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# **MAP OF DIGESTIVE DISORDERS & DISEASES**

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## Map of Digestive Disorders & Diseases (MDD)



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# I. Map of Digestive Disorders and Diseases

## I.1. Definition

Digestive disorders and diseases significantly affect millions of persons worldwide inducing a highly significant economical impact comprising health care costs and work absenteeism, in addition to patient's decreased quality of life.

Organic diseases reviewed in this document include gastroesophageal reflux disease, *Helicobacter pylori* infection, and colorectal cancer.

Functional digestive disorders (the term 'functional' means that there is no anatomical, structural or organic abnormality that explains the symptoms) reviewed include: functional dyspepsia, Irritable Bowel Syndrome (IBS), functional constipation.

## I.2. Objectives

The aim of this document is to estimate the prevalence of digestive disorders and diseases on human health under a global worldwide perspective. The approach was not restricted to life-threatening diseases but also to functional disorders, those conditions with potential impact on well-being and quality of life. For this purpose, a group of experts proposed an initial list of gastroenterological disorders or diseases to be investigated. Criteria for the selection of appropriate conditions were: first, their prevalence should be admittedly high, i.e. above 5% of the population in at least some parts of the World; second, data of candidate disorders or diseases should be available in databases or medical literature in order to have the possibility of gathering a considerable number of data by a retrospective approach. After detailed screening, six worldwide prevalent



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disorders or diseases were selected as shown in the table of contents of this document.

### **I.3. Methodology**

The first step was to establish definition and diagnostic criteria for each condition. On this issue, we adopted those concepts and criteria widely accepted in the medical literature, including Rome III criteria for functional disorders, Montreal consensus on GERD, etc. Thereafter, the study has been developed by reference searches in medical databases together with data compiled by a questionnaire-based survey with the collaboration of the National Societies of Gastroenterology that are members of the World Gastroenterology Organization. The final set of data was therefore composed by both statistical data published in scientific articles and information received directly from the National Societies.

The main output consists in Tables of data as obtained from the above mentioned sources, showing national prevalence (incidence for colo-rectal cancer).



## II. Gastroesophageal reflux disease (GERD)

Gastroesophageal reflux disease develops when the reflux of stomach contents in the esophagus causes chronic symptoms (such as heartburn, regurgitation, occasionally sore throat and cough) and mucosal damage (1).

GERD can be divided into: erosive GERD (presence of esophageal mucosal breaks at endoscopy) and non-erosive GERD (no lesions can be seen in the mucosa of the esophagus).

The manifestations of GERD are divided into esophageal and extra esophageal symptoms. The main esophageal symptoms are heartburn and regurgitation. Heartburn is defined as a burning sensation in the retrosternal area, and regurgitation as the perception of flow of acidic material into the mouth or hypopharynx. Extra esophageal symptoms include sore throat, cough, dysphagia and sleep disturbance. Other processes denominated as atypical manifestations, or extra esophageal manifestations have been classified basically in three groups: breathing manifestations, thoracic atypical pain and manifestations of the oto-rhino-laryngeal area and of the oral cavity. GERD may be present with no symptoms of heartburn; thus, people with dry cough, asthma or swallowing difficulties might suffer from this digestive disease.

Patients fulfill the diagnostic criteria of GERD when presenting one of the following characteristic symptoms: (i) troublesome heartburn and/or regurgitation more than twice a week, (ii) erosions of the esophagus near the junction with the stomach confirmed by upper gut endoscopy, (iii) abnormal values of 24-hour esophageal pH monitoring.



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Nowadays GERD is considered a chronic entity that must be treated correctly. This is important considering that permanent acid reflux can induce esophageal complications such as esophagitis (i.e. inflammation of the esophageal mucosa), hemorrhage, Barrett's esophagus, and adenocarcinoma in the esophagus.

### **II.1. Main causes**

The pathophysiology of GERD is multifactorial and includes failure of the antireflux barrier (The lower esophageal sphincter responsible for allowing the transit of food and liquids to the stomach relaxes a few times a day in non-GERD individuals and more frequently in GERD patients), impaired esophageal clearance mechanisms, the presence of offensive factors in the refluxate, and defective esophageal tissue resistance (2).

Other factors correlated with GERD include pregnancy, smoking, and high body mass index (BMI).

### **II.2. Complications and seriousness**

Analysis of GERD patients has revealed that nearly one third of patients had extra-esophageal symptoms and presented asthma, cough, and laryngitis (3). Additionally, GERD has been related to the development of Barrett's Esophagus, and also, although not commonly, adenocarcinoma of the esophagus (4).

Barrett's esophagus is defined as the presence of intestinal metaplasia in the esophagus distal mucosa. The prevalence is about 10-15% amongst the patients with GERD. Its incidence increases with age. Association between GERD and adenocarcinoma development is also considered, with an annual prevalence between 0,5 and 1%.

### **II.3. Diet and GERD**



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High saturated fat and cholesterol intake have been related to significantly increased symptoms of GERD in individuals with high body mass index ( $>25$  kg/m<sup>2</sup>), whereas individuals with a rich fiber diet correlated with a reduced impact of GERD symptoms (5). Moreover, calorie density intake correlates with the severity of gastroesophageal reflux (6).

### II.4. GERD management

Diet and lifestyle modifications suggested to moderate GERD severity and symptoms include: weight loss if needed (Overweight patients suffering GERD present heartburn and regurgitation in a more severe and frequent manner than non-overweight patients, with higher risk of severe esophagitis in women (7)), and avoid smoking. And lying down after meals.

### II.5. Geographic prevalence of GERD

Table 1. Global GERD prevalence.

Country	Prevalence	Survey date	Type of Study	Author/source of information
Argentina	11,9%(adults)	2005	Questionnaires validated at Mayo Clinic, USA	Chiocca JC, Olmos JA, Salis GB, Soifer LO, Higa R, Marcolongo M. Prevalence, clinical spectrum and atypical symptoms of gastro-oesophageal reflux in Argentina. <i>Aliment Pharmacol Ther.</i> 2005 Aug 15; 22(4):331-42.
Australia	10,40%	2006	Population-based study with self report questionnaire	Boyce PM, Talley NJ, Burke C, Koloski NA. Epidemiology of the functional gastrointestinal disorders diagnosed according to Rome II criteria: an Australian population-based study. <i>Intern Med. J.</i> 2006 Jan;36 (1):28-36
Belgium	28%	2002	Two thousand face to face interviews	Louis E, DeLooze D, Deprez P, Hiele M, Urbain D, Pelckmans P, Devière J, Deltente M. Heartburn in Belgium: prevalence, impact on daily life, and utilization of medical resources. <i>Eur J Gastroenterol Hepatol.</i> 2002 Mar; 14(3):279-84.



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Brazil	11,90%	2005	Brazilian urban Inquiry in 22 cities	Data from Brazilian Federation of Gastroenterology
Brazil	7%	2005	A national inquiry enrolling 13,959 adults conducted in 22 Brazilian cities	Moraes-Filho, J. P., D. Chinzon, J. N. Eisig, C. L. Hashimoto, and S. Zaterka. 2005. Prevalence of heartburn and gastroesophageal reflux disease in the urban Brazilian population. <i>Arq Gastroenterol</i> 42:122-7.
Colombia	13,70%	2005	Screening transversal descriptive study	Data from Asociación Colombiana de Gastroenterología
Czech Republic	18%	2006	Czech National Study Group of Dysmotility Disorders	Data from Czech Republic GE association. Czech National Study Group of Dysmotility Disorders
China	7,28%(Eastern part)	2008	A cross-sectional survey in a cluster random sample conducted from November 2004 to June 2005 using a validated Chinese version of the reflux disease questionnaire	Li YM, Du J, Zhang H, Yu CH. Epidemiological investigation in outpatients with symptomatic gastroesophageal reflux from the Department of Medicine in Zhejiang Province, east China. <i>J Gastroenterol Hepatol</i> . 2008 Feb; 23(2):283-9.
China	2,3% (Southern part)	2005	A face-to-face interview using a validated Chinese version of the Reflux Disease Questionnaire	Chen, M., L. Xiong, H. Chen, A. Xu, L. He, and P. Hu. 2005. Prevalence, risk factors and impact of gastroesophageal reflux disease symptoms: a population-based study in South China. <i>Scand J Gastroenterol</i> 40:759-67.
Finland	Incidence of GERD 307 per 100,000 population/year. Endoscopy-positive GERD 207/100,000/year	2000	Study population in 1,562 consecutive patients referred for endoscopy	Voutilainen M, Sipponen P, Mecklin JP, Juhola M, Färkkilä M. Gastroesophageal reflux disease: prevalence, clinical, endoscopic and histopathological findings in 1,128 consecutive patients referred for endoscopy due to dyspeptic and reflux symptoms. <i>Digestion</i> 2006; 61(1):6-13.
Germany	14%	2006	German National Health Interview and Examination Survey	Nocon, M., T. Keil, and S. N. Willich. 2006. Prevalence and sociodemographics of reflux symptoms in Germany--results from a national survey. <i>Aliment Pharmacol Ther</i> 23:1601-5.
Italy	8%	1999	Interview of two samples ( 424 subjects of S.Matteo Hospital staff and 344 subjects of the Military Factory of Pavia) of Italian employees	Valle, C., F. Broglio, A. Pistorio, C. Tinelli, and M. Perego. 1999. Prevalence and impact of symptoms suggestive of gastroesophageal reflux disease. <i>Dig Dis Sci</i> 44:1848-52.



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Japan	6,60%	2005	Cross-sectional study (with self report questionnaire) of 6035 Japanese subjects who visited a clinic for a routine health check up	Fujiwara, Y., K. Higuchi, Y. Watanabe, M. Shiba, T. Watanabe, K. Tominaga, N. Oshitani, T. Matsumoto, H. Nishikawa, and T. Arakawa. 2005. Prevalence of gastroesophageal reflux disease and gastroesophageal reflux disease symptoms in Japan. <i>J Gastroenterol Hepatol</i> 20:26-9.
Malaysia	38,80%	2004	Endoscopy based amongst a population sample	Data from University of Malaysia. Malaysia GE Association. <i>EJGH</i> 2004. 16: 495-501
Mexico	35%(Mexico City)	2006	Rome II Modular Questionnaire among 324 healthy volunteers, with a mean age of 35	Schmulson M, Ortíz O, Santiago-Lomeli M, Gutiérrez-Reyes G, Gutiérrez-Ruiz MC, Robles-Díaz G, Morgan D. Frequency of functional bowel disorders among healthy volunteers in Mexico City. <i>Dig Dis</i> . 2006; 24(3-4):342-7.
Norway	31%	2004	Public health survey among 65,363 adult participants in Nord-Trøndelag, Norway	Nilsson, M., R. Johnsen, W. Ye, K. Hveem, and J. Lagergren. 2004. Prevalence of gastro-oesophageal reflux symptoms and the influence of age and sex. <i>Scand J Gastroenterol</i> 39:1040-5.
Republic of Belarus	1,53%	2005	Local National Register for Gastroenterological Disease	Data from Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education.
Republic of Belarus	1,41%	2007	Local National Register for Gastroenterological Disease	Data from Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education.
Republic of Belarus	1,15%	2006	Local National Register for Gastroenterological Disease	Data from Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education.
Singapore	1,60%	1998	Questionnaire	Data from Changi General Hospital (Singapore GE Association). <i>Am. J. Gastroenterol</i> . 1998; 93 (10): 1816-22.
Spain	32%	2004	Questionnaire based studies	Data from Sociedad Española de Patología Digestiva. Díaz Rubio et al, <i>APT</i> 2004
Spain	15%	2006	Questionnaire based studies	Data from Sociedad Española de Patología Digestiva. Ponce et al, <i>APT</i> 2006
Sweden	17%	2000	Nationwide population-based case-control study	Terry, P., J. Lagergren, A. Wolk, and O. Nyren. 2000. Reflux-inducing dietary factors and risk of adenocarcinoma of the esophagus and gastric cardia. <i>Nutr Cancer</i> 38:186-91.
Switzerland	17,6% (adults)	2004	A population-based telephone survey in 7222 participants	Schwenkglens M, Marbet UA, Szucs TD. Epidemiology and costs of gastroesophageal reflux disease in Switzerland: a population-based study. <i>Soz Praventivmed</i> . 2004; 49(1):51-61.



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Turkey	20-23%	2005	Local epidemiologic study	Data from Ege University School of Medicine, Sect Gastroenterology (Turkish Gastroenterology Association). Bor S, Mandiracioglu A, Kitapcioglu G, Caymaz-Bor C, Gilbert RJ. Gastroesophageal reflux disease in a low income region in Turkey. Am J Gastroenterol. 2005; 100(4):759-65
UK	29%	2000	Postal Questionnaire UK	Data from Irish Gastroenterology Association. Department of Gastroenterology, Connolly Hospital
UK	21%	2005	A questionnaire mailed to 4000 subjects, stratified by age, gender and ethnicity to be representative of the local population	Mohammed, I., P. Nightingale, and N. J. Trudgill. 2005. Risk factors for gastro-oesophageal reflux disease symptoms: a community study. Aliment Pharmacol Ther 21:821-7.
USA	29%	2004	A cross-sectional survey among 496 employees at a VA medical center	El-Serag, H. B., N. J. Petersen, J. Carter, D. Y. Graham, P. Richardson, R. M. Genta, and L. Rabeneck. 2004. Gastroesophageal reflux among different racial groups in the United States. Gastroenterology 126:1692-9.
USA	15%	2007	Population-based, cross-sectional survey by mailing a valid symptom questionnaire	Jung HK, S. Halder, M. McNally, G. R. Locke, 3rd, C. D. Schleck, A. R. Zinsmeister, and N. J. Talley. Overlap of gastro-oesophageal reflux disease and irritable bowel syndrome: prevalence and risk factors in the general population. Aliment Pharmacol Ther 26:453-61.
Yemen	34%	2006	Longitudinal study among 2002-2006	Data from Yemen Gastroenterology Association. Gastro Endoscopic Unit Hospital

The survey has detected a prevalence ranging from 11% to 38.8%. Malaysia, Mexico, Spain and Yemen reported figures on the top quartile of prevalence, **whereas the Asian** countries reported prevalence rates in the lowest quartile.

Variability in methodology for obtaining data may explain some of the differences between countries.



### III. *Helicobacter pylori* Infection

The Gram-negative spiral bacteria *Helicobacter pylori* is known to cause infection of the gastric mucosa.

Infection by *H. pylori* causes mucosal inflammation (i.e. gastritis, detected by histological examination of biopsies), although 80% of infected individuals remain asymptomatic. Approximately 15-20% of infected people will develop peptic ulcer. 2% of infected people will develop gastric cancer and 1% MALT lymphoma.

#### III.1. Main Causes

*H. pylori* infection is diagnosed following a positive result in one of the following tests: (i) urea breath test (Breath test), (ii) microscopic demonstration of *H. pylori* in gastric mucosal biopsies (Histology), (iii) rapid urease test in gastric mucosal biopsies (Urease test), (iv) detection of anti-*H. pylori* antibodies in blood obtained by venepuncture or by finger stick (Serology), or (iv) detection of *H. pylori* in feces (Stool test).

#### III.2. Complications and seriousness

Eradication of this Gram-negative bacteria can be successfully achieved thanks to tritherapy (2 antibiotherapies + 1 PPI).



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### III.3. Prevention

*H. pylori* is transmitted on a person-to-person basis in early childhood in low hygienic environment (water and humans being the two main reservoirs). Adequate management of water and food sources may contribute to limit *H. pylori* transmission. In fact, most people who are infected are usually asymptomatic. Further studies are necessary to identify how could it be prevented.

### III.4. Geographic prevalence

Table 3. Global *Helicobacter pylori* infection prevalence.

Country	Prevalence	Survey Data	Type of Study	Author/Source of information
Argentina	40%(children in Buenos Aires)	2007	Survey with 395 children with upper gastrointestinal symptoms referred to the Gastroenterology Unit of the Children Hospital "Sor Maria Ludovica"	Goldman C, Barrado A, Janjetic M, et al. Factors associated with <i>Helicobacter pylori</i> epidemiology in symptomatic children in Buenos Aires, Argentina. World J Gastroenterol 2006; 12:5384-8.
Argentina	36%	2000	Nationwide epidemiologic study.	Olmos, J. A., H. Rios, and R. Higa. 2000. Prevalence of <i>Helicobacter pylori</i> infection in Argentina: results of a nationwide epidemiologic study. Argentinean <i>Helicobacter pylori</i> Epidemiologic Study Group. J Clin Gastroenterol 31:33-7.
Australia	32%	2003	Prospective epidemiological survey of <i>H. pylori</i> serological status in 500 consecutive voluntary blood donors	Robertson MS, Cade FJ, Savoia HF, Clancy RL. <i>Helicobacter pylori</i> infection in the Australian community: current prevalence and lack association with ABO blood groups. Intern Med J. 2003 Apr;33(4):163-7
Brazil	66,5%(man) 63,2%(woman) 65,6 (group) Age range 18-65	2007	A survey among asymptomatic blood donors	Data from Brazilian Federation of Gastroenterology
Bulgaria	52,6% (Children)	2003	Survey among 321 children to study the prevalence of <i>Helicobacter pylori</i> and <i>Helicobacter heilmanni</i> .	Boyanova L, Koumanova R, Lazarova E, Jeleu C. <i>Helicobacter pylori</i> and <i>Helicobacter heilmanni</i> in children, A Bulgarian study. Diagn Microbiol Infect Dis 2003. Aug; 46(4):249:52.



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Canada	23,1%(Ontario)	2007	Serology of 1306 men and women aged 50-80 years belonged to control colorectal cancer population-based study group	Naja F, Kreiger N, Sullivan T. <i>Helicobacter pylori</i> infection in Ontario: prevalence and risk factors. Can J Gastroenterol. 2007 Aug; 21(8):501-6.
Colombia	69,10%	2003	Comparative Study	Data from Asociación Colombiana de Gastroenterología
Croatia	60,4-68%	2008		Data from Croatian National Institute of Public Health. Croatian Society of Gastroenterology
Czech Republic	33%(among symptomatic) 7,5% (among asymptomatic) children aged 2-18 years	2003	Study in paediatric gastroenterology department between 1994-1999, with serology	Sedláčková M, Malaty H, Volf V, Frühauf P, Marx D, Soucek A, Graham DY. <i>Helicobacter pylori</i> infection in a group of symptomatic and asymptomatic children and adolescents in the Czech Republic. Cas Lek Cesk. 2003 Feb; 142(2):102-5
Czech Republic	48%	2006	Czech Epidemiological Study of <i>Helicobacter pylori</i> prevalence and incidence	Data from Czech Republic GE association. Czech Epidemiological Study of <i>Helicobacter pylori</i> prevalence and incidence
Czech Republic	42%	2006	Cross-sectional of representative population study in 2001	Bures J, Kopacova M, Koupil I, et al. Epidemiology of <i>Helicobacter pylori</i> infection in the Czech Republic. <i>Helicobacter</i> 2006, 11:56-65.
Czech Republic	42%	2006	Survey in a sample of 2309 persons aged 5-100yrs, representative of general population.	Bures J, Kopacova M, Koupil I, et al. Epidemiology of <i>Helicobacter pylori</i> in the Czech Republic. <i>Helicobacter</i> 2006, 11:56-65.
Chile	43 - 92%	1997	Bibliography compilation between 1985 and 1995	Figueroa, G., R. Acuna, M. Troncoso, D. P. Portell, M. S. Toledo, and J. Valenzuela. 1997. <i>Helicobacter pylori</i> infection in Chile. Clin Infect Dis 25:983-9.
Chile	73%	2007	Study carried out in an urban area of Santiago among symptomatic patients	Ortega J, Calvo A, Gabrielli L, Pruyas M, Villarroel L, Soza A, Riquelme A, Abbott E, Pattillo A, Rollan A. Frecuencia de infección benigna por <i>Helicobacter pylori</i> en pacientes con patología gastrointestinal benigna (abstract). Gastroenterol Latinoam 2005; 16: 336
China	49%	2007	Seroprevalence tests among a representative sample of population	Chen, J., X. L. Bu, Q. Y. Wang, P. J. Hu, and M. H. Chen. 2007. Decreasing seroprevalence of <i>Helicobacter pylori</i> infection during 1993-2003 in Guangzhou, southern China. <i>Helicobacter</i> 12:164-9
Denmark	25,60%	2003	1983-1984 population survey in Copenhagen County	Milman, N., K. E. Byg, L. P. Andersen, G. Mulvad, H. S. Pedersen, and P. Bjerregaard. 2003. Indigenous Greenlanders have a higher seroprevalence of IgG antibodies to <i>Helicobacter pylori</i> than Danes. Int J Circumpolar Health 62:54-60.



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Estonia	73%, 78%, 87%	1995	Randomised population-based study in 3 regions	Data from Estonian Society of Gastroenterology. Maaros <i>Helicobacter pylori</i> Infection in Est. Population. Ann Med 1995
France	16,7%	2006	Prospective study in a large series of patients with PPP	Hervé G, Cailleux N, Benhamou Y, Ducrotté P, Lemeland JF, Denis P, Marie I, Lévesque H. <i>Helicobacter pylori</i> prevalence in Raynaud's disease. Rev Med Interne. 2006 Oct; 27(10):736-41.
Germany	9% (children)	2003	Cross-sectional study in 540 children in schools of the Aschaffenburg area.	Grimm, W., and W. Fischbach. 2003. ( <i>Helicobacter pylori</i> infection in children and juveniles: an epidemiological study on prevalence, socio-economic factors and symptoms). Dtsch Med Wochenschr 128:1878-83.
Germany	22-76%(females, age of 25 to 34 and of 55 to 64 years respectively) southern Germany	1993	Representative cross-sectional study among 543 participants randomly selected from the general population in the age of 25 to 34 and of 55 to 64 years from Mosbach	Haubrich T, Boeing H, Göres W, Hengels KJ, Scheuermann W, Wahrendorf J. Prevalence of <i>Helicobacter pylori</i> and gastritis in southern Germany. Results of a representative cross-sectional study. Z Gastroenterol. 1993 jul Aug; 31(7-8):432-6.
Germany	13-75% (males, age of 25 to 34 and of 55 to 64 years respectively) southern Germany	1993	Representative cross-sectional study among 543 participants randomly selected from the general population in the age of 25 to 34 and of 55 to 64 years from Mosbach	Haubrich T, Boeing H, Göres W, Hengels KJ, Scheuermann W, Wahrendorf J. Prevalence of <i>Helicobacter pylori</i> and gastritis in southern Germany. Results of a representative cross-sectional study. Z Gastroenterol. 1993 jul Aug; 31(7-8):432-6.
Greenland	48,3%(men) 45,2%(women)	2003	1993-1994 population survey in Nuuk	Milman, N., K. E. Byg, L. P. Andersen, G. Mulvad, H. S. Pedersen, and P. Bjerregaard. 2003. Indigenous Greenlanders have a higher seroprevalence of IgG antibodies to <i>Helicobacter pylori</i> than Danes. Int J Circumpolar Health 62:54-60.
Guadeloupe	55%	2002	Seroepidemiology Study in 854 blood donors	Weill FX, Margeridon S, Broutet N, Le Hello S, Neyret C, Mégraud F. Seroepidemiology of <i>Helicobacter pylori</i> infection in Guadeloupe. Trans R Soc Trop Med Hyg. 2002 Sep-Oct;96(5):517-9
Hungary	59%	2003	Seroprevalence of <i>Helicobacter pylori</i> infection among 756 volunteers study	Iszlai, E., E. Kiss, E. Toldy, S. Agoston, B. Sipos, L. Ven, F. Racz, and L. Szerafin. 2003. (Seroprevalence of <i>Helicobacter pylori</i> infection and anti-CagA positivity in the county Szabolcs-Szatmar-Bereg). Orv Hetil 144:1713-8.



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India	49,4%(general population) 21,1%(group aged 12-20 years) 76,2%(>70 years)	1999	Population-based serological study in a randomly selected urban upper class population	Alaganantham TP, Pai M, Vaidehi T, Thomas J. Seroepidemiology of <i>Helicobacter pylori</i> infection in an urban, upper class population in Chennai. Indian J Gastroenterol. 1999 Apr-Jun;18(2):66-8
Ireland	43%	1998	Community based cohort study	Data from Irish Gastroenterology Association. Department of Gastroenterology, Connolly Hospital
Italy	67,9% (69%men, 67%women)	2001	Cross-sectional study among 1533 residents in Loiano/Monghidoro, a rural area in Northern Italy (792 men, 741 women, age range 28-80 years)	Bazzoli F, Palli F, Zagari RM, Festi D, Pozzato P, Nicolini G, Masala G, Fossi S, Ricciardiello L, Panuccio D, Roda E. The Loiano-Monghidoro population-based study of <i>Helicobacter pylori</i> infection: prevalence by 13C-urea breath test and associated factors.
Italy	13,4%(teenagers)	2001	Serological study among 164 students	Giannuzzi F, Giannuzzi U, Bianciardi L, Giannace R, Campagna S, Franci MB, Lucani B, Orlandini G, Torricelli V, Lenzi C, Colapinto R, Guglielmetti P, Figura N. Risk factors for acquiring <i>Helicobacter pylori</i> infection in a group of Tuscan teenagers.
Italy	47%	2001	Cohort study made from April 1995 to July 1995 with 619 consecutive volunteer blood donors	Ponzetto, A., R. Pellicano, A. Morgando, D. Cirillo, G. Marchiaro, F. Curti, and M. Rizzetto. 2001. Seroprevalence of <i>Helicobacter pylori</i> infection among blood donors in Torino, Italy. Minerva Gastroenterol Dietol 47:3-7.
Japan	29%(children aged 15-19 years)	2001	Comparative study among two groups of children; healthy children and institutionalized children with neurologic illness.	Yamashita Y, Fujisawa T, Kimura A, Kato H. Epidemiology of <i>Helicobacter pylori</i> infection in children: a serologic study of the Kyushu region in Japan. Pediatr Int. 2001 Feb, 43(1):4-7
Kazakhstan	79%(among Russians ethnic group) 80%(among Kazakhs ethnic group)	2002	Cross-sectional seroepidemiologic study conducted among unrelated healthy individuals in Kazakhstan	Nurgalieva ZZ, Malaty HM, Graham DY, Almuchambetova R, Machmudova A, Kapsultanova D, Osato MS, Hollinger FB, Zhangabylov A. <i>Helicobacter pylori</i> infection in Kazakhstan: effect of water source and household hygiene. Am J Trop Med Hyg. 2002 Aug;67(2):201-6
Korea	75%(adults) 22%(children)	1996	Survey among 413 healthy 1- to 75-year-old asymptomatic volunteers	Malaty HM, Kim JG, Kim SD, Graham DY. Prevalence of <i>Helicobacter pylori</i> infection in Korean children: inverse relation to socioeconomic status despite a uniformly high prevalence in adults. Am J Epidemiol. 1996 Feb 1;143(3):257-62
Latvia	19%(children)	2001	Cross-sectional study among asymptomatic children	Daugule I, Rumba I, Lindkvist P, Bergström M, Ejderhamn J. A relatively low prevalence of <i>Helicobacter pylori</i> infection in a healthy paediatric population in Riga, Latvia: a cross-sectional study.



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Malaysia	26-55%	2001	Various community and population surveys	Data from University of Malaysia. Malaysia GE Association. EIGH 2001 13: 177-83
Mexico	80 - 90%	1998	Nationwide community-based survey for <i>Helicobacter pylori</i> infection	Torres, J., Y. Leal-Herrera, G. Perez-Perez, A. Gomez, M. Camorlinga-Ponce, R. Cedillo-Rivera, R. Tapia-Conyer, and O. Munoz. 1998. A community-based seroepidemiologic study of <i>Helicobacter pylori</i> infection in Mexico. J Infect Dis 178:1089-94.
Mexico	41%(11 to 14 years) 60%(18-24 years)	2005	Serum samples collected from 5861 Mexicans aged 11-20 years.	Constanza CM, Eduardo LP, Javier T, Eduardo VM, Manuel Q, Pelayo C. Determinants of <i>Helicobacter pylori</i> seroprevalence in Mexican adolescents. <i>Helicobacter</i> 2004; 9:106-14.
Mexico	66%	2007	Serology	Data from Asociación Mexicana de Gastroenterología
Netherlands	1% (children)	2007	Seroprevalence study in children of general population	Mourad-Baars, P. E., H. W. Verspaget, B. J. Mertens, and M. L. Mearin. 2007. Low prevalence of <i>Helicobacter pylori</i> infection in young children in the Netherlands. Eur J Gastroenterol Hepatol 19:213-6.
Poland	78,5%(Lublin region)	2007	Seroprevalence study in 585 subjects in the Lublin region of Poland	Celinski K, Kurzeja-Mirosław A, Słomka M, Cichoż-Lach H, Madro A, Kasztelan-Szczerbinska B. The effects of environmental factors on the prevalence of <i>Helicobacter pylori</i> infection in inhabitants of Lublin Province. Ann Agric Environ Med 2006; 13:185-91.
Poland	34,5% (children)	2005	Epidemiological study among 1500 randomly children	Iwanczak, F., B. Iwanczak, T. Pytrus, O. Dworak, G. Gosciniak, and E. Vogtt. 2005. (Prevalence of <i>H. pylori</i> infection in the Polish child population). Pol Merkur Lekarski 18:407-11.
Portugal	80% in asymptomatic	1998	Cross-sectional study	Data from Sociedade Portuguesa de Gastroenterología
Portugal	52,9% in children aged 6-11 years.	1999	Cross-sectional study	Data from Sociedade Portuguesa de Gastroenterología
Republic of Belarus	55-76% (dependent from diseases) 50-60% (health person) 10-45% (children)	1995-2004	Comparison in adults and Childhood gastric mucous lesion in same population sources with high rate of <i>H. pylori</i> colonization	Data from Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education. Kirill Marakhouski. Characteristics and variables stomach mucose disorders, comparable with <i>Helicobacter pylori</i> colonization and contamination in child's populations. Dissertation, 2005



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Romania	69%	2003	Study population in a representative group of workers: 960, 206 F (21.46%) and 754 M (78.54%), mean age 36.8+/-7.6 years (range 18-60 years)	Sporea, I., A. Popescu, M. van Blankenstein, R. Sirli, M. Focsea, and M. Danila. 2003. The prevalence of <i>Helicobacter pylori</i> infection in western Romania. Rom J Gastroenterol 12:15-8.
Russia	70-92%(in Siberia)	2001	Population-based epidemiological study. 649 adults from five regions of Siberia and the Far East, and 79 children and adolescents from Novosibirsk	Reshetnikov OV, Häivä VM, Granberg C, Kurilovich SA, Babin VP. Seroprevalence of <i>Helicobacter pylori</i> infection in Siberia. <i>Helicobacter</i> . 2001 Dec;6(4):331-6
Russia	25% (15-19 years old)	2007	2 cross-sectional studies, first in 1995 and second in 2005	Tkachenko, M. A., N. Z. Zhannat, L. V. Erman, E. L. Blashenkova, S. V. Isachenko, O. B. Isachenko, D. Y. Graham, and H. M. Malaty. 2007. Dramatic changes in the prevalence of <i>Helicobacter pylori</i> infection during childhood: a 10-year follow-up study in Russia. J Pediatr Gastroenterol Nutr 45:428-32.
Saudi Arabia	51%	2007	Seroprevalence in asymptomatic healthy individuals	Khan, M. A., and H. O. Ghazi. 2007. <i>Helicobacter pylori</i> infection in asymptomatic subjects in Makkah, Saudi Arabia. J Pak Med Assoc 57:114-7.
Singapore	Malay 27,9%	2005	Community Observational Study	Data from Changi General Hospital (Singapore GE Association). Journal of Gastroenterology & Hepatology 2005; 20: 1603-9
Singapore	Indian 48,1%	2005	Community Observational Study	Data from Changi General Hospital (Singapore GE Association). Journal of Gastroenterology & Hepatology 2005; 20: 1603-9
Singapore	Chinese 46,3%	2005	Community Observational Study	Data from Changi General Hospital (Singapore GE Association). Journal of Gastroenterology & Hepatology 2005; 20: 1603-9
Spain	69%	2006	Breath test	Data from Sociedad Española de Patología Digestiva. Macerelle et al, Rev Esp Enf Dig 2006
Spain	60%	2007	Breath test	Data from Sociedad Española de Patología Digestiva. Sanchez-Ceballos et al, Rev Esp Enf Dig 2007
Spain	52%	2002	Blood sera	Data from Sociedad Española de Patología Digestiva. Baena et al, Aten Primaria 2002



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Tunisia	80 - 85% (adults) 69% (children)	2003	Prospective study in 191 asymptomatic children	Maherzi, A., A. Bouaziz Abed, C. Fendri, F. Oubich, C. Koubaa, J. L. Fauchere, and S. Bousnina. 2003. ( <i>Helicobacter pylori</i> infection: prospective study for asymptomatic Tunisian children). Arch Pediatr 10:204-7
Turkey	49% (children)	2003	Small study to estimate the prevalence, determinants and associations of <i>Helicobacter pylori</i> infection in a group of 327 healthy school children using 13C-urea breath test	Ertem, D., H. Harmanci, and E. Pehlivanoglu. 2003. <i>Helicobacter pylori</i> infection in Turkish preschool and school children: role of socioeconomic factors and breast feeding. Turk J Pediatr 45:114-22.
Turkey	42%(1-9years)100%(60-69)80%(over 70 years)	2005	Enzyme immunoassay and immunoblotting analysis of <i>Helicobacter pylori</i> infection in 309 Turkish asymptomatic subjects aged 1-82 years	Abasiyanik MF, Tunc M, Salih BA. Enzyme immunoassay and immunoblotting analysis of <i>Helicobacter pylori</i> infection in Turkish asymptomatic subjects. Diagn Microbiol Infect Dis2004;50:173-7
Turkey	82%	2008	Country wide study on 5640 subjects	Data from Ege University School of Medicine, Sect Gastroenterology (Turkish Gastroenterology Association).
UK	26%(Scottish children)	2005	Survey among Scottish children (306 males and 320 females), aged 2-16 years, underwent 13C-urea breath test (UBT).	European <i>Helicobacter</i> Study Group. Epidemiology of <i>Helicobacter pylori</i> Infection Malcolm CA, MacKay WG, Shepherd A, Weaver LT. <i>Helicobacter pylori</i> in children is strongly associated with poverty. Scott Med J 2004; 49:136-8.
UK	27,60%	2002	A random sample of 32929 subjects aged 40-49 years interview by a researcher in their local primary care centre.	Moayyedi, P., A. T. Axon, R. Feltbower, S. Duffett, W. Crocombe, D. Braunholtz, I. D. Richards, A. C. Dowell, and D. Forman. 2002. Relation of adult lifestyle and socioeconomic factors to the prevalence of <i>Helicobacter pylori</i> infection. Int J Epidemiol 31:624-31.
Ukraine	43% (children and adolescents)	2001	Examination of children and juveniles aged seven to eighteen years old (n = 332) resident in Kiev	Saltanova, S. D. 2001. (Prevalence of <i>Helicobacter pylori</i> among children and juveniles as evidenced by the 13C urea breath test). Lik Sprava: 174-6.
USA	32% (children)	2002	Three diagnostic tests conducted in children from 10 licensed day care centers from various locations in Houston, Texas	Malaty HM, Haveman T, Graham DY, Fraley JK. <i>Helicobacter pylori</i> infection in asymptomatic children: impact of epidemiologic factors on accuracy of diagnostic tests. J Pediatr Gastroenterol Nutr. 2002 Jul;35(1):59-63
USA	12,2% (children in Texas)	2000	Study based on serum samples from children aged 6 months to 18 years	Opekun AR, Gilger MA, Denyes SM, Nirken MH, Philip SP, Osato MS, Malaty HM, Hicks J, Graham DY. <i>Helicobacter pylori</i> infection in children of Texas. J Pediatr Gastroenterol Nutr. 2000. Oct;31(4):405-10



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USA	9.40%	1995		Marshall BJ. The 1995 Albert Lasker Medical Research Award. <i>Helicobacter pylori</i> : the etiologic agent for peptic ulcer. JAMA 1995 Oct; 274:1064-6
Yemen	82.20%	2004	Cohort study	Data from Yemen Gastroenterology Association. Gastro Endoscopic Unit Hospital
Zambia	61%	2003	Screening survey with diagnostic tests of 87 primary and secondary school students	McLaughlin NJ, McLaughlin DI, Lefcort H. The influence of socio-economic factors on <i>Helicobacter pylori</i> infection rates of students in rural Zambia. Cent Afr J Med. 2003 Mar-Apr;49(3-4):38-41

Infection by *Helicobacter pylori* is highly prevalent in the adult population, with a median prevalence around 50%. However, the range of variability among countries is remarkably wide, ranging from over 80% in developing countries (Africa, South America) to 30% in developed countries (Western and Northern Europe, North America). As pointed out by previous surveys, differences between countries appear to be associated to socio economic development. Interestingly, the current survey detected much lower prevalence rates in the young population as compared to adults, due to a reduced acquisition of the bacteria in early childhood thanks to the improvement of hygienic conditions. One fourth of the countries reported prevalence rates in the young population at 10% or below.



### IV. Colorectal Cancer

Diagnosis of colorectal cancer (CRC) consists in detecting the presence of adenocarcinoma in the mucosa of the colon or rectum, verified by histological examination. Colorectal cancer is the third most common cancer type and the second mortality cancer-related cause in the Western countries with over 600.000 deaths worldwide (World Health Organization, February 2006).

It is considered that approximately 6% of the population will suffer from CRC, resulting in a 40% mortality rate (8).

Colorectal cancer frequently presents no symptoms until the disease has reached a relatively advanced stage. Monitoring of anal macroscopic bleeding, as well as periodical screening by colonoscopy, or fecal occult blood testing are designed to detect colorectal cancer occurrence. Alarming symptoms include: the presence of red or very dark blood in the stool, a change in the frequency of stools (constipation and/or diarrhea), a change in their quality or in their consistency, general abdominal discomfort associated with a weight loss, constant tiredness and anaemia.

There is great evidence supporting screening of average-risk individuals over 50 years of age to prevent CRC (See WGO Global Guidelines, <http://www.worldgastroenterology.org/global-guidelines.html>). Screening of average-risk individuals can reduce CRC mortality by detecting cancer at an early and curable stage. In addition, a program of screening can detect and remove adenomas, although there is no perfect CRC screening test to date. Colonoscopy every 10 years is an acceptable option for CRC screening in average-risk adults beginning at 50 years of age. Universal colonoscopy screening program has a



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high economic cost. Annual screening with high-sensitivity fecal occult blood test is considered an acceptable alternative option for average-risk patients. Any positive test should be followed up with colonoscopy.

### IV.1. Risk factors

At present, the role of the different factors contributing to colorectal cancer is not well known. However, several factors seem to increase the risk of CRC. Individuals over the age of 50 are more likely to develop CRC. Higher risk is also present in people with a family medical history of this type of malignancy, familial adenomatous polyposis (FAP) and hereditary nonpolyposis colorectal cancer (HNPCC) or Lynch Syndrome. Patients with chronic inflammatory bowel disease also have an increased risk of CRC (9).

### IV.2. Diet and colorectal cancer

Epidemiological surveys have repeatedly shown a correlation between diet high in fresh fruits and vegetables, and low in cooked red meat, and a lower risk of colorectal adenoma development (10), (11), (12).

### IV.3. Geographic incidence of colorectal cancer

Table 4. Global Colorectal Cancer Incidence

Country	Female Incidence (rates per 100,000)	Male Incidence (rates per 100,000)	Survey Date	Type of Study	Author/Source of information
Algeria	3,8	3,8	2002		Globocan
Argentina	25,4	32,2	2002		Globocan
Austria	59,6	69,0	2002		Globocan
Belgium	59,9	65,8	2002		Globocan
Brazil	12,6	11,0	2002		Globocan
Bulgaria	33,9	43,2	2002		Globocan
Canada	52,5	61,1	2002		Globocan
Colombia	11,6	8,2	2002		Globocan



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Croatia	50,3	67,3	2002		Globocan
Czech Republic	61,8	88,0	2002		Globocan
Chile	16,8	14,3	2002		Globocan
China	10,0	13,3	2002		Globocan
Denmark	66,9	69,3	2002		Globocan
Egypt	2,2	2,9	2002		Globocan
Finland	43,3	40,9	2002		Globocan
France	51,5	66,3	2002		Globocan
Germany	77	79,2	2002		Globocan
Greece	34,0	37,1	2002		Globocan
Guatemala	4,2	4,2	2002		Globocan
Hungary	68,1	84,7	2002		Globocan
India	2,7	3,6	2002		Globocan
Indonesia	8,9	8,9	2002		Globocan
Ireland	41,8	55,8	2002		Globocan
Israel	47,4	45,9	2002		Globocan
Italy	58,5	73,6	2002		Globocan
Japan	58,3	92,9	2002		Globocan
Malaysia	11,7	13	2002		Globocan
Mexico	5,5	5,6	2002		Globocan
Morocco	4,2	4,0	2002		Globocan
Netherlands	57,0	62,5	2002		Globocan
Norway	73,5	70,6	2002		Globocan
Poland	40,0	41,1	2002		Globocan
Portugal	41,5	58,6	2002		Globocan
Republic of Belarus	33,1	32,7	2002		Globocan
Romania	24,7	31,6	2002		Globocan
Russia	34,1	32,7	2002		Globocan
Saudi Arabia	4,8	6,0	2002		Globocan
Slovakia	44,2	66,6	2002		Globocan
Slovenia	49,4	65,3	2002		Globocan
South Africa	7,1	6,8	2002		Globocan
Spain	49,6	63,8	2002		Globocan
Sweden	59,3	63,4	2002		Globocan
Switzerland	53,9	75,5	2002		Globocan
Thailand	6,5	8,6	2002		Globocan
Tunisia	5,8	5,3	2002		Globocan
Turkey	7,6	7,4	2002		Globocan
UK	54,8	66,2	2002		Globocan
Ukraine	32,3	37,7	2002		Globocan



<b>Uruguay</b>	46,6	52,0	2002		Globocan
<b>USA</b>	55,1	60,0	2002		Globocan

This survey includes the information provided by the Globocan 2002 Database. Data are age-standardized rates of annual incidence (newly diagnosed cases per year per population normalized by standard age-structure). This correction is convenient for comparisons between countries because age has a powerful influence on the risk of colorectal cancer.

Such age-standardized data demonstrate that incidence of colorectal cancer is 10 to 20 times higher in countries in the top quartile (North America & Western Europe) as compared to those in the lowest quartile (India, Africa). In general, the figures correlate well with socio-economic development but not in a strictly linear relationship.



## V. Functional Dyspepsia

### V.1. Main causes

The Rome III Committee set the following definition: “Dyspepsia is defined as the presence of 1 or more symptoms that are considered to originate from the gastroduodenal region, in the absence of any organic, systemic, or metabolic disease that is likely to explain the symptoms.” Rome III Criteria for Functional Dyspepsia is valid if for at least 3 months, with onset at least 6 months previously, of one or more of the following occurs: 1) bothersome postprandial fullness; 2) early satiation; 3) epigastric pain; 4) epigastric burning and 5) no evidence of structural disease (including at upper endoscopy) that is likely to explain the symptoms.

The precise pathological origin of functional dyspepsia remains unclear, although a combination of visceral hypersensitivity, gastric motor dysfunction, and psychological factors has been suggested to induce this condition (55). In addition, some patients identify foods that exacerbate their symptoms.

### V.2. Complications and seriousness

Functional dyspepsia is not a life-threatening disorder and has not been associated with any increase in mortality.

### V.3. Diet and functional dyspepsia

The role of diet in functional dyspepsia has not been thoroughly studied. Mahadeva *et al.* reviewed several studies concerning diet and dyspepsia



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reporting no significant differences between vegetarian and meat eaters, nor high ingestion of tea or coffee (13).

Nevertheless, in some subjects, specific food could trigger symptoms, such as soft drinks, high fat food, heavy and spicy meals (14).

### V.4. Geographic prevalence of functional dyspepsia

**Table 6. Global Functional Dyspepsia Prevalence.**

Country	Prevalence	Survey Date	Type of Study	Author/Source of information
Argentina	43,20%	2006	Population based study in 839 subjects	Olmos JA, Pogorelsky V, Tobal F, Marcolongo M, Salis G, Higa R, Chiocca JC. Uninvestigated dyspepsia in Latin America: a population-based study. <i>Dig Dis Sci.</i> 2006 Nov; 51(11):1922-9. Epub 2006 Oct 6.
Colombia	27%	2005	Screening transversal descriptive study	Asociación Colombiana de Gastroenterología
Czech Republic	19%	2003	Lower GIT Dyspepsia (National Study)	Data from Czech Republic GE association.
Denmark	Annual Incidence Rate 3,4%	1998	National Health Insurance System a systematic, prospective registration. 1-year analysis	Meineche-Schmidt V, Krag E. Dyspepsia in general practice in Denmark. A 1-year analysis of consultants in general practice. <i>Scand J Prim Health Care.</i> 1998 Dec; 16(4): 216-21.
Germany	20,40%	2002	A prospective BASF <i>Helicobacter pylori</i> prevention campaign among 6143 employees	Schilling D, Messerer P, Ott MG, Schauwecker P, Zober A, Riemann JF. Dyspepsia and <i>Helicobacter pylori</i> infection in employees of a large industry. Results of a prospective BASF <i>Helicobacter pylori</i> prevention campaign. <i>Med Klin(Munich).</i> 2002 Jan 15;97(1):6-11.
Italy	13,4% (children)	2004	Thirteen primary care pediatricians were randomly selected from the Campania region of the Italian National Health Service. Each pediatrician completed a detailed FGID questionnaire on consecutive patients seen during a 3-month period (Total: 9660 patients)	Miele E, Simeone D, Marino A, Greco L, Auricchio R, Novek SJ, Staiano A. Functional gastrointestinal disorders in children: an Italian prospective survey. <i>Pediatrics.</i> 2004. Jul; 114(1):73-8.
Malaysia	30,%	No yet published	Community-rural and urban survey	Data from University of Malaysia. Malaysia GE Association.



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Mexico	8,50%	2007	Mexican Diagnostic and Treatment Guides in Gastroenterology 2007	Data from Asociación Mexicana de Gastroenterología
Netherlands	13,80%	2001	A random sample of 500 adults interview by telephone	Boekema PJ, van Dam van Isself EF, Bots ML, Smout AJ. Functional bowel symptoms in a general Dutch population and associations with common stimulants. <i>Neth J Med.</i> 2001 Jul; 59(1):23-30. <i>Neth J Med.</i> 2001 Jul; 59(1):23-30
Republic of Belarus	6,06%	2007	Local National Register for Gastroenterological Disease Epidemiology	Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education
Republic of Belarus	5,97%	2006	Local National Register for Gastroenterological Disease Epidemiology	Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education
Republic of Belarus	4,68%	2005	Local National Register for Gastroenterological Disease Epidemiology	Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education
Singapore	7,90%	1998	Questionnaire - community based	Changi General Hospital (Singapore GE Association) <i>Am. J. Gastroenterol.</i> 1998; 93(10): 1816-22
Spain	24%	2000	Small study in Granada	Data from Sociedad Española de Patología Digestiva, Caballero et al, <i>Rev Esp Enf Dig</i> 2000
Sweden	25%	2002	Review survey.	Agréus L. Natural history of dyspepsia. <i>Gut.</i> 2002 May; 50 Suppl 4:iv2-9.
Turkey	28,40%	2007	Questionnaires	Data from Ege University School of Medicine, Sect Gastroenterology (Turkish Gastroenterology Association). Kitapcioglu G, Mandiracioglu A, Bor CC, Bor S. Overlap of symptoms of dyspepsia and gastroesophageal reflux in the community. <i>Turk J Gastroenterol.</i> 2007; 18(1):14-19
Turkey	9,50%	2008	Questionnaires completed by nurses during face-to-face interviews	Basaranoglu M, Celebi S, Ataseven H, Rahman S, Deveci E, Acik Y. Prevalence and Consultation Behavior of Self-Reported Rectal Bleeding by Face-to-Face Interview in an Asian Community. <i>Digestion</i> , 2008. Jan 30; 77(1):10-15.
UK	41%(South England and north Scotland)	1990	A validated postal questionnaire in five geographical locations from the south coast of England to the north of Scotland among 7428 subjects.	Jones RH, Lydeard SE, Hobbs FD, Kenkre JE, Williams EI, Jones SJ, Repper JA, Caldwell JL, Dunwoodie WM, Bottomley JM. Dyspepsia in England and Scotland. <i>Gut.</i> 1990 Apr;31(4):401-5.
USA	5-12%	2004	Systematic Review in the general population. Full-length published manuscripts during 1980-2002 were included	El-Serag HB, Talley NJ. Systemic review: the prevalence and clinical course of functional dyspepsia. <i>Aliment Pharmacol Ther.</i> 2004 Mar 15; 19 (6):643-54.

	<h2>Map of Digestive Disorders &amp; Diseases (MDD)</h2>	
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USA	1,9-3,3%	2007	Prospective cohort study used data from multiple validated surveys	Halder SL, Locke GR 3rd, Schleck CD, Zinsmeister AR, Melton LJ 3rd, Talley NJ Natural history of functional gastrointestinal disorders: a 12-year longitudinal population-based study. <i>Gastroenterology</i> . 2007 Sep; 133(3):799-807. Epub 2007 Jun 20.
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Prevalence rates of functional dyspepsia are widely dispersed as compared with other functional disorders such as IBS or constipation. Median rate for dyspepsia is 13.4%, close to the figure for IBS, but data range widely from 1.9 to 43%. These figures are probably distorted by inconsistency in the definition used in the different studies.



## VI. Functional constipation

This functional digestive disorder is characterised by persistently difficult, infrequent, or seemingly incomplete defecation.

It can be defined by different subjective or measurable definitions:

- straining, hard stools or scybala, unproductive calls, infrequent stools, or incomplete evacuation;
- or less than 3 bowel movements per week;
- or daily stool weight below 35g/day;
- or straining more than 25% of the time;
- or prolonged whole-gut or colonic transit.

The most recent definition recognized worldwide is Rome III criteria (15) for functional constipation:

- (i) fewer than 3 defecations per week,
- (ii) lumpy or hard stools in at least 25% of defecations,
- (iii) sensation of incomplete evacuation for at least 25% of defecations,
- (iv) straining during at least 25% of defecations,
- (v) manual manoeuvres to facilitate at least 25% of defecations (e.g. digital evacuation, support of the pelvic floor),
- (vi) sensation of anorectal obstruction/blockage for at least 25% of defecations. Individuals should present at least two of the above symptoms for the last 3 months since symptom onset and at least 6 months prior to diagnosis.



**VI.1. Complications and seriousness**

Chronic constipation may lead to complications including hemorrhoids, caused by continuous strain in stool passage, or fecal impaction. This occurs when dried and hard stools accumulate in the rectum and anus, preventing natural ejection. Concomitant alterations induced by fecal impaction encompass swelling of the rectum, fecal incontinence, and rectal bleeding.

**VI.2. Diet and functional constipation**

A high fiber (wholegrain, fruits, vegetables) and fluid intake, regular physical exercise and maintaining optimal weight are factors contributing to optimal digestive functions and reducing the risk of suffering from constipation.

**VI.3. Geographic prevalence of constipation**

**Table 2. Global Functional Constipation Prevalence.**

Country	Prevalence	Survey Date	Type of Study	Author/Source of information
Australia	14,1 - 27,7%	2000	Questionnaire survey. Sometimes or often experiencing constipation symptoms during the preceding 12 months. Women aged 18 - 75.	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.
Australia (Sydney)	6,3 - 10,3%	2001	Mailed questionnaire survey. At least one of < 3 DPW, hard or lumpy stools, anal blockage, during preceding 3 months. People divided into 5 socioeconomic classes.	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.
Australia (Sydney)	30,70%	2006	Mailed questionnaire survey. Roma II criteria. 25 - 64 yr, randomly selected from 28 districts	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.



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Bulgaria	20,6% (Sofia District)	1978	Cross-sectional inquiry of Sofia district	Vutr Boles. 1978; 17(3):96-100. Distribution and characteristics of chronic constipation among a part of the population of Sofia District. Damianov D, Damianova T.
Canada	16,70%	2001	Random National Survey	Pare, P., S. Ferrazzi, W. G. Thompson, E. J. Irvine, and L. Rance. 2001. An epidemiological survey of constipation in Canada: definitions, rates, demographics, and predictors of health care seeking. Am J Gastroenterol 96:3130-7.
Colombia	27%	2005	Screening transversal descriptive study	Data from Asociación Colombiana de Gastroenterología
Czech Republic	13%	2007	Czech National Standards and guidelines-dyspeptic syndrome	Data from Czech Republic GE association. Czech National Standards and guidelines-dyspeptic syndrome
China	25,92%(adolescents)	2007	A questionnaire survey with a sampling collected by stratified and randomized	Zhou HQ, Li DG, Song YY, Zhong CH, Hu Y, Xu XX, Lu HM. An epidemiologic study of functional bowel disorders in adolescents in China. Zhonghua Yi Xue Za Zhi. 2007 Mar 13; 87(10):657-60.
France	22,4%	2006	Mailed questionnaire survey among 7,196 patients	Siproudhis L, Pigot F, Godeberge P, Damon H, Soudan D, Bigard MA. Defecation disorders: a French population survey. Dis Colon Rectum. 2006 Feb;49(2):219-27
Italy	34,1% (children)	2004	Italian prospective survey with detailed FGID questionnaire	Miele E, Simeone D, Marino A, Greco L, Auricchio R, Novek SJ, Staiano A. Functional gastrointestinal disorders in children: an Italian prospective survey. Pediatrics 2004. Jul; 114(1):73-8.
Mexico	19%(Mexico City)	2006	Study population using Rome II Modular Questionnaire	Schmulson M, Orfíz O, Santiago-Lomeli M, Gutiérrez-Reyes G, Gutiérrez-Ruiz MC, Robles-Díaz G, Morgan D. Frequency of functional bowel disorders among healthy volunteers in Mexico City. Dig Dis.2006; 24(3-4):342-7.
Netherlands	22%	2006	RCT investigating the effect of training on constipation, questionnaire study. 172 participants living in long term facilities, 64 - 94 yr.	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.
New Zealand	4,3 had 3 or more DPW. 20,3 had one of the three factors.	1992	Systematic literature review regarding the epidemiology of constipation in Europe and Oceania	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.



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New Zealand	19,90%	2004	Questionnaire survey. 924 person 26 yr old, from a birth cohort.	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.
Singapore	3,90%	1998	Questionnaire	Data from Changi General Hospital (Singapore GE Association). Am. J. Gastroenterol. 1998; 93 (10): 1816-22
Spain	29% Self reported			Data from Sociedad Española de Patología Digestiva. Ponce te al, Am J Epidemiol 2004
Spain	19% Rome I Criteria	2004		Data from Sociedad Española de Patología Digestiva. Ponce te al, Am J Epidemiol 2004
Spain	4,4%	2006	Systematic literature review regarding the epidemiology of constipation in Europe and Oceania	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.
Sweden	6,50%	2006	Prospective cohort study, questionnaire survey. 2 - 5 yr-children from a birth cohort.	George Peppas, Vangelis G Alexiou, Eleni Mourtzoukou and Matthew E Falagas. Epidemiology of constipation in Europe and Oceania: a systematic review. BCM Gastroenterology.
Turkey	24,50%	2008	Questionnaires completed by nurses during face-to-face interviews	Basaranoglu M, Celebi S, Ataseven H, Rahman S, Deveci E, Acik Y. Prevalence and Consultation Behavior of Self-Reported Rectal Bleeding by Face-to-Face Interview in an Asian Community. Digestion, 2008. Jan 30; 77(1):10-15.
Turkey	8,90%	2008		Data from Ege University School of Medicine, Sect Gastroenterology (Turkish Gastroenterology Association).
USA	2-27%		Review Systematically published literature	Higgins, P. D., and J. F. Johanson. 2004. Epidemiology of constipation in North America: a systematic review. Am J Gastroenterol 99:750-9.
USA	18%	2007	Self-report questionnaire mailed	Chang JY, Locke GR, Schleck CD, Zinsmeister AR, Talley NJ. Risk factors for chronic constipation and a possible role of analgesics. Neurogastroenterol Motil. 2007 Nov, 19(11):905-11.



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Prevalence of functional constipation is reported above 15% of the general population in most of the studies performed in recent years. The highest prevalence detected by the current survey was 34% in children in Italy (but constipation in children is not defined as functional constipation as defined here). In general, these data are above the figures reported by previous global studies. The change in trend and the high incidence among children in Western countries point out the need of serious concern with this issue by Public Health Care agencies.



## VII. Irritable Bowel Syndrome (IBS)

**Rome III Criteria for IBS are established as follows (71):**

\* Recurrent abdominal pain or discomfort (uncomfortable sensation which is not described as pain) at least 3 days per month in the last 3 months and is associated with 2 or more of the following:

1. Improvement with defecation
2. Onset associated with a change in frequency of stool.
3. Onset associated with a change in form (appearance) of stool.

**IBS can be subtyped by predominant stool pattern (71):**

1. IBS with constipation (IBS-C): hard or lumpy stools at least 25% and loose or watery stools <25% of bowel movements.
2. IBS with diarrhea (IBS-D): loose (mushy) or watery stools at least 25% and hard or lumpy stool < 25% of bowel movements.
3. Mixed IBS (IBS-M): hard or lumpy stools at least 25% and watery stools at least 25% of bowel movements.
4. Unsubtyped IBS. Insufficient abnormality of stool consistency to meet criteria for IBS-C, IBS-D, or IBS-M.

According to Rome III criteria, IBS symptoms must:

- occur for the first time  $\geq 6$  months before the patient presents
- and their presence on  $\geq 3$  day a month during the last 3 months, that means current activity (71).



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### VII.1. Main causes

Etiology of IBS is not identified yet. Recent reports pointed out gastrointestinal motor disturbances, visceral hypersensitivity, abnormal central processing of sensations as well as psychological disturbances interactions as an hypothesis for pathophysiology in IBS.

### VII.2. Complications and seriousness

IBS has not been shown to lead to more serious conditions except for the negative effect on the quality of life. IBS-related symptoms negatively affect patient activities in daily living, social relationships, and productivity at work or school. Patients with IBS typically score lower on measures of quality of life compared to general population norms or patients with other chronic diseases (16).

IBS also puts a heavy economic burden on the healthcare system, resulting in more than \$10 billion in direct costs and \$20 billion in indirect costs each year (17), (18).

### VII.3. Geographic prevalence of IBS

Table 5. Global Irritable Bowel Syndrome Prevalence.

Country	Prevalence	Survey Date	Type of Study	Author/Source of information
Australia	8.90%	2006	Population-based study in 1225 subjects with self report questionnaire	Boyce PM, Talley NJ, Burke C, Koloski NA. Epidemiology of the functional gastrointestinal disorders diagnosed according to Rome II criteria: an Australian population-based study. Intern Med. J. 2006 Jan;36 (1):28-36



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Australia	6,90%	2000	Postal questionnaire to 4500 randomly selected subjects, with equal numbers of male and female subjects aged > or = 18 yr and representative of the Australian population.	Boyce PM, Koloski NA, Talley NJ. Irritable bowel syndrome according to varying diagnostic criteria: are the new Rome II criteria unnecessarily restrictive for research and practice? Am J Gastroenterol. 2000 Nov;95(11):3176-83
Bangladesh	8,50%	2001	Questionnaire administered in house-to-house survey	Masud MA, Hasan M, Khan AK. Irritable bowel syndrome in a rural community in Bangladesh: prevalence, symptoms pattern, and health care seeking behavior. Am J Gastroenterol 2001; 96: 1547-52.
Belgium	6,70%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. Aliment Pharmacol Ther 17:643-50.
Canada	25%	2003	Random sample of residents, telephone, electronic or postal questionnaire	Li FX, Patten SB, Hilsden RJ, Sutherland LR. Irritable bowel syndrome and health-related quality of life: a population based study in Calgary, Alberta. Can J Gastroenterol 2003; 17: 259-63.
Canada	12%	2002	Telephone survey of random sample of population	Thompson WG, Irvine EJ, Pare P, Ferrazi S, Rance L. Functional gastrointestinal disorders in Canada: first population-based survey using Rome II criteria with suggestions for improving the questionnaire. Dig Dis Sci 2002; 47: 225-35.
Canada	10%	2004	Postal survey among 8646 randomly patients aged >or=18 years	Wilson, S., L. Roberts, A. Roalfe, P. Bridge, and S. Singh. 2004. Prevalence of irritable bowel syndrome: a community survey. Br J Gen Pract 54:495-502.
Colombia	17,50%	2005	Screening transversal descriptive study	Data from Asociación Colombiana de Gastroenterología
Czech Republic	20%	2007	Czech Guidelines	Data from Czech Republic GE association. Study Group of Dysmotility Disorders
China	20,19%(adolescents)	2007	A questionnaire survey with a sampling collected by stratified and randomized	Zhou HQ, Li DG, Song YY, Zhong CH, Hu Y, Xu XX, Lu HM. An epidemiologic study of functional bowel disorders in adolescents in China. Zhonghua Yi Xue Za Zhi. 2007 Mar 13; 87(10):657-60.
China	7%	2002	Telephone interviews using a validated questionnaire	Kwan, A. C., W. H. Hu, Y. K. Chan, Y. W. Yeung, T. S. Lai, and H. Yuen. 2002. Prevalence of irritable bowel syndrome in Hong Kong. J Gastroenterol Hepatol 17:1180-6.



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China (Taiwan)	22,10%	2003	Survey with a sample of 2865 subjects using Rome II Modular Questionnaire	Lu CL, Chen CY, Lang HC, Luo JC, Wang SS, Chang FY, Lee SD. Current patterns of irritable bowel syndrome in Taiwan: the Rome II questionnaire on a Chinese population. <i>Aliment Pharmacol Ther.</i> 2003 Dec; 18(11-12):1159-69
Finland	5,10%	2004	Postal questionnaire in random sample of population	Hillila MT, Farkkila MA. Prevalence of irritable bowel syndrome according to different diagnostic criteria in a nonselected adult population. <i>Aliment Pharmacol Ther</i> 2004; 20:339-45.
France	11,30%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. <i>Aliment Pharmacol Ther</i> 17:643-50.
France	4,70%	2004	Postal questionnaire in a nationally representative sample	Dapoigny M, Bellanger J, Bonaz B, et al. Irritable bowel syndrome in France: a common, debilitating and costly disorder. <i>Eur J Gastroenterol Hepatol</i> 2004; 16: 995-1001.
France	1,10%	2004	Telephone survey contacting subjects representative of the French population. Screening questionnaire	Bommelaer G, Poynard T, Le Pen C, Gaudin AF, Maurel F, Priol G, Amouretti M, Frexinos J, Ruszniewski P, El Hasnaoui A. Prevalence of irritable bowel syndrome (IBS) and variability of diagnostic criteria. <i>Gastroenterol Clin Biol.</i> 2004. Jun-Jul; 28(6-7 Pt):554-61.
Germany	15-22%	2004	Bibliography review of epidemiological studies	Hauser, W., and M. Lempa. 2004. (Irritable bowel syndrome). <i>Schmerz</i> 18:130-5.
Germany	7,40%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. <i>Aliment Pharmacol Ther</i> 17:643-50.
Hong Kong	6,60%	2002	Telephone interviews of randomly selected individuals	Kwan AC, Hu WH, Chan YK, Yeung YW, Lai TS, Yuen H. Prevalence of irritable bowel syndrome in Hong Kong. <i>J Gastroenterol Hepatol.</i> Nov, 17 (11):1180-6.
Hong Kong	3,70%	2002	Face-to-face interviews of adults living in two housing blocks.	Lau EM, Chan FK, Ziea ET, Chan CS, Wu JC, Sung JJ. Epidemiology of irritable bowel syndrome in Chinese. <i>Dig Dis Sci</i> 2002; 47: 2621-4.
Iran	5,80%	2003	Face-to-face interviews of randomly selected sample of the population	Hoseini-Asl MK, Amra B. Prevalence of irritable bowel syndrome in Shahrekord, Iran. <i>Indian J Gastroenterol.</i> 2003 Nov-Dec; 22(6):215-6



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Ireland	15%	2001		Data from Irish Gastroenterology Association. Department of Gastroenterology, Connolly Hospital. NJ Talley, American Journal of Epidemiology
Italy	13,9%(children)	2004	Prospective survey with detailed FGID questionnaire	Miele E, Simeone D, Marino A, Greco L, Auricchio R, Novak SJ, Staiano A. Functional gastrointestinal disorders in children: an Italian prospective survey. Pediatrics.2004. Jul; 114(1):73-8.
Italy	12%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. Aliment Pharmacol Ther 17:643-50.
Japan	10-20%	2004	Bibliography review	Torii A, Toda G. Management of irritable bowel syndrome. Intern Med.2004 May; 43(5):353-9.
Korea	5,70%	2005	Cross-sectional study using a self-reported questionnaire	Kim YJ, Ban DJ. Prevalence of Irritable bowel Syndrome, influence of lifestyle factors and bowel habits in Korean college Students. Int J Nurs Stud. 2005 Mar;42(3):247-54
Malaysia	8-15%	2003	Survey on medical students	Data from University of Malaysia. Malaysia GE Association. Tan Ym. Goh KL, et al. JGH 2003; 18:1412-6
Malaysia	15,70%	2004	Face-to-face interview of race stratified random sample of population	Rajendra S, Alahuddin S. Prevalence of irritable bowel syndrome in a multi-ethnic Asian population. Aliment Pharmacol Ther 2004, 19: 704-6.
Mexico	35%(Mexico city)	2006	Study population using Rome II Modular Questionnaire	Dig Dis. 2006;24(3-4):342-7. Frequency of functional bowel disorders among healthy volunteers in Mexico City. Schmulson M, Orfíz O, Santiago-Lomeli M, Gutiérrez-Reyes G, Gutiérrez-Ruiz MC, Robles-Díaz G, Morgan D.
Mexico	20%(patients that goes to a Gastroenterologist office)	2004	Multicentric study	Data from Asociación Mexicana de Gastroenterología
Netherlands	6,20%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. Aliment Pharmacol Ther 17:643-50.



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Republic of Belarus	3,16%	2007	Local National Register for Gastroenterological Disease Epidemiology	Data from Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education
Republic of Belarus	2,51%	2006	Local National Register for Gastroenterological Disease Epidemiology	Data from Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education
Republic of Belarus	2,10%	2005	Local National Register for Gastroenterological Disease Epidemiology	Data from Department of Gastroenterology and Nutrition, Byelorussian Medical Academy Postgraduate Education
Romania	1-10%	2006	Preliminary investigation with questionnaires in 100 General Practitioners	Dumitrascu, D. L., L. David, and M. Singer. 2006. What general practitioners know about irritable bowel syndrome. Preliminary data from a Romanian province. <i>J Gastrointestin Liver Dis</i> 15:227-30.
Russia	24%girls, 14% boys (14-17 years) according to Rome criteria	2001	Random community population of adolescents study	Reshetnikov OV, Kurilovich SA, Denisova DV, Zav'ialova LG, Svetlova IO, Tereshonok IN, Krivenchuk NA, Ereemeeva LI. Prevalence and risk factors of the development of irritable bowel syndrome in adolescents: a population study. <i>Ter Arkh.</i> 2001; 73(2):24-9.
Singapore	8,60%	2004	Face-to-face interview of random sample of householders	Data from Changi General Hospital (Singapore GE Association) Gwee KA, Wee S, Wong ML, Png DJ. The prevalence, symptom characteristics, and impact of irritable bowel syndrome in an Asian community. <i>Am. J. Gastroenterol.</i> 2004; 99(5), 924-931.
Spain	7,30%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. <i>Aliment Pharmacol Ther</i> 17:643-50.
Spain	5%	2001		Data from Sociedad Española de Patología Digestiva. Mearin et al, <i>Scand J Gastroenterol</i> 2001
Switzerland	8,40%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. <i>Aliment Pharmacol Ther</i> 17:643-50.
Thailand	5-10%	2007	Literatura review study	Chang FY, Lu CL. Irritable bowel syndrome in the 21st century: perspectives from Asia or South-east Asia. <i>J Gastroenterol Hepatol.</i> 2007 Jan; 22(1):4-12.



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Turkey	19,10%	2003	Systematic sampling of 998 people in a city centre	Karaman N, Turkay C, Yonem O. Irritable bowel syndrome prevalence in city center of Sivas. Turk J Gastroenterol 2003; 14: 128-31.
Turkey	8,60%	2008	Questionnaires completed by nurses during face-to-face interviews	Basaranoglu M, Celebi S, Ataseven H, Rahman S, Deveci E, Acik Y. Prevalence and Consultation Behavior of Self-Reported Rectal Bleeding by Face-to-Face Interview in an Asian Community. Digestion, 2008. Jan 30; 77(1):10-15.
Turkey	6,30%	2004	Face-to-face interviews of random sample of population	Celebi S, Acik Y, Deveci SE, et al. Epidemiological features of irritable bowel syndrome in a Turkish urban society. J Gastroenterol Hepatol 2004; 19: 1217-24
Turkey	2,70%	2008	Countrywide unpublished study	Data from Ege University School of Medicine, Sect Gastroenterology (Turkish Gastroenterology Association).
UK	12%	2003	A community survey using quota sampling and random digit telephone dialing	Hungin, A. P., P. J. Whorwell, J. Tack, and F. Mearin. 2003. The prevalence, patterns and impact of irritable bowel syndrome: an international survey of 40,000 subjects. Aliment Pharmacol Ther 17:643-50.
USA	8,3-11,4%	2007	Prospective cohort study used data from multiple validated surveys	Halder SL, Locke GR 3rd, Schleck CD, Zinsmeister AR, Melton LJ 3rd, Talley NJ. Natural history of functional gastrointestinal disorders: a 12-year longitudinal population-based study. Gastroenterology. 2007 Sep; 133(3):799-807.
USA	14%	2005	Two-phase community survey used quota sampling and random-digit telephone dialing (screening interview)	Hungin, A. P., L. Chang, G. R. Locke, E. H. Dennis, and V. Barghout. 2005. Irritable bowel syndrome in the United States: prevalence, symptom patterns and impact. Aliment Pharmacol Ther 21:1365-75.
USA	12,10%	2003	Follow-up postal postal questionnaire study of a sex- and age-stratified sample of the population	Saito YA, Talley NJ, Melton J, Fett S, Zinsmeister AR, Locke GR. The effect of new diagnostic criteria for irritable bowel syndrome on community prevalence estimates. Neurogastroenterol Motil 2003; 15: 687-94
USA	5-10% (men/women)	2007	Population-based, cross-sectional survey by mailing a valid symptom questionnaire	Jung, H. K., S. Halder, M. McNally, G. R. Locke, 3rd, C. D. Schleck, A. R. Zinsmeister, and N. J. Talley. 2007. Overlap of gastro-oesophageal reflux disease and irritable bowel syndrome: prevalence and risk factors in the general population. Aliment Pharmacol Ther 26:453-61.

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Yemen	25%			Data from Yemen Gastroenterology Association. Gastro Endoscopic Unit Hospital
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Median prevalence of IBS is 11%. Even if the defining criteria have been changing over the past few years, dispersion of the data are not too wide when compared to other functional disorders. Half of the countries in this survey reported prevalence rates between 10 and 20%. Another interesting point is the absence of gradient between Western and Eastern societies. Furthermore, more women than men report IBS in Western and European countries (with a ratio of 3:1).

These figures are highly relevant since they disclose the important impact of IBS on health care providers worldwide.



### VIII. Discussion

Aim of this project was to collect epidemiological data worldwide with the contribution of the National Societies Members of The World Gastroenterology Organization, and to review the literature in order to provide new awareness of the prevalence of digestive disorders and diseases. For this purpose, a total of 142 National Societies were contacted and literature searches with appropriate key terms were conducted using the main scientific and medical databases. Herein, this report gives the definition and prevalence of the most frequent functional disorders and diseases of the gastrointestinal system. We also suggested several possible lines of dietary management. Obtained data from a considerable number of countries are presented in the tables.

Infection by *Helicobacter pylori* is the most prevalent digestive disease in the adult population, with median prevalence around 50% of the World population. As pointed out by previous surveys, differences between countries appear to be associated with socio-economic development. A highly interesting observation of our survey is the reduced prevalence found in children and young adults due to a reduced infection rate in the last decades, thanks to improved hygienic and environmental conditions. One fourth of the countries reported prevalence rates at 10% or below.

Among the gastrointestinal diseases of highest severity, colorectal cancer remains the most frequent disease, and it is still associated with high mortality. Dispersion of data on prevalence is remarkably wide. Age-standardized data demonstrates that incidence of colorectal cancer is 10 to 20 times higher in countries in the top quartile (Western Europe and North America) as compared to those in the lowest quartile (Africa, India).



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Gastro-Esophageal Reflux Disease, functional constipation, and irritable bowel syndrome are also highly prevalent diseases and disorders affecting each of them 1 out of every 6 persons all over the World. Median prevalence rates for these conditions are around 15% of the population with quartiles ranging from 8% up to 30% in different countries. It is important to remark that functional constipation is highly prevalent among children of the industrialized societies with prevalence rates ranging from 20 to 34%.

Finally, dyspepsia is a functional disorder that requires further epidemiological investigation. Prevalence rates seem to be around 10 to 20% of the population, but data are scarce and widely dispersed because of the wide diversity of the definitions used in epidemiological studies.

To summarize, this report provides for the first time a valuable tool to assess the prevalence of some of the main gastrointestinal disorders and diseases worldwide. Many of current data point out consistently to high prevalence of functional digestive disorders and diseases on the world population. A major limitation is the limited availability of data from African and some Asian countries. Further surveys coordinated by the National Societies, including prospective studies, will provide further insights into this interesting topic.



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