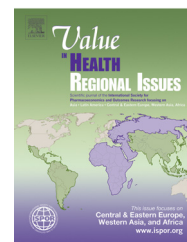




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## Costs of Medically Attended Acute Gastrointestinal Infections: The Polish Prospective Healthcare Utilization Survey

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### ABSTRACT

**Objectives:** The burden of acute gastrointestinal infections (AGIs) on the society has not been well studied in Central European countries, which prevents the implementation of effective, targeted public health interventions. **Methods:** We investigated patients of 11 randomly selected general practices and 8 hospital units. Each patient meeting the international AGI case definition criteria was interviewed on costs incurred related to the use of health care resources. Follow-up interview with consenting patients was conducted 2 to 4 weeks after the general practitioner (GP) visit or discharge from hospital, collecting information on self-medication costs and indirect costs. Costs were recalculated to US dollars by using the purchasing power parity exchange rate for Poland. **Results:** Weighting the inpatient costs by age-specific probability of hospital referral by GPs, the societal cost of a medically attended AGI case was estimated to be US \$168. The main cost drivers of

direct medical costs were cost of hospital bed days (US \$28), cost of outpatient pharmacotherapy (US \$20), and cost of GP consultation (US \$10). Patients covered only the cost of outpatient pharmacotherapy. Considering the AGI population GP consultation rate, the age-adjusted societal cost of medically attended AGI episodes was estimated at US \$2222 million, of which 53% was attributable to indirect costs. **Conclusions:** Even though AGIs generate a low cost for individuals, they place a high burden on the society, attributed mostly to indirect costs. Higher resources could be allocated to the prevention and control of AGIs.

**Keywords:** direct medical costs, direct nonmedical costs, gastrointestinal infections, indirect costs, Poland.

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### Introduction

Acute gastrointestinal infections (AGIs) can be caused by viruses, bacteria, and parasites, as well as through physical or chemical intoxications. Symptoms and high incidence of AGIs may put a substantial burden on patients and the health care system—from medical, social, and economic perspectives. An estimation of the true burden of AGI symptoms on the society, however, is difficult [1]. In developed countries, AGIs are common but usually do not cause severe disease. Sufferers frequently downplay its significance, and doctors often do not trace the causes of individual cases. The majority of AGIs in Poland are not treated at all or are treated with rehydration and/or over-the-counter drugs [2,3]. For these reasons, economic consequences of AGIs are not properly assessed and thus their true burden is underestimated.

Available scarce evidence indicates that the societal cost of the so-called mild gastrointestinal illnesses is considerably higher than the costs associated with acute hospitalized cases [4]. To date, high-quality evidence on burden and costs to the society has been collected mostly for rotavirus-associated AGIs—in relation to both ambulatory care [5,6] and hospital settings [7–9]. Costs for AGIs

caused by other pathogens have not been well documented, although recent evidence indicates that costs for AGIs caused by different etiological factors can be similar [10].

Poland, located in Central Europe, with its 38.4 million inhabitants is the 34th most populous country in the world and the 6th largest country in the European Union. The gross national product per capita is almost US \$16,710 [11]. The overall quality of health care provision nationwide, as judged by European standards, is regarded as being high, which is reflected in the nation's average life expectancy, estimated at 71 years for men and 80 years for women [11]. Poland's health care system is based on an all-inclusive social insurance system. An insured person and members of his or her family are entitled to free health services offered by providers who have signed contracts with the National Health Fund. The National Health Fund is a state-owned third-party payer. It finances health services and assures reimbursement of medicines. There is a rapidly growing private sector consisting of private general practitioners' (GPs) and specialists' practices and rarely private clinics and hospitals, paid on a fee-for-service or prepaid basis. The drugs reimbursement system grants unrestricted access to essential drugs and different level of co-payment for the remaining specialty medicines (depending on the

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Anatomical Therapeutic Chemical [ATC] Classification System group, disease, patient's status, etc.).

Currently in Poland, no reliable cost data in health care system are available [12]. These data are not recorded by health care institutions, because GP practices are reimbursed for the number of registered patients and hospital admissions are reimbursed on the basis of discharge codes of the *International Statistical Classification of Diseases, 10th Revision*, not depending on the health care procedures used. Consequently, there are no health care cost databases in Poland that are similar to those in other developed countries, such as the National Health Service database in the United Kingdom [13].

The aim of the present article was to summarize direct medical, nonmedical, and indirect costs related to the management of AGI cases to estimate its societal costs and to enable

better planning and monitoring of AGI prevention programs in the future.

## Methods

We estimated AGI-related resource use linked to GP consultations and hospitalizations by using a prospective study conducted between May 2008 and September 2009. We have described detailed methods for study site selection and AGI cases recruitment in previous publication [3].

## Studied Population

The Polish Prospective Healthcare Utilization Survey was performed in a randomly selected population sample served by 11

**Table 1 – List of unit costs generated by AGI cases consulting GPs in Poland between May 2008 and September 2009.**

Detailed cost categories	Number	Unit cost per patient (US \$)*				Total cost (US \$)*	
		Mean	95% CI	Median	95% CI	Paid by payer <sup>†</sup>	Paid by patient
GP consultation	385/385	10.25	9.64–10.86	8.14	8.05–8.21	3946.54	0.00
Laboratory testing	14/385	19.26	13.91–24.62	19.46	12.40–26.52	269.70	0.00
Complete blood count	10/385	3.52	3.02–4.03	3.74	2.83–4.65	35.22	0.00
Stool sample for microbiological confirmation	9/385	14.17	11.14–17.21	13.51	9.17–17.85	127.57	0.00
Other (blood smear, electrolytes, etc.)	10/385	10.69	7.58–13.79	10.24	6.45–14.03	106.91	0.00
Imaging diagnostics (ultrasonography)	11/385	17.28	14.46–20.10	13.51	6.60–20.43	190.11	0.00
Pharmacotherapy (ATC)	382/385	20.71	19.86–21.55	19.33	18.51–20.15	985.11	6924.65
Rehydration fluids (–)	230/385	6.72	6.18–7.25	5.06	4.76–5.37	442.67	1102.28
Intestinal anti-infectives (A07A)	229/385	5.77	5.53–6.02	4.75	4.02–5.47	0.00	1322.01
Antidiarrheal microorganisms (A07F)	144/385	8.30	8.03–8.57	8.83	–	0.00	1195.4
Other probiotics (–)	89/385	8.97	8.14–9.84	8.03	–	0.00	798.83
Other antidiarrheals (A07X)	127/385	7.59	7.48–7.70	7.53	–	0.00	963.81
Drugs for functional gastrointestinal disorders (A03)	81/385	5.12	4.36–5.89	4.59	4.37–4.81	41.81	373.22
Analgesics and anti-inflammatory products (N02B, M01A)	82/385	4.02	3.28–4.77	1.74	0–3.58	67.32	262.42
Antibacterials for systemic use (J01)	60/385	8.02	6.68–9.35	7.35	6.85–7.85	159.89	320.94
Other pharmaceuticals (A01A, A02B, A07D, A09A, R05C, R06A, V06D, no ATC code)	68/385	10.63	8.82–12.44	8.47	3.32–13.62	273.42	449.19
Materials used	66/385	0.34	0.17–0.51	0.09	0.04–0.14	22.30	0.00
Medical devices (syringes, needles, ports, fluid transfusion sets)	19/385	0.37	0.19–0.55	0.15	0.12–0.28	7.01	0.00
Biological specimen containers	4/385	1.29	0.11–2.46	0.95	0–2.43	5.16	0.00
Other (gloves, swabs, disposable towels, gowns, disinfectants, soaps, etc.)	66/385	0.15	0.10–0.20	0.09	0.04–0.14	10.14	0.00
Emergency department visits	4/115	54.05	–	54.05	–	216.22	0.00
Specialist consultation	7/115	17.78	–	17.78	–	124.45	0.00
Transport (number of kilometers)	82/115	36.96	17.91–56.01	13.00	9.21–16.79	–	–
Cost per kilometer × number of kilometers	82/115	16.84	8.02–25.66	6.32	4.26–8.39	0.00	1380.85
Home care (family, friends, service)	34/115	127.98	64.37–29.42	62.89	36.11–89.66	4,351.30	54.05
Absence from work (number of days off work)	10/115	6.10	3.89–8.31	6.00	3.03–8.97	–	–
Cost per day off × number of days	10/115	511.48	330.91–692.04	503.09	262.75–743.44	5,114.77	0.00

AGI, acute gastrointestinal infection; ATC, Anatomical Therapeutic Chemical Classification System; CI, confidence interval; GP, general practitioner; WHO, World Health Organization.

\* US \$1 = 1.85 PLN (WHO CHOICE).

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