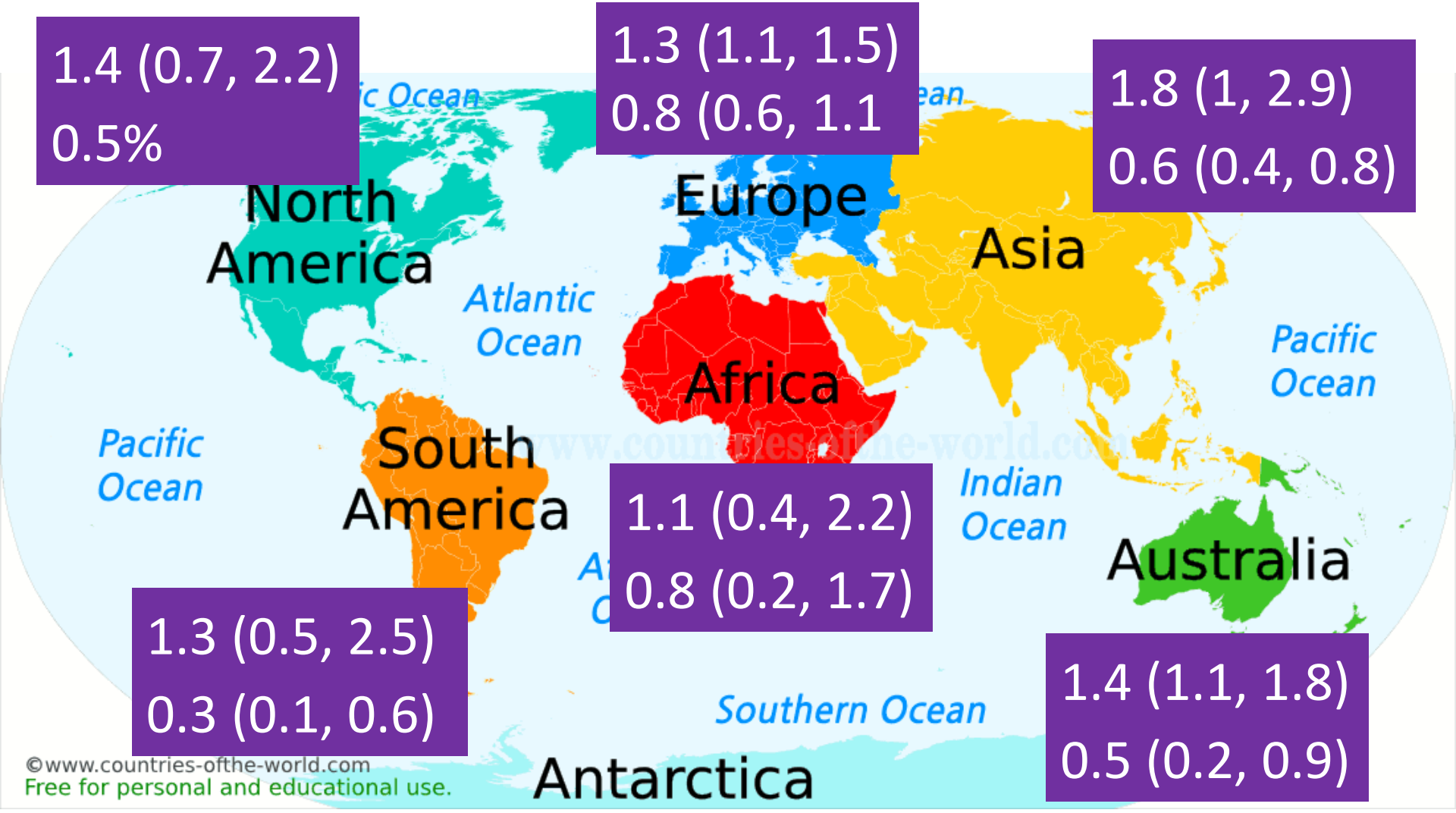
Prevalence: Continent wise

Continent wise prevalence

Location	No screened for sero-prevalence	sero +	Pooled sero-prevalence (95% CI)	No screened for biopsy proven CeD	Bx proven CeD	Pooled prevalence of CeD
Continents						
Europe	163,700	2340	1.3 (1.1, 1.5)	98, 391	1119	0.8 (0.6, 1.1)
N America	17,778	200	1.4 (0.7, 2.2)	200	01	0.5
S America	20,245	280	1.3 (0.5, 2.5)	16,550	69	0.3 (0.1, 0.6)
Asia	68,632	2607	1.8 (1, 2.9)	18, 052	114	0.6 (0.4, 0.8)
Africa	15,775	253	1.1 (0.4, 2.2)	7902	42	0.8 (0.2, 1.7)
Oceania	4,075	59	1.4 (1.1, 1.8)	4075	27	0.5 (0.2, 0.9)

Singh P, Clin Gastroenterol Hepatol, In press

Prevalence: continent wise



Singh P, Clin Gastroenterol Hepatol, In press

CeD in world's top ten most populous countries

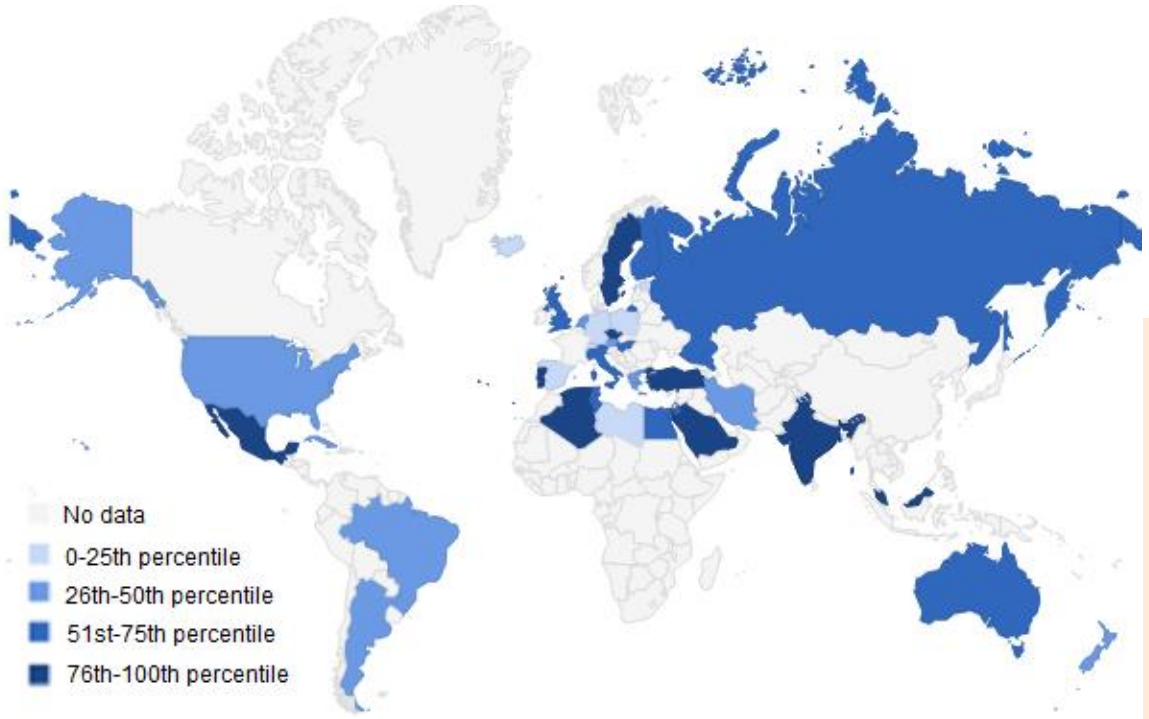
- Population based prevalence available only from four top ten populous countries
  - India
  - USA
  - Brazil
  - Russia

Lack of data from

- China
- Indonesia
- Pakistan
- Nigeria
- Bangladesh
- Japan

Sero-prevalence: country wise

Highest Q
Algeria
Czech Rep
India
Israel
Saudi-Arabia
Sweden
Portugal
Turkey

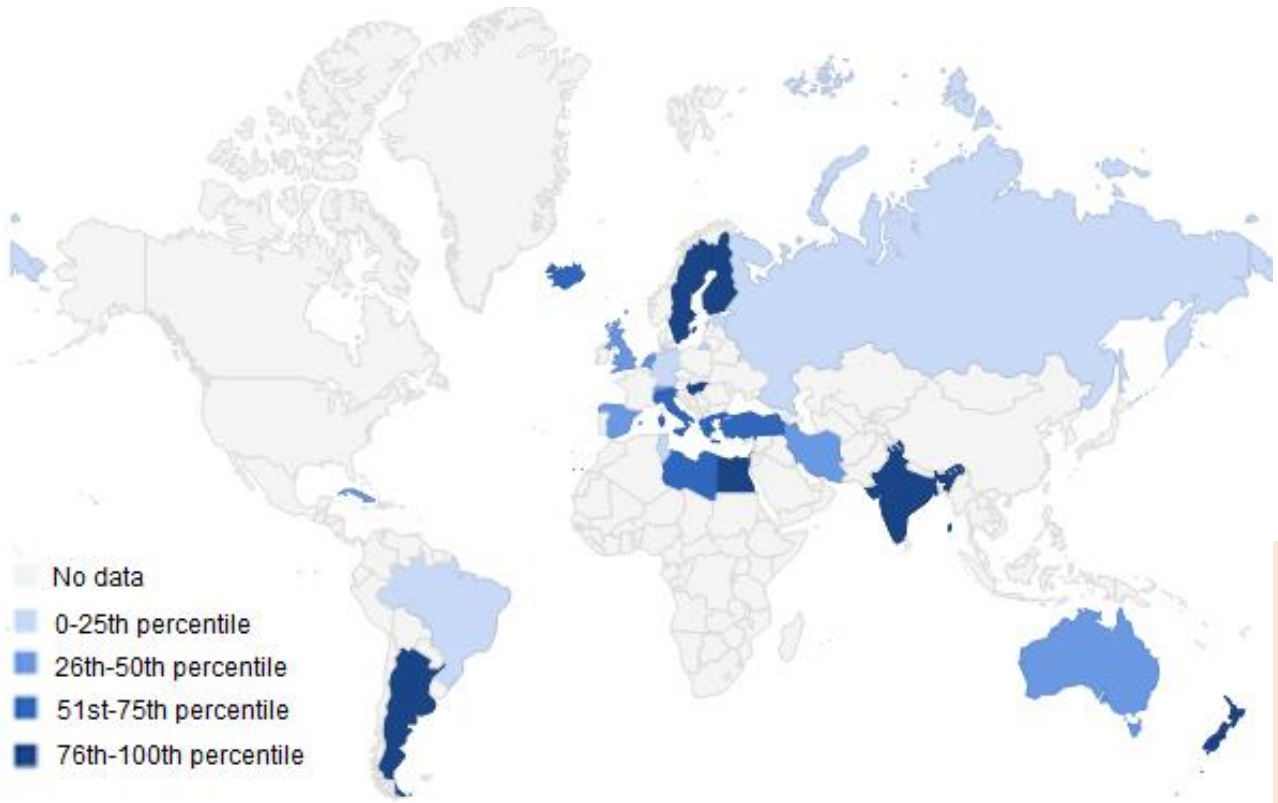


Lowest Q
Estonia
Germany
Iceland
Libya
Poland
Spain
Switzerland

Singh P, Clin Gastroenterol Hepatol, In press

Prevalence of CeD: country-wise

Highest Q
Argentina
Egypt
Hungary
Finland
India
NZ
Sweden



Lowest Q
Brazil
Germany
Russia
Tunisia

Singh P, Clin Gastroenterol Hepatol, In press

Children Vs Adults
Difference in prevalence of biopsy confirmed CeD

- Of 57 studies, 43 reported separate pooled prevalence for pediatric pts and adult pts
- Pooled prevalence of CeD: (P<0.001)
  - 276 of 40,076 adults: 0·5% (95% CI 0·3, 0·8)
  - 891 of 65,957 children: 0·9% (95%CI 0·6, 1.3)

Summary: 1

- CeD is a global disease
- 1.37% of global population is seropositive
- 0.68% of the global population have biopsy confirmed CeD

Underestimation of the disease

- Exclusion of studies in whom <50% were biopsied

Trend of prevalence of CeD

Two contexts

Has the prevalence of CeD plateaued, or still evolving

Emergence of CeD in new regions

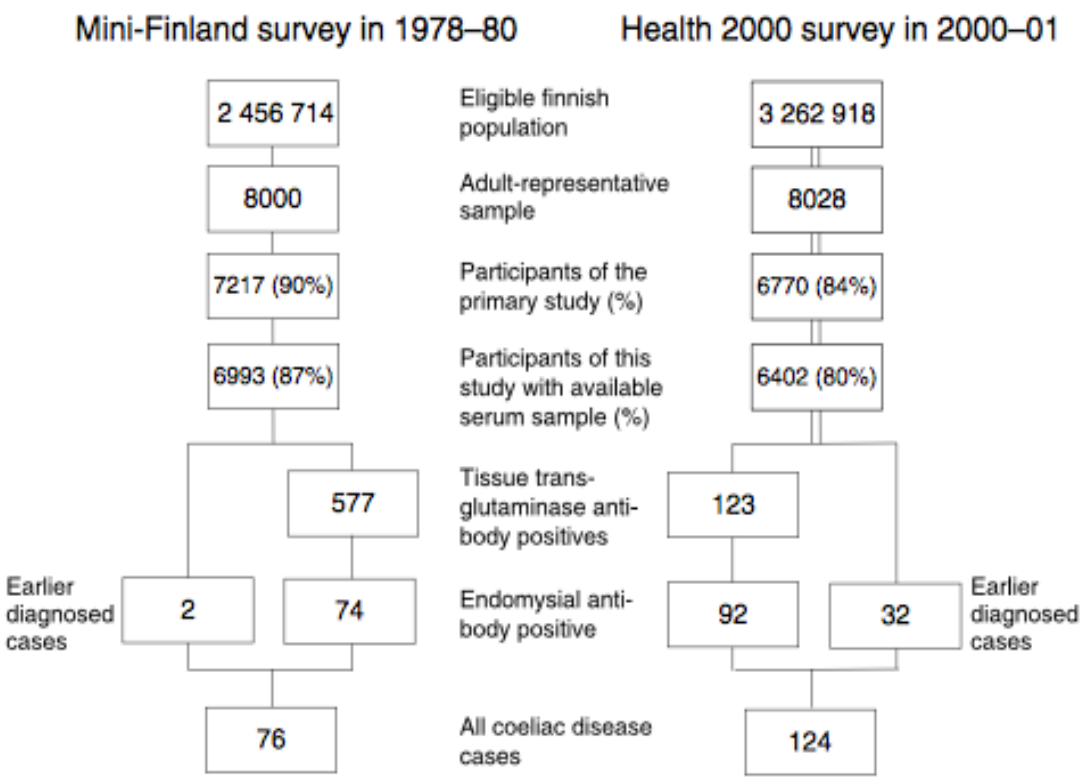
Increasing prevalence over time

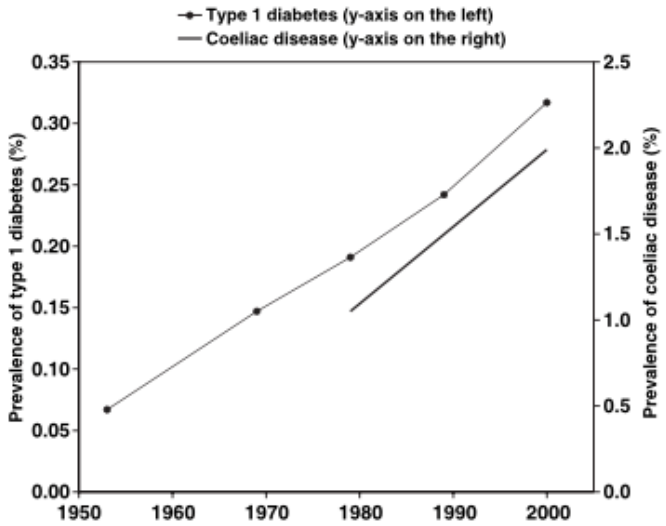
- Stratified the studies into 2 time periods:
  - January 1991 to December 2000
  - Jan 2001 onward (based on actual study period)
  - Studies overlapping 2 time periods: Deleted

- 1991 to 2000: 0.6% (95% CI, 0.5%–0.7%)
- 2011 to March 2016: 0.8% (95% CI, 0.5%– 1%)

Singh P, Clin Gastroenterol Hepatol, In press

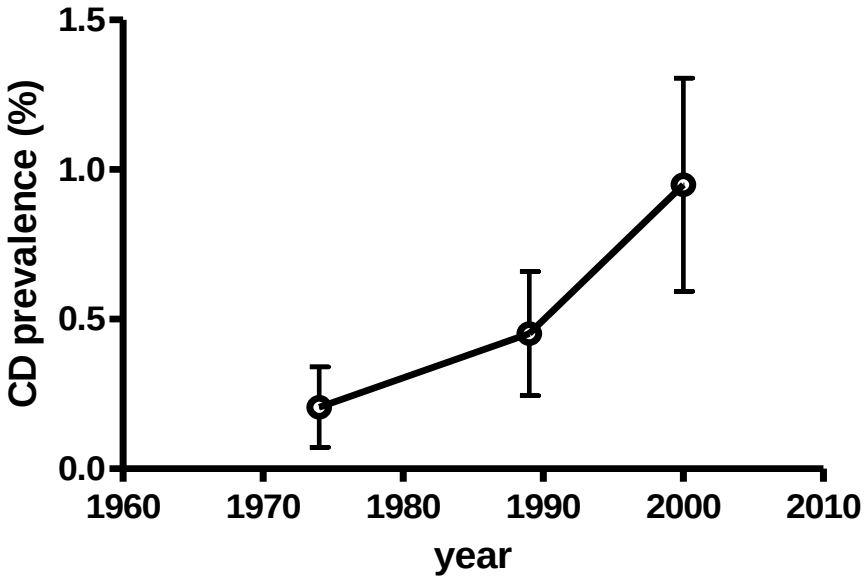
Prevalence almost doubled in Finland





Lohi S, Aliment Pharmacol Ther 2007;26: 1217–25

CeD is increasing in USA



Catassi C et al, Ann Med 2010

Rise in CeD: Why?

- Increase in awareness
- Advancement in the diagnostic tools

- Use of wheat in rice eating regions
- Increase in gluten content of infant feeding
  - Sweden epidemic (1985 to 1995)

Ivarsson A, Acta Paediatr2000;89: 165–71

Summary: 2

In many countries, the prevalence has increased 2 to 4 fold over 20 - 30 yrs

Europe


ICELAND
SWEDEN
FINLAND
NORWAY
ESTONIA
LATVIA
LITHUANIA
RUSSIAN FEDERATION
DENMARK
IRELAND
UNITED KINGDOM
NETHERLANDS
BELARUS
POLAND
GERMANY
BELGIUM
CZECH REP.
SLOVAKIA
UKRAINE
AUSTRIA
HUNGARY
FRANCE
SWITZERLAND
ROMANIA
GEORGIA
AZERBAIJAN
ARMENIA
BLACK SEA
CROATIA
BOS. & HER.
SERVIA
ITALY
BULGARIA
PORTUGAL
MACEDONIA
TURKEY
SPAIN
ALB
GREECE

Prevalence of CeD in children and adolescents in Germany.

- German Health Interview and Examination Survey for Children and Adolescents 2003-2006
- 12, 741 participants aged 1 to 17 years (6546 boys)
  - 9 (0.07%) had a reported history of CeD.
  - 98 anti-tTG positive on screening
- Prevalence of undiagnosed CeD (based on + serology): 0.8% (95% CI 0.6-1.0%),

Overall prevalence of the disease: 0.9%.

Laass MW, Detach Arztebl Int. 2015;112:553-60

Russia: still unexplored

Sparse reports on prevalence

Possibility of large burden of CeD in Russia, needs to be explored

CeD in Russia

Region	Year	Participants	Test	screened	CD
Karelia region	1997–2001	School children	Anti-tTG	1988	1 : 496 (0.20%)
Ryazan region	ND	blood donors	Anti-tTG	1740	1 : 174 (0.57%)
Irkutsk region	2011	Specific risk*	Anti-tTG	1441	1 : 18 (5.56%)
				1402	1 : 31 (3.32%)
	2014	Specific risk*		1775	1 : 40 (2.50%)
Krasnodar region	2010	Specific risk*	Anti-tTG and/or AEA	742	1 : 36.6 (2.73%)
Moscow	2003–07	Specific risk*	Anti-tTG	363	1 : 6.2 (15.98%)
	2012	Specific risk**		318	1 : 106 (0.94%)
Nizhny Novgorod	2008	Specific risk*	Anti-tTG	1045	1 : 7.6 (13.16%)
Ryazan region	2002–2006	Specific risk***	Anti-tTG	256	1 : 57 (1.75%)

Lyudmila V. Savvateeva, J Immunol Res. 2017

CeD in Sub-Sahara

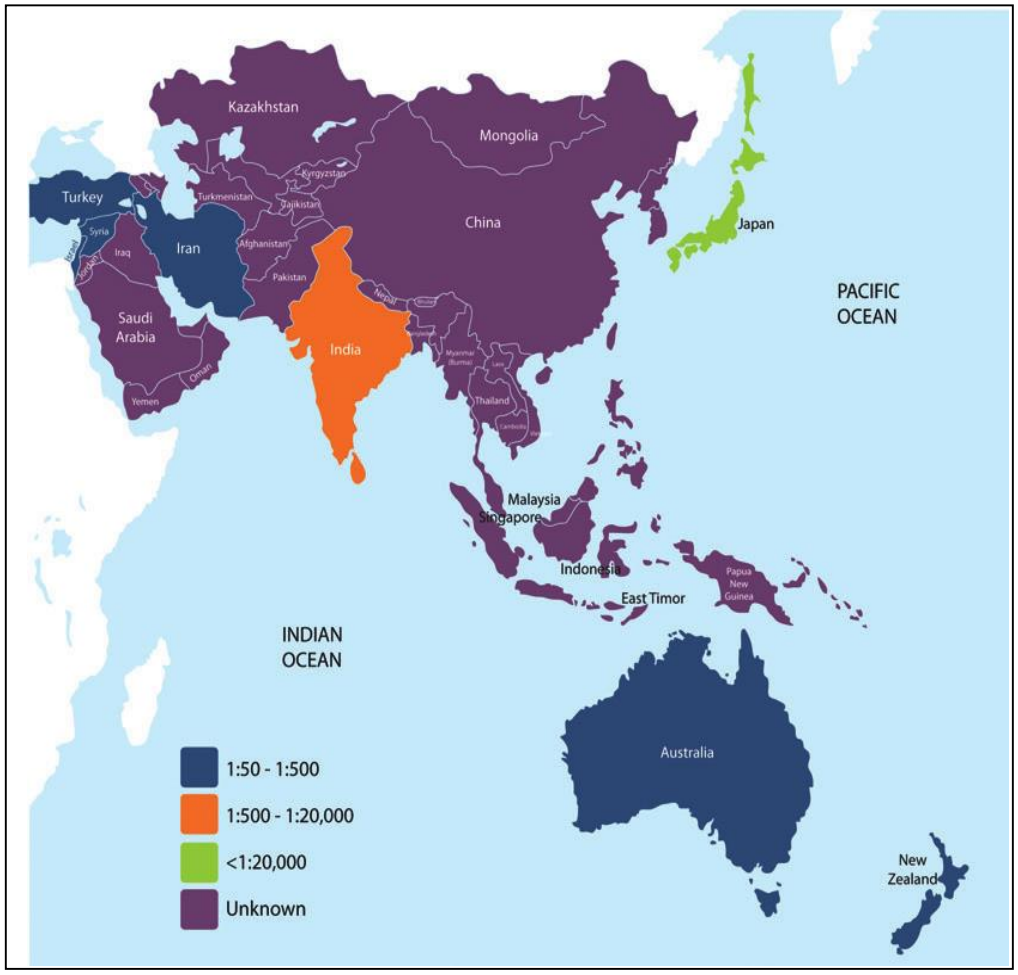
16 with positive AEA: All coeliac
56/989 AEA+: 5.6%

5 fold higher
High gluten consumption
High HLA-DQ2/DQ8

Catassi, Lancet, 1999
Catassi, Tissue antigen, 2001

Asia

Map of CeD in Asian region



Cummins AG, J Gastroenterol Hepatol. 2009

India

India: Population-based study

Two stage screening: Symptoms-based questionnaire and serology
Seropositive: Biopsy

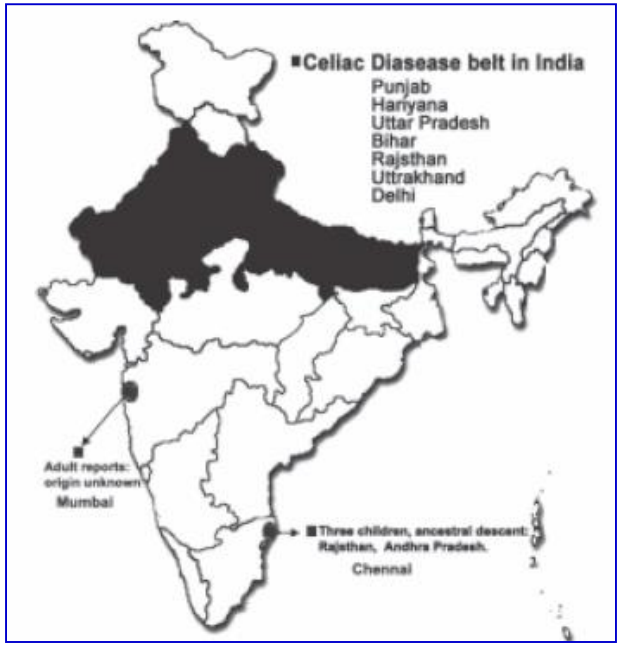
Subgroup	Corrected seroprevalence (95% CI)	Corrected prevalence of CeD (95% CI)
Adults (*n = 6845)*	*1.10% (0.86, 1.37)*	*0.85% (0.64, 1.09)*
Children (*n= 3643)*	*2.06% (1.62, 2.57)*	*1.41% (1.04, 1.84)*
Males (*n = 5305)*	*1.28% (1.00, 1.62)*	*0.91% (0.67, 1.20)*
Females (*n = 5183)*	*1.60% (1.28, 1.98)*	*1.20% (0.92, 1.53)*

1.04% (One in 96)

Population prevalence of CeD in India

Investigators	Study	No	Prevalence
Sood et al, 2006	Population based study in children (Punjab)	4347	1 in 310 (O.3%)
Makharia, 2010	Population based study in adults (NCR)	2879	1 in 96 (1.04%)
Kochhar, 2015	Healthy blood donor	1610	1 in 179 (0.56%)
Singh P, JGH, 2016	**Metaanalysis**		**0.6%**

Regional differences



- Mostly in Northern part
- Few from Southern and North Eastern part of India.

- Is it dietary factor ?
- Genetic predisposition?

Indian population: 1.2 Billion

Northern Indian (Aryans)

North Eastern (Indo Burman)

Southern India (Dravidians)

Multi-site prevalence study

Total subjects contacted: 32,618

↓

Agreed for screening for CeD: 23,331

↓

Anti tTG ab +ve (Aeskulisa): 1,709 (7.3

↓ Se A

Both positiv %)

A uodenal biopsy: 103/158

↓

as abnormality (March grade≥2) S/o CeD: 38

Villous abnormality (Marsh grade 0-1) S/o potential CeD: 58

Inadequate biopsy: 7

Ramakrishna, AJG 2015

Combined prevalence of CeD & potential CeD in India : 0.67%

India: Multi-site population based prevalence

Northern part

Prevalence	1.2%
CeD	0.85%
Potential CeD	0.37%

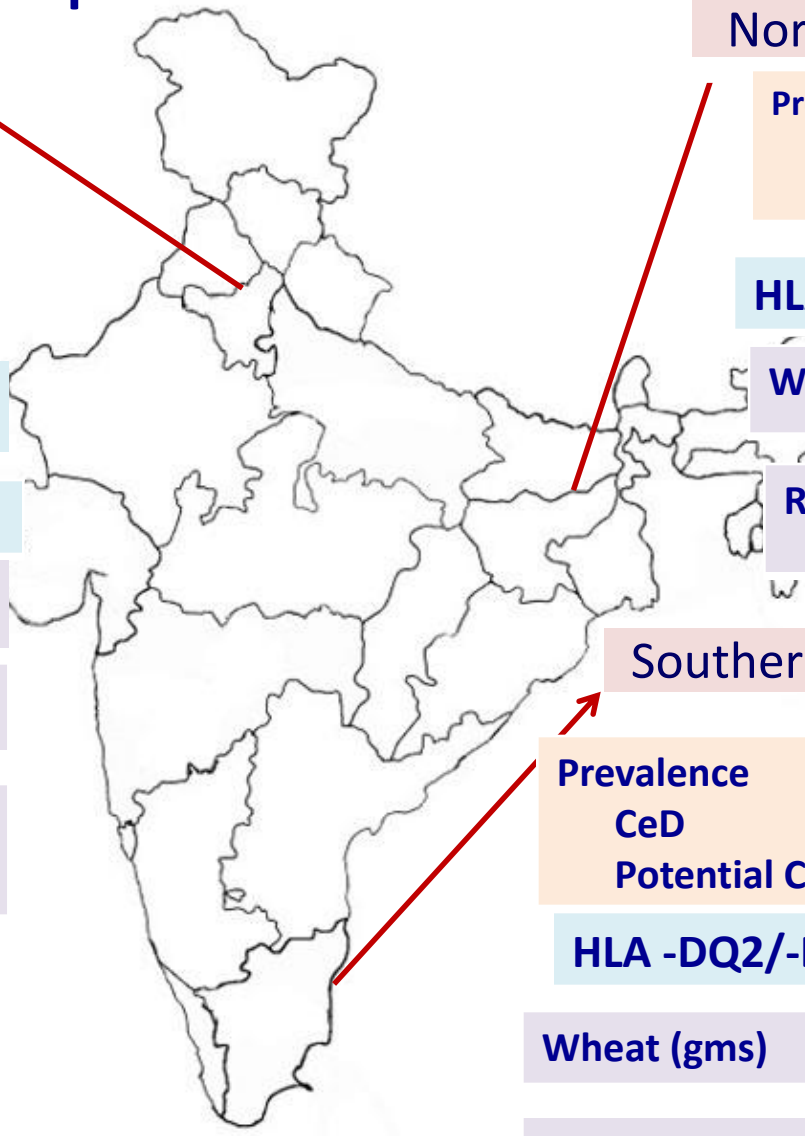
Risk factors

HLA haplotype

HLA -DQ2/-DQ8	38.1%

Daily Dietary intake

Wheat (gms)	455.6±114.5
Rice (gms)	75.1 ±39.2



North Eastern part

Prevalence	0.87%
CeD	0.46%
Potential CeD	0.39%

HLA -DQ2/-DQ8	31.4%
Wheat (gm)	37.8±11.5
Rice (gm)	326.1±130.6

Southern part

Prevalence	0.13%
CeD	0.01%
Potential CeD	0.12%

HLA -DQ2/-DQ8	36.4%
Wheat (gms)	25.7±26.8
Rice (gms)	167.5±77.2

South Indians in USA: lowest prevalence
Punjabis in USA: highest prevalence

National pathology laboratory 2008 and 2015.
Prevalence of villous atrophy
Algorithmic determination of ethnicity based on names

- Among all patients (n=454,885)
  - Overall prevalence: 1.74%.
  - Other Americans (n=380,163): 1.83%
- Lower prevalence in
  - Patients of South Indian (n=177, 0%; P=.08),
  - East Asian (n=4700, 0.15%; P=<.0001),
  - Hispanic (n=31,491, 1.06%; P=<.0001).
- Higher in pts from Punjab (n=617, 3.08%)
  - others North India (n=1195, 1.51%; P=.02).

Krugel A, Clin Gastroenterol and Hepatol, 2016

Why?

CeD in China: Unexplored

Traditional belief: No CeD in China

Study	Province	Patients	Criteria for diagnosis	No.	Prevalence
Wu J 2010, Rev Esp Enferm Dig.	Nanjing	IBS_D (72) IDDM (6)	IgA-AGA IgA-TTG	6/78 (AGA+) 2/78 (tTG+)	7.7% 2.6%
Wang XQ, 2010 Zhonghua Er Ke Za Zhi.	Shanghai	Chronic diarrhea	Clinical sypmtoms Duodenal Bx	14/118 suspected	**12%**
Xin-Qiong W, JPGN, 2011	Shanghai, Wuhan, Jinan, Chengdu	Children with Chr diarrhea		14/118	

19,778 undiagnosed Chinese adolescents and young adults (age, 16-25 y): 2.19% coeliac disease Ab positive

Clin Gastroenterol Hepatol, 2017

CeD in IBS-D patients

- 246 IBS patients (North China) and 246 healthy controls.
- Screened with anti-tTG: Positive test: probe-based confocal laser endomicroscopy (pCLE) and duod Bx
- Sero-prevalence: 12 IBS (4.8%) & 2 controls (0.81%)
- 5 underwent pCLE and targeted biopsy; all CeD
- With GFD: Seven serologically positive clinical improvement,
- Minimum Prevalence of CeD: 2.85%.

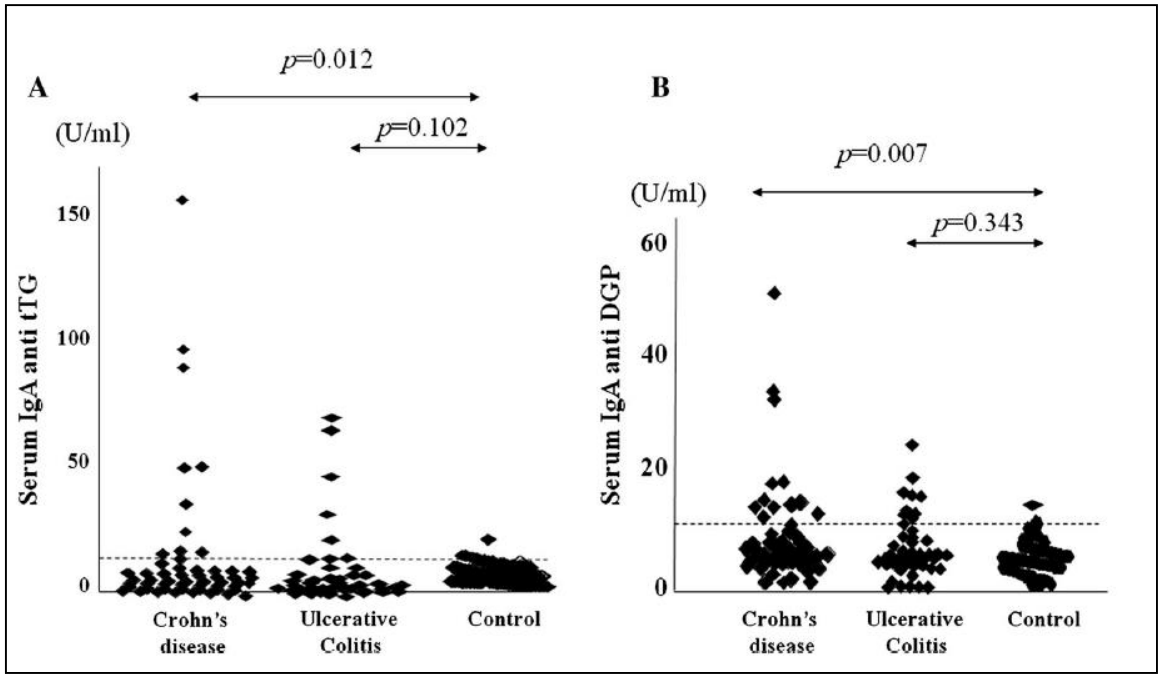
Kou G, J Dig Dis. 2018 Feb 16

CeD in Japan

Yr	Diagnosis	n	Gluten Challenge Test or GFD	Serological Test	Biopsy Confirmed	HLA
1983	Celiac sprue, Gluten induced enteropathy	1	Yes(Gluten challenge, GFD)	No	Yes(villous atrophy)	No
1991	Celiac sprue	4	Yes (Gluten Challenge	No	Yes(villous atrophy)	No
1988 1993	Celiac disease	2	Yes (GFD)	No	Yes(villous atrophy)	No
2000	Celiac sprue	1	Yes (GFD)	No		No
2003	Celiac disease	1	No	No	No	No
2006	B-cell Lymphoma associated with celiac disease	1	No	positive for tTG	Yes(villous atrophy)	Yes (nonDQ2/8)
2007	T-cell Lymphoma associated with celiac disease	1	No	No	Yes(villous atrophy)	No

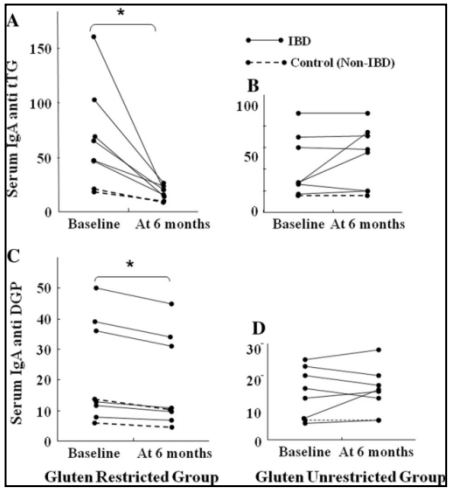
Courtsey, Watanabe C

Sero-prevalence of CeD in IBD: Japan



IBD: anti-tTG Ab and anti-DGP Ab: 22 (12.8%) and 23 (13.4 %)

Controls (n=172): 3 (1.6%) and 1(0.5%),



Watanabe; J Gastroenterol 2014

CeD in Malaysia

- 562 Healthy young volunteers (mean age 24 ± 2.4 yrs)
- Screening for CeD: Two stages
  - First step: IgG/IgA AGA and anti-tTG IgA/IgG.
  - Second step: Testing of positive samples by EmA.
- Definition of CeD: Both positive
- Seroprevalence of CeD: 1.25% (95% CI, 0.78-1.72) (7 of 562)
  - Median AGA: 38.2 U/ml (IQR, 28.3–60.4 U/ml)
  - IgA anti-tTG Ab: 49.2 U/ml (IQR, 41.1–65.9 U/ml)

Malay: 0.8% (2 of 236),
Chinese: 1.7% (3 of 177)
Indian: 1.3% (2 of 149)

Sero-prevalence of CeD: 1.25% (1 in 100)
CD is underdiagnosed, Could be a much greater problem

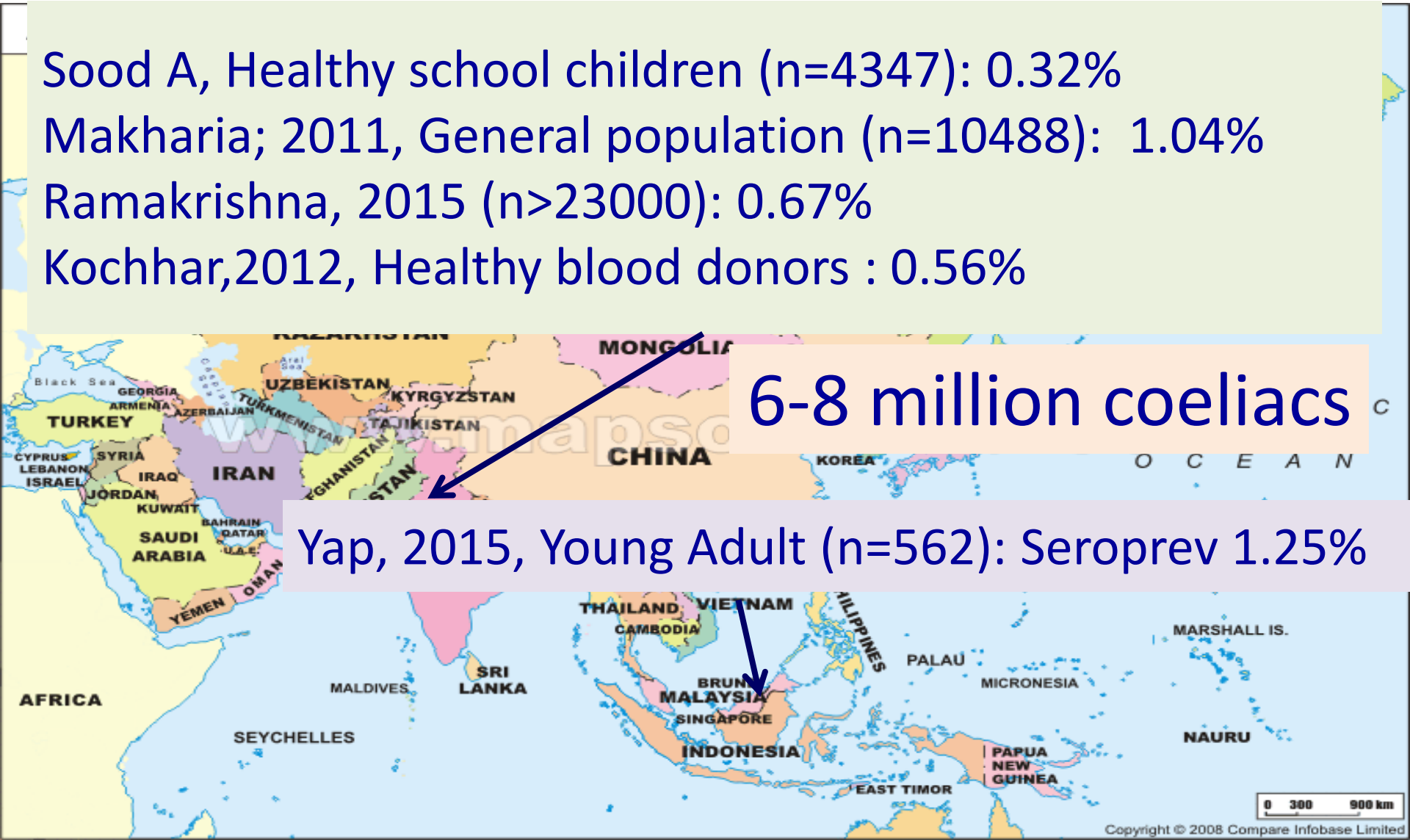
Population based studies: Eastern/Southern Asia

Sood A, Healthy school children (n=4347): 0.32%

Makharia; 2011, General population (n=10488): 1.04%

Ramakrishna, 2015 (n>23000): 0.67%

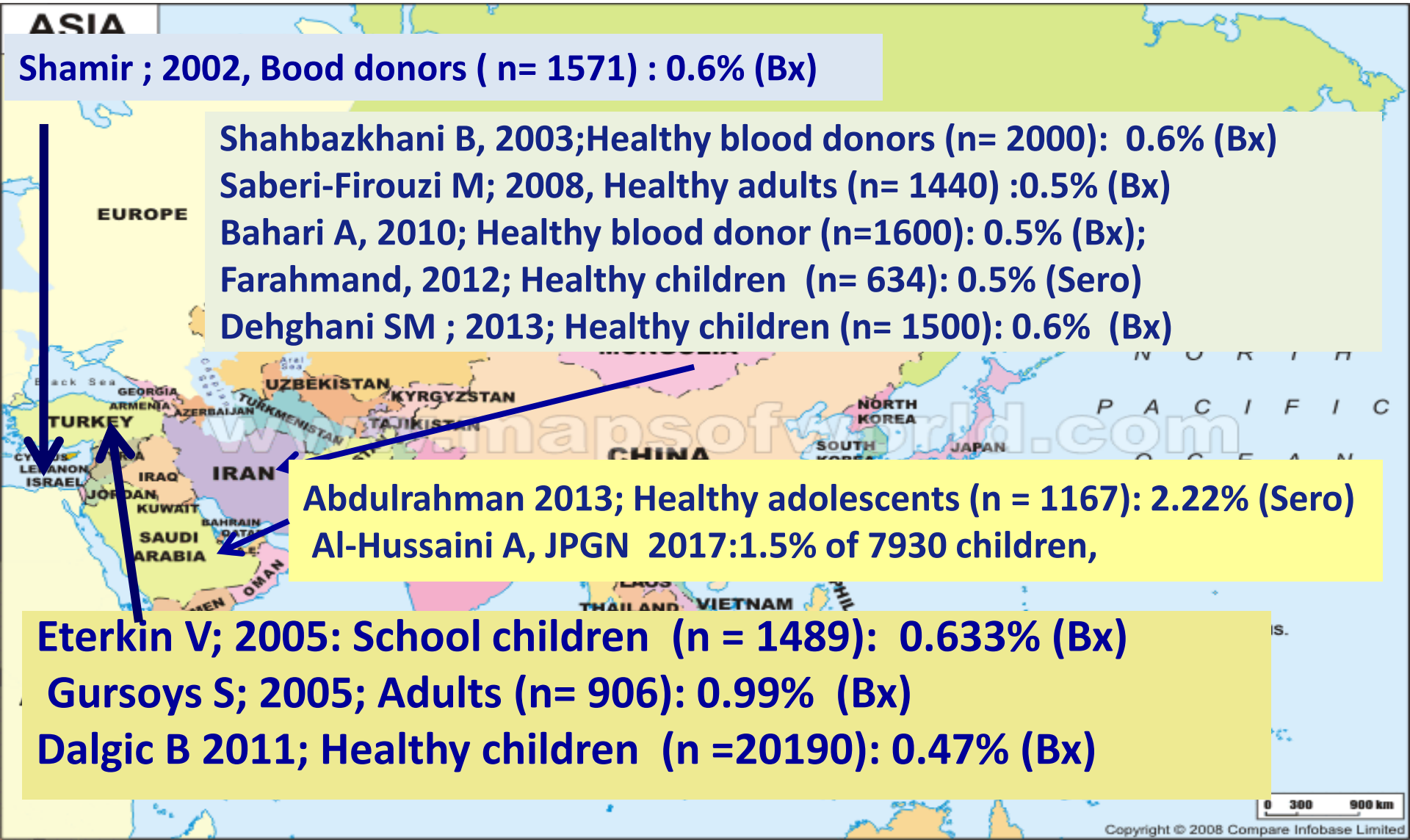
Kochhar,2012, Healthy blood donors : 0.56%



6-8 million coeliacs

Yap, 2015, Young Adult (n=562): Seroprev 1.25%

Population based studies: Middle East/West Asia



Shamir ; 2002, Bood donors (n= 1571) : 0.6% (Bx)

Shahbazkhani B, 2003;Healthy blood donors (n= 2000): 0.6% (Bx)
Saberi-Firouzi M; 2008, Healthy adults (n= 1440) :0.5% (Bx)
Bahari A, 2010; Healthy blood donor (n=1600): 0.5% (Bx);
Farahmand, 2012; Healthy children (n= 634): 0.5% (Sero)
Dehghani SM ; 2013; Healthy children (n= 1500): 0.6% (Bx)

Abdulrahman 2013; Healthy adolescents (n = 1167): 2.22% (Sero)
Al-Hussaini A, JPGN 2017:1.5% of 7930 children,

Eterkin V; 2005: School children (n = 1489): 0.633% (Bx)
Gursoys S; 2005; Adults (n= 906): 0.99% (Bx)
Dalgic B 2011; Healthy children (n =20190): 0.47% (Bx)

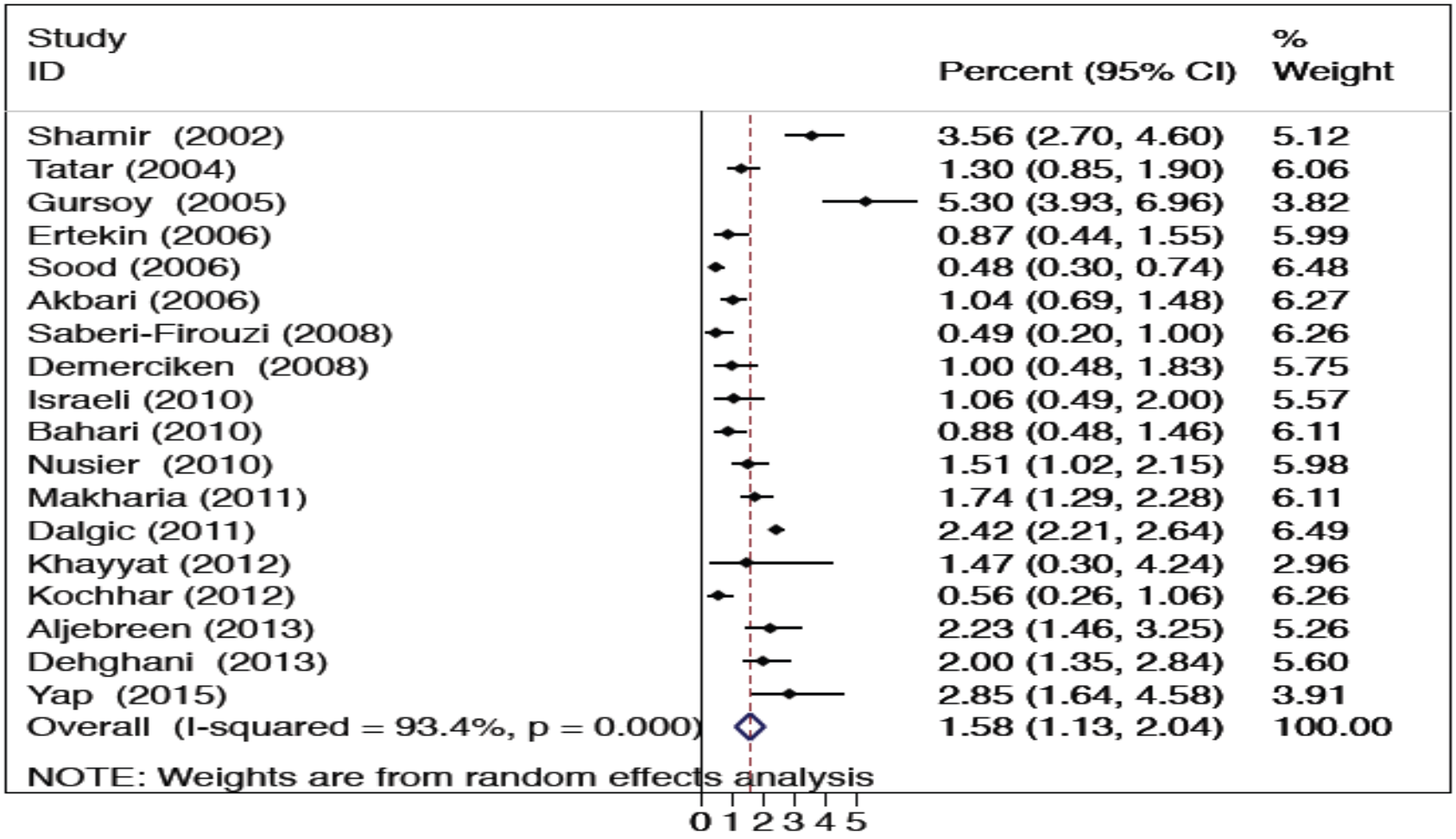
Asian countries: Case report/case series

Jordon, Georgia, Pakistan, Sri-Lanka, Bangladesh, Thailand, Singapore, Indonesia, Japan, Taiwan, South Korea

No reports from

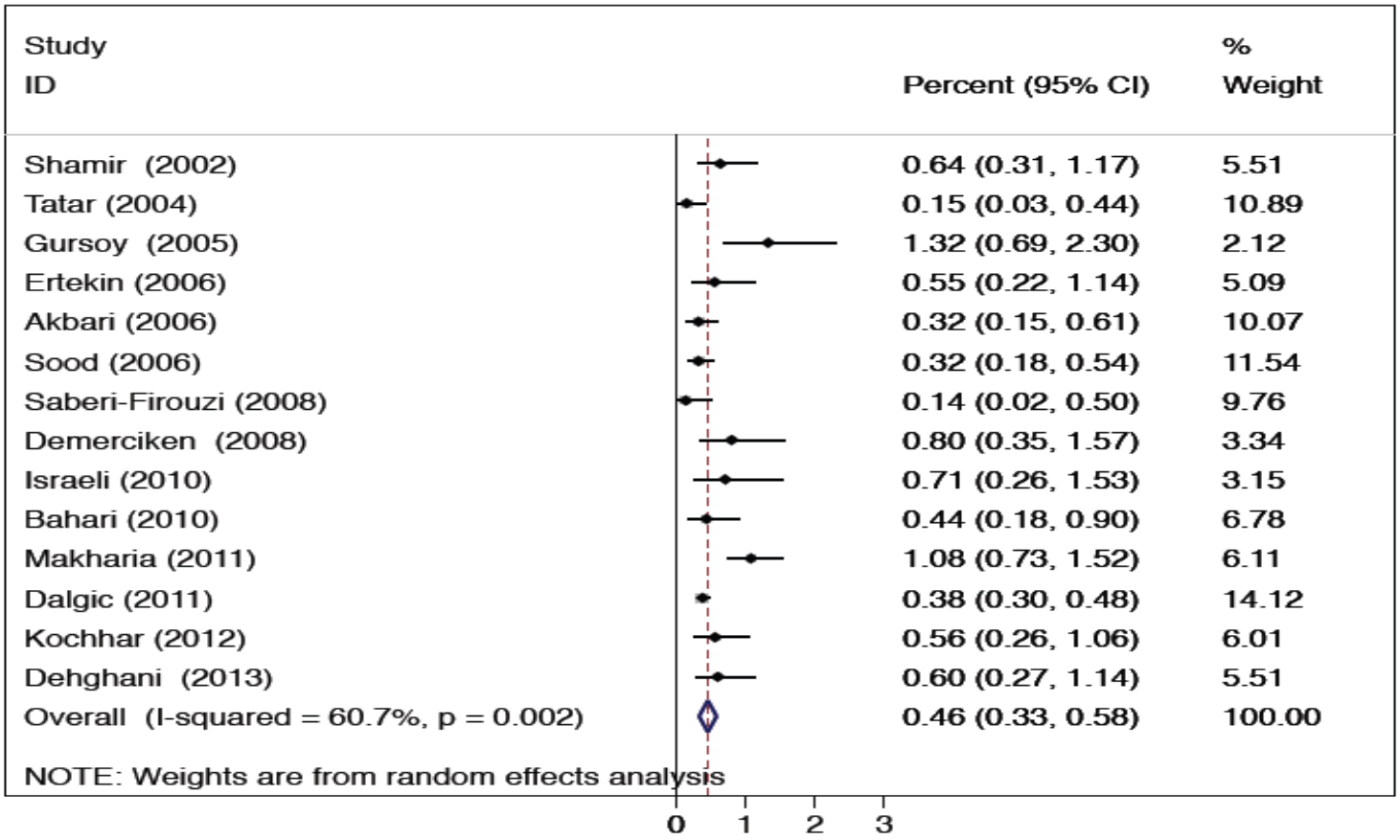
Azerbaijan, Kazakhstan, Uzbekistan, Turkminstan, Afganistan, Kyrgyzstan, Tajikistan, Cambodia, Mynmar, Mongolia, Brunei Darussalam, Oman, Nepal , Bhutan,

Pooled seroprevalence of CeD in Asia: Systematic review



Prashant Singh, et al, JGH 2016

Pooled prevalence of CeD in Asia: Systematic review



Prashant Singh, et al, JGH 2016

Summary 3:
CeD in Asia

- 50 countries
- 60% of the world's population 4.2 billion
- Two largest countries: China and India
  - China: 1.35 Billion
  - India: 1.22 Billion

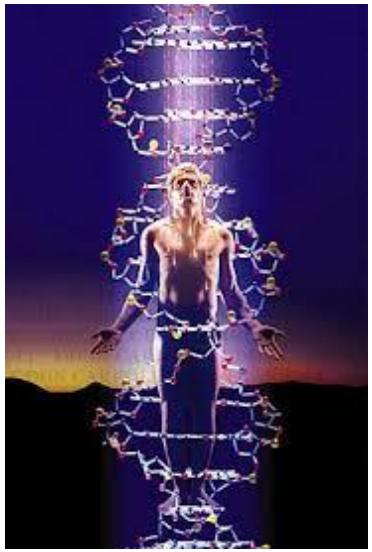
No of patients with CeD in Asia is likely to increase

There is a need to understand the epidemiology of coeliac disease in Asia

CeD: In Future

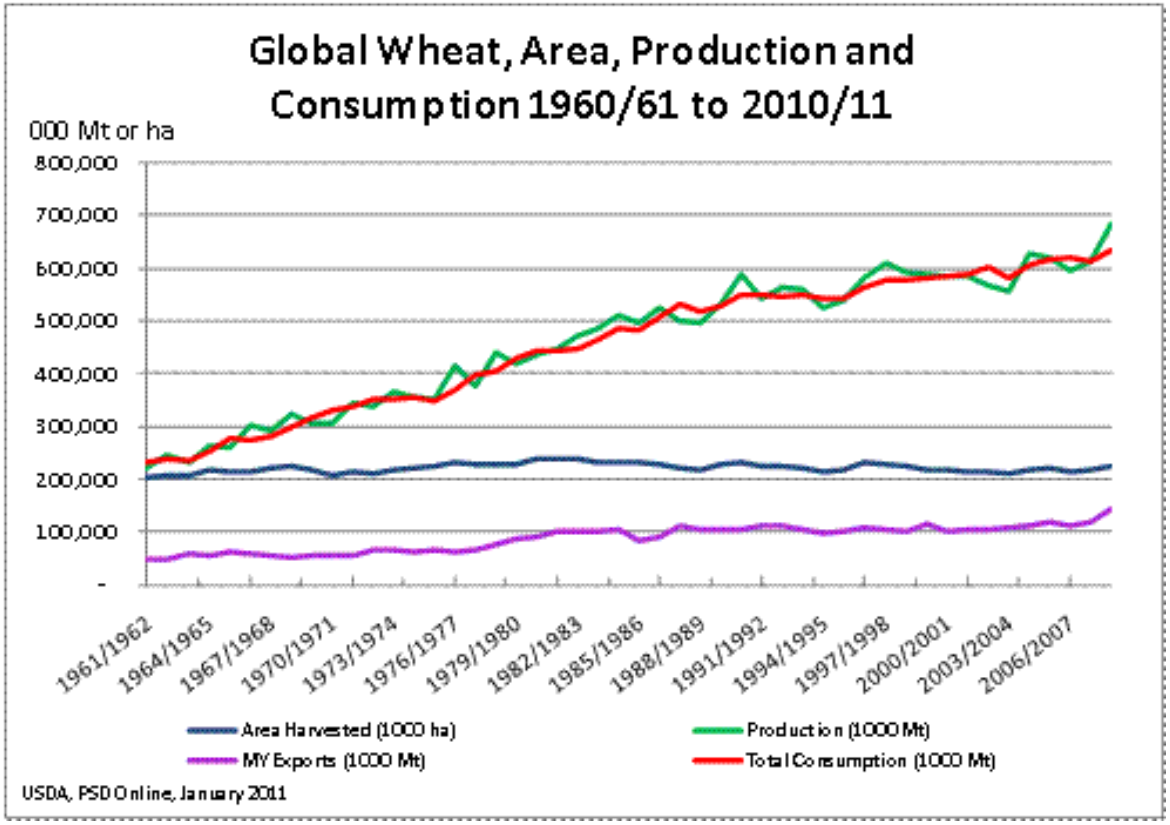
What are the predictions?

CeD: Essential factors



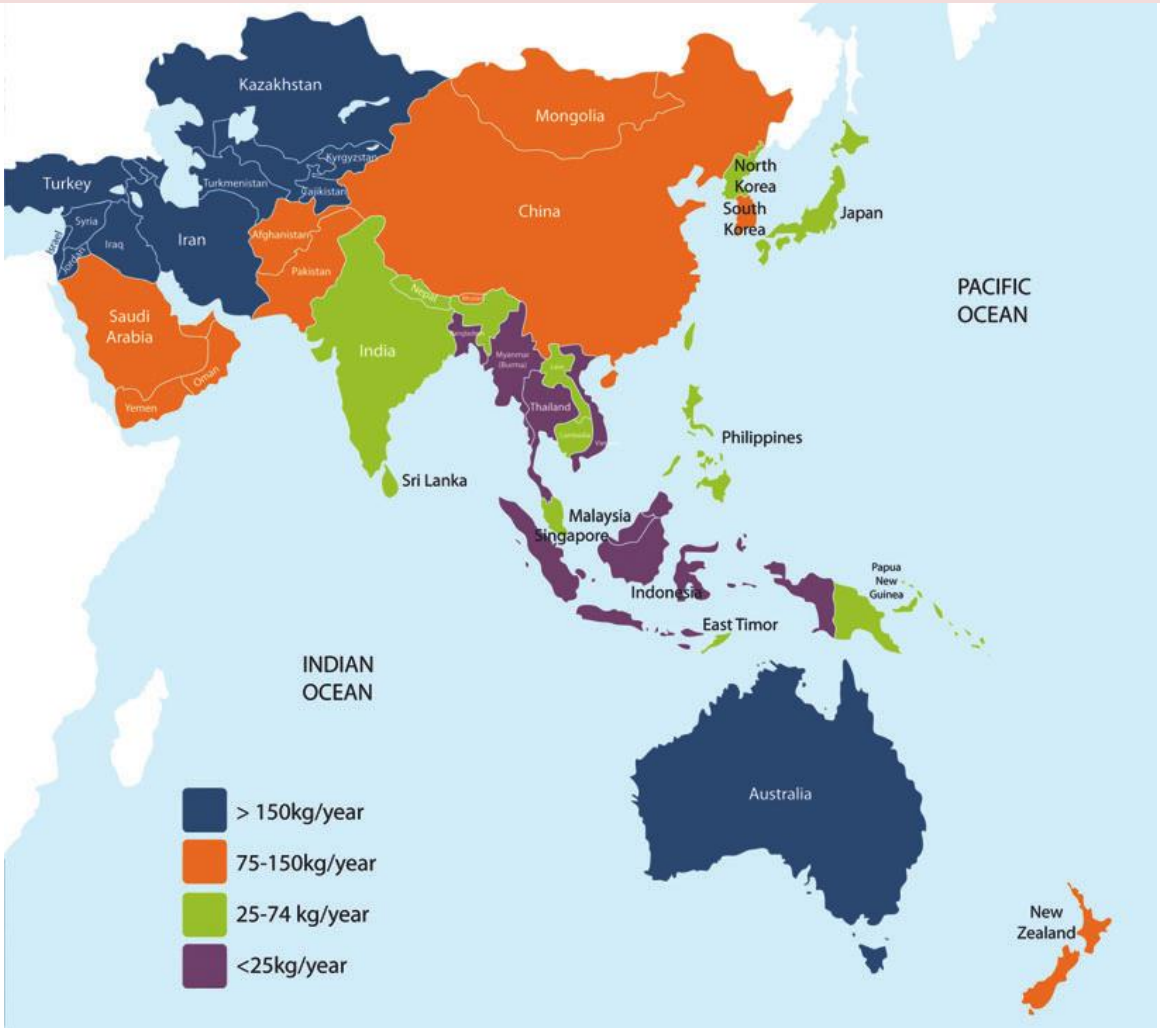
HLA-DQ2 and/or -DQ8)

Wheat production has increased globally



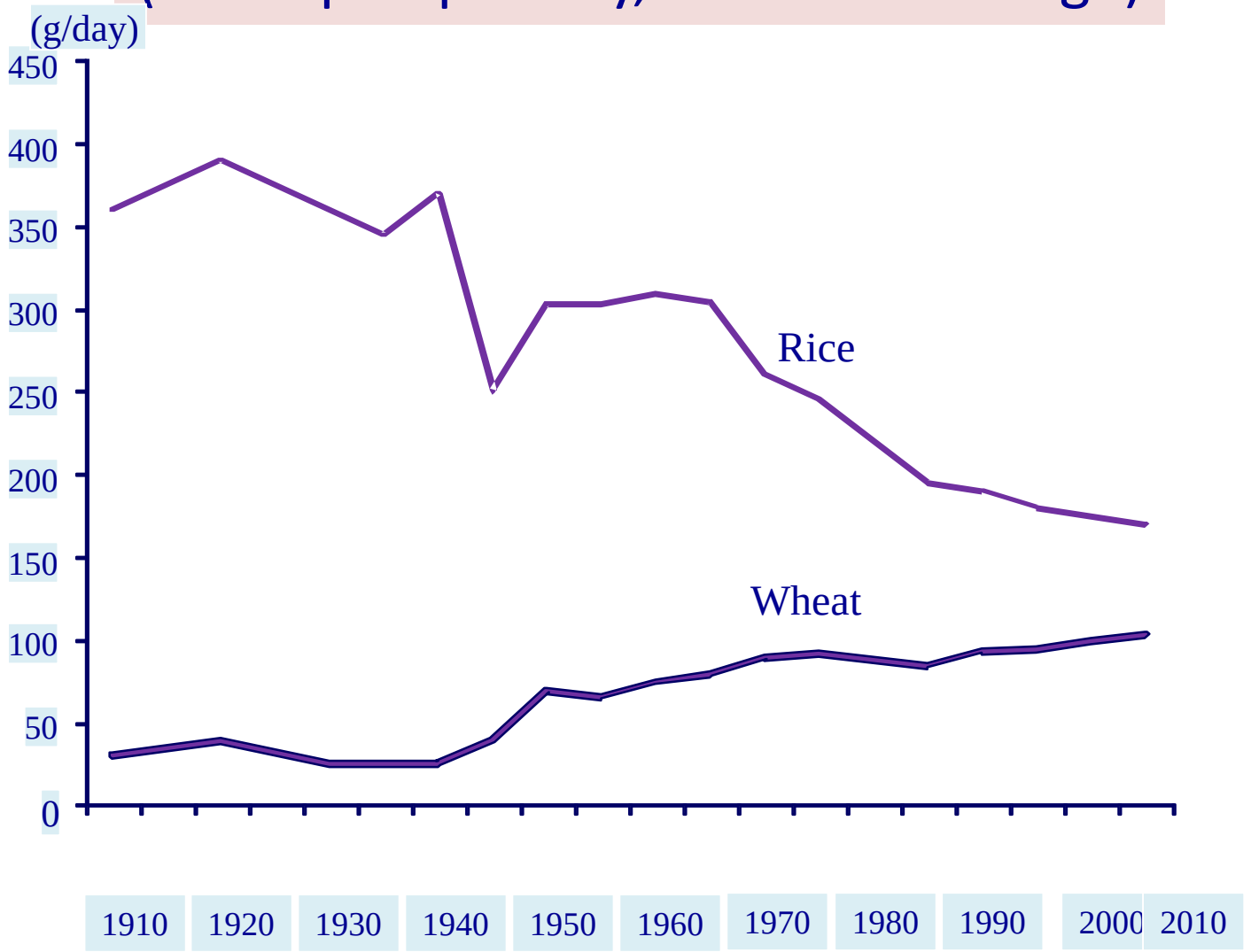
http://www.grdc.com.au/Research-and-Development/GRDC-Update-Papers/2011/09/~/media/F468B203AFBE4A7FB62A5DFBCD0A730C.gif?w=496&h=349

Wheat consumption (kg) per person per year for countries in the Asia Pacific region



Aquino P, Carrión F, Calvo R. *Selected Wheat Statistics. 2001*
Cummins AG, J Gastroenterol Hepatol. 2009

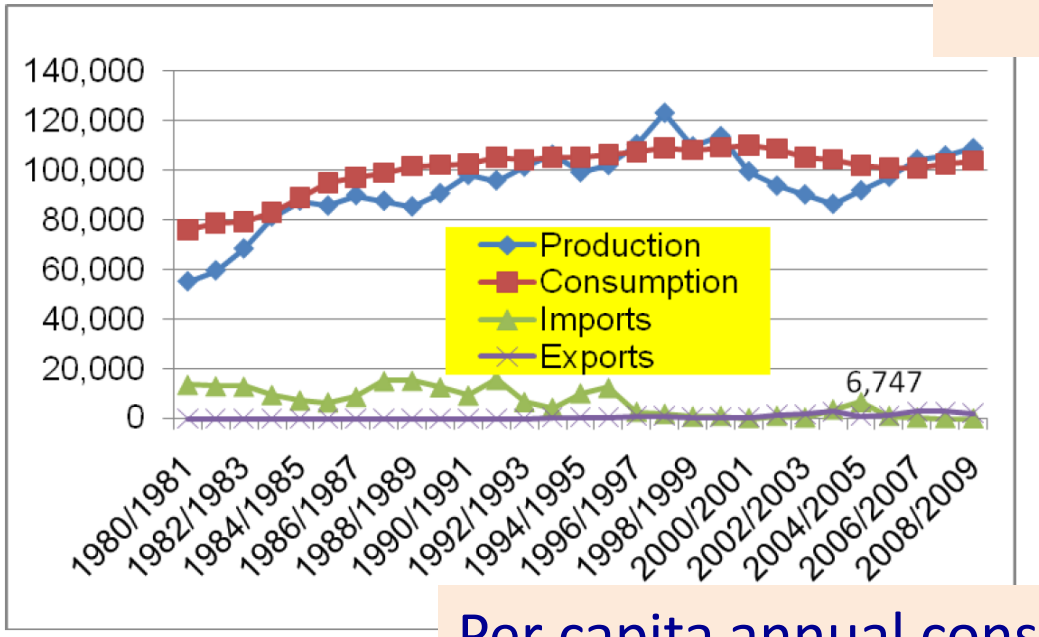
Trends in Food Intake 1910 to 2011 (Per capita per day, National Average)



National Health and Nutrition Survey Japan, 2010

Wheat statistics in China (1000mt)

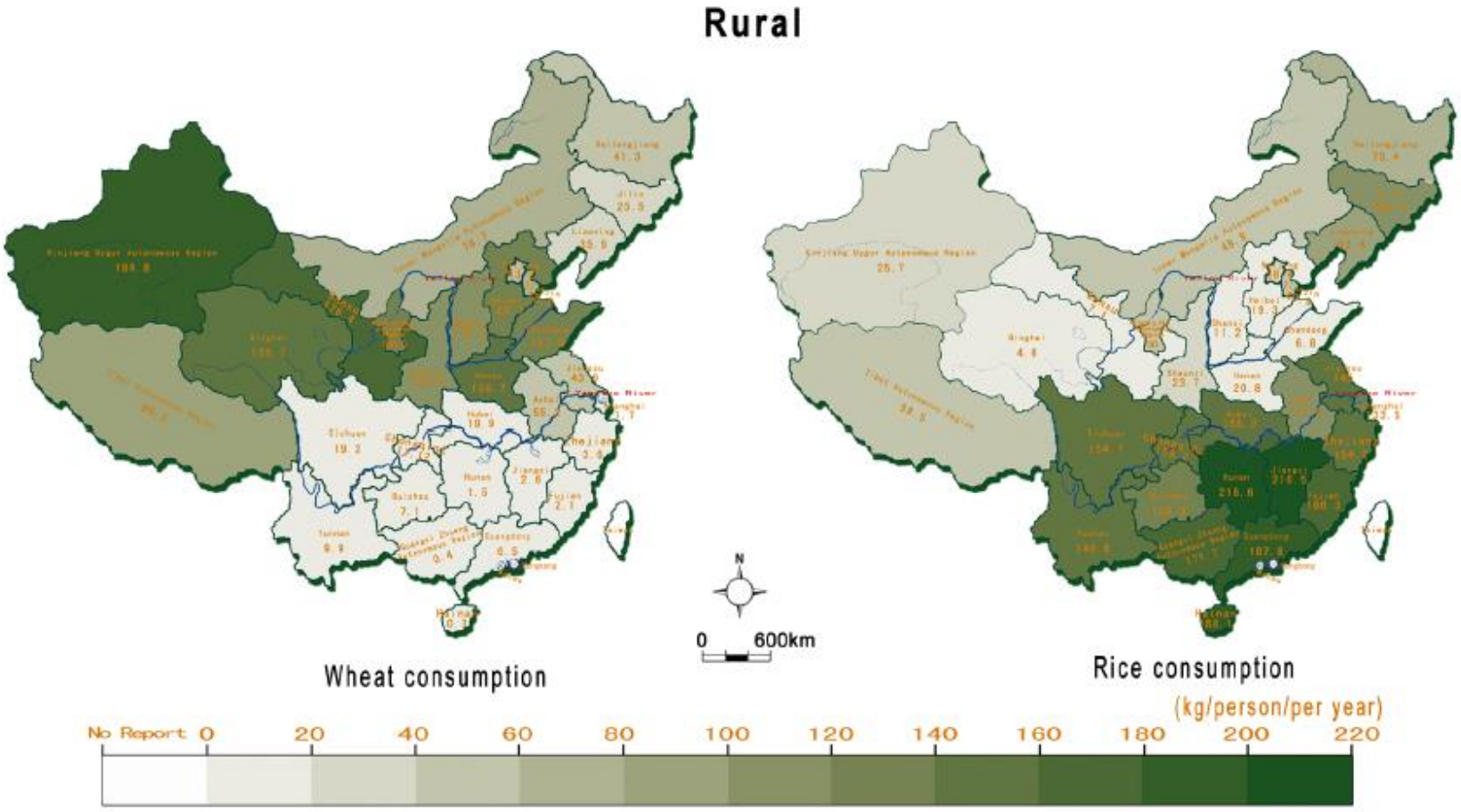
Consumption of wheat is over 100 million metric tons for over 1,370 million people



Per capita annual consumption of wheat
Rural households: 59.6kgs
Wheat flour in urban households: 12.5 kg

Yuan J, PLoS, 2013

Wheat consumption pattern: China



Yuan J, PLoS, 2013

Change in dietary pattern

- Increasing demand for convenience foods Urbanization
- Migration of people from rural to urban area
- Change in traditional eating practices to breads, pasta, pizza and burger

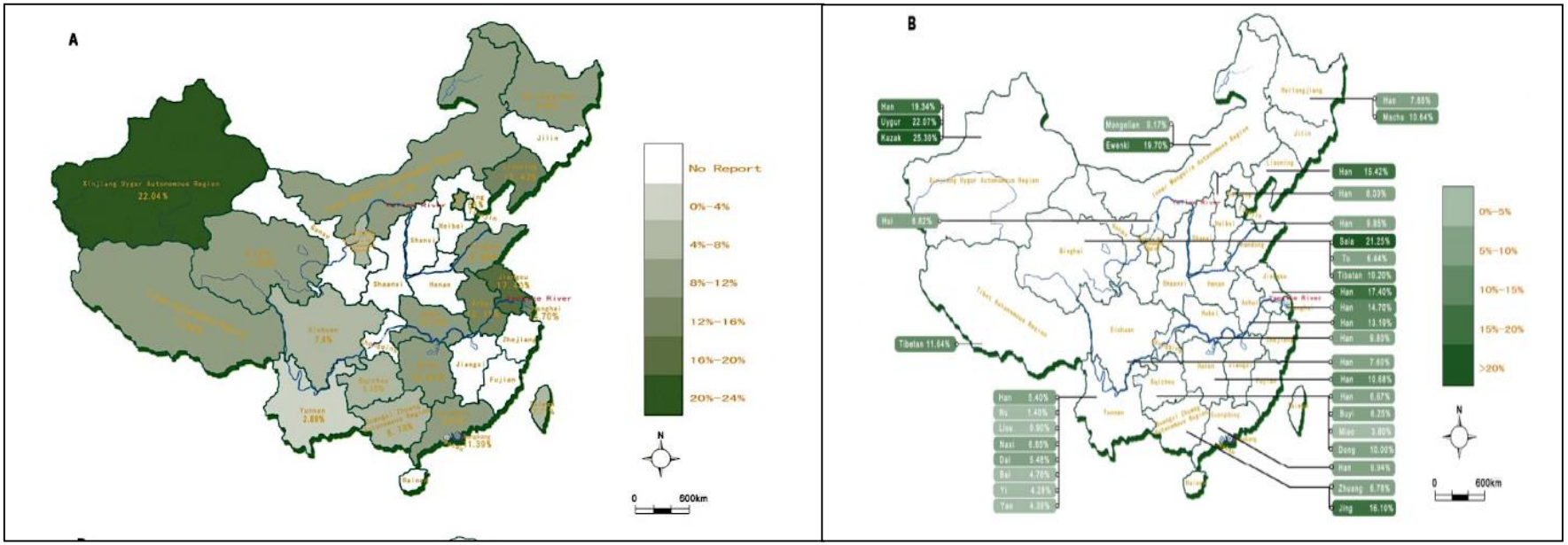
Frequency of HLA-DQ2 in the population of various countries in the Asia–Pacific region

< 5%	5-20%	>20%
Cook Islands	China	Australia
Indonesia	India	Iran
Japan	Malaysia	Israel
Korea	Mongolia	New Zealand
Nauru	Singapore	Pakistan
New Caledonia	Sri Lanka	Saudi Arabia
Papua New Guinea	Taiwan	
Philippines	Thailand	
Samoa	Turkey	
	Vietnam	

Middleton D. *Allele*Frequencies in Worldwide Populations*. Available from URL:http://www.allelefrequencies.net/
Cummins AG, J Gastroenterol Hepatol. 2009

HLA DQB1*0201/0202 allele in China

Ethinic minorities



Yuan J, PLoS, 2013

Summary 4

Both the initials reports and presence of predisposing factors highlight that coeliac disease exists in many Asian countries

Barriers

- Believes
- Lack of diagnostic tests
- Very high threshold of suspicion

World Gastroenterology Organization

Asian Pacific Association

Awareness about CeD should be increased amongst medical clinicians and patients

Final summary

- CeD is now a GLOBAL disease
  - It affects atleast 0.68% of global population (39-56 million globally)
- Prevalence of the disease has increased over past few decades
- Asia is now coming to the centerstage of CeD
- India presents a unique geographical region, with varying prevalence in North and South, to understand the factors

Acknowledgement

Artistic expression

Sankha Samatha