

Economic impact of inflammatory bowel disease in Alberta

B.R. PINCHBECK, PHD, J. KIRDEIKIS, BSC, A.B.R. THOMSON, MD, PHD, FRCPC, FACP

ABSTRACT: This paper attempts to estimate the cost of inflammatory bowel disease (IBD) to the health care system of Alberta. In the 1015 patients responding to a questionnaire, two types of direct costs were compared to provincial averages; physicians' fees and hospital costs. Costs were calculated using the Alberta Health Care Insurance Plan prescribed billing rates. The 15-to 24-year-old age group exhibited the highest annual physician fees. This was probably due to the high incidence rate of IBD in this group. The mean cost per patient-year for Crohn's disease was estimated to be \$4400 and the mean cost for ulcerative colitis was estimated to be \$3020; this did not include outpatient laboratory or radiological investigations, and as such represents an underestimation of the total costs to the health care system. However, only a small minority of the patients were using a large majority of the resources: for example, for both Crohn's and ulcerative colitis, 7% of the patients accounted for 69% of hospital days. The average hospital and physician associated costs declined markedly with duration of the disease. It is estimated that the future cost of IBD to the provincial health care system (the percentage of the provincial health care budget used to diagnose and treat IBD) will double from 1985 to 2000. This underscores the need for continued and expanded research into the cause and treatment of IBD, and the importance of maintaining a health care system which can respond to the needs of these patients. *Can J Gastroenterol* 1988;2(2):53-56

Key Words: *Chronic idiopathic ulcerative colitis, Crohn's disease, Treatment costs*

Nutrition and Metabolism Research Group, Department of Medicine, University of Alberta, Edmonton, Alberta

Correspondence and reprints: Dr A.B.R. Thomson, Nutrition and Metabolism Research Group, Division of Gastroenterology, 519 Robert Newton Research Building, University of Alberta, Edmonton, Alberta T6G 2C2

Received for publication October 1987. Accepted February 23, 1988

AS THE COST OF HEALTH CARE HAS become a substantial part of personal and government expenditure in Canada, interest in the cost of illnesses has developed in both the economic and medical communities. This paper attempts to estimate the cost of inflammatory bowel disease (IBD) to the health care system and the economy of the province of Alberta. The cost to the health care system is the direct cost of diagnosing and treating the disease which includes physician fees and hospital costs. The cost to the economy is the indirect cost of the illness that results from lost work days. The results from a recent epidemiological study of IBD in this area of northern Canada (1) were used to predict the future number of cases and the economic impact of these patients.

METHODS

The area included in this study was the northern half of the province of Alberta, which had a population of 1,295,360 people in 1981. Patients with

Crohn's disease and ulcerative colitis were identified by a procedure described earlier (1). Their hospital and physicians' records were then reviewed to determine what procedures they had undergone. Each of the patients was sent a questionnaire regarding the number of doctor visits per year, days hospitalized per year, days incapacitated per year and effect of IBD on work.

A total of 1015 of the 2430 self-administered questionnaires (41.8%) were returned. The cost per patient-year was calculated using the Alberta Health Care Insurance Plan billing rates (1985), which are regulated by the provincial government. The total cost was divided by the total number of patient-years, to determine the average patient-year cost in 1985 Canadian dollars. This aggregate approach is more suitable for estimating the cost of a specific illness than the disaggregative approach of assigning a portion of the total health budget to an illness (2).

The future estimates of the cost of IBD were based on predicted numbers of patients, from known incidence and prevalence figures, multiplied by the average costs for Crohn's disease and ulcerative colitis. The predicted number of cases

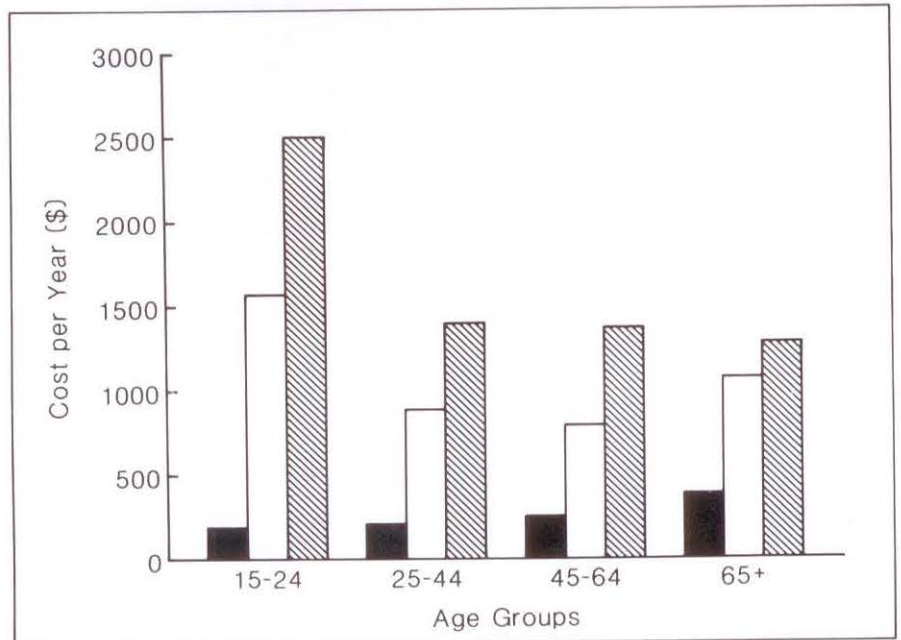


Figure 1) Cost per year for physicians' fees for patients with ulcerative colitis (□) or Crohn's disease (▨), as compared with age-matched provincial averages for the entire population (■)

were calculated using the finding that the incidence of both diseases was constant from 1976 to 1981. The annual health budget was estimated using yearly population predictions and assuming that the annual average cost per person will remain relatively constant in 1985 dollars.

RESULTS

As might be expected, the cost per year of health care for a person afflicted with Crohn's disease or ulcerative colitis is much higher than the provincial average per person costs. The difference for physicians' fees (Figure 1) is most evident in the 15-to 24-year-old age group where the cost for Crohn's disease is more than 13 times the provincial average and the cost of ulcerative colitis is almost eight times the average cost. For all age groups, the mean physician cost per patient-year was \$1495 for Crohn's and \$950 for ulcerative colitis, compared with the provincial average of \$207 per year. This physician cost did not include outpatient laboratory or radiological investigations, and as such represents an underestimation of the total costs to the health care system.

IBD patients also had much higher costs than average for the other direct expense, hospitalization. The mean days in hospital per year were 7.43 for Crohn's and 5.30 for ulcerative colitis compared with the provincial average of 1.44 days. The means for the disease groups are not representative of the true situation as they were affected by outliers. A better picture can be derived from Figure 2 which shows that about 75% of the IBD patient population had not been in hos-

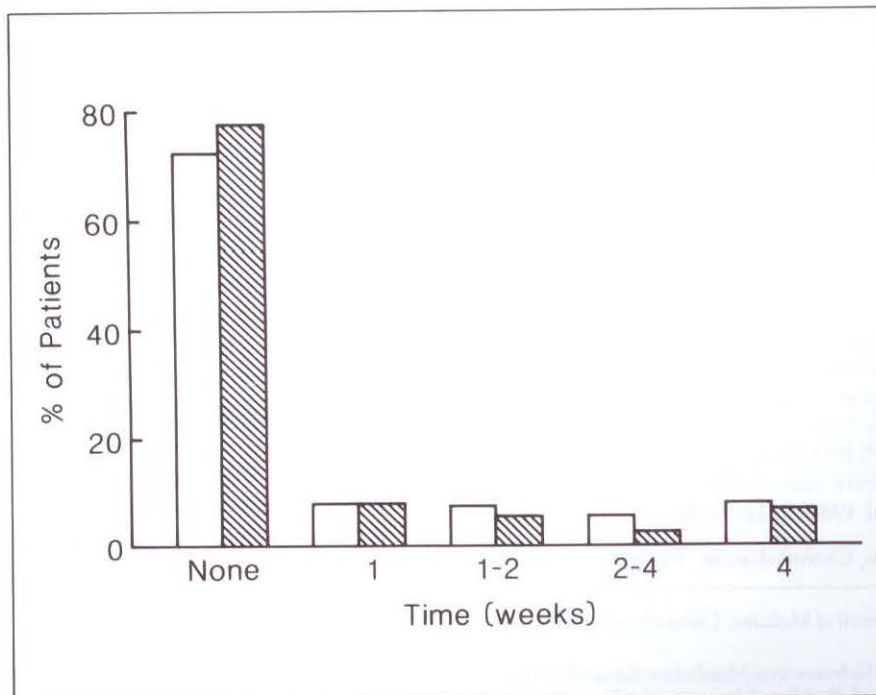


Figure 2) Percentage of patients with Crohn's disease (□) or ulcerative colitis (▨) hospitalized in one year

TABLE 1

Mean days incapacitated or hospitalized per year

	Days incapacitated	Days hospitalized
Crohn's disease	26.1	7.43
Ulcerative colitis	17.5	5.30
Provincial average	6.3	1.44

pital during the past year. Whatever the proportion of patients requiring hospitalization, the total cost is substantial, \$2905 per patient-year for Crohn's disease and \$2070 for ulcerative colitis. From these results the total direct cost per patient-year for Crohn's is \$4400 and \$3020 for ulcerative colitis. For 1985, the total amount expended on physician and hospital costs for patients with either disease is estimated at over \$19 million.

The mean values for days incapacitated per year (Table 1) for both Crohn's disease (26.1) and ulcerative colitis (17.5) were also influenced by outliers. Figure 3 shows that over 50% of Crohn's and over 60% of ulcerative colitis patients did not lose any time from work (outside the home) due to IBD. As was the case with the hospital statistics, a minority of the patients was using a majority of the resources.

TABLE 2

Estimated future cost of inflammatory bowel disease in Alberta

Year	Cases of IBD	Physician costs (millions)	Percentage of budget
1985	4880	6.33	0.13
1990	6970	9.05	0.17
1995	9410	12.22	0.21
2000	12,120	15.83	0.26

Using known incidence and prevalence rates for the northern half of Alberta (1), the numbers of future cases of the diseases were estimated, together with estimates of direct physician costs (Table 2). If incidence rates continue unchanged and mortality from IBD remains low, then by the year 2000 the physician costs to the Alberta Health Care Insurance Commission for the care of 12,120

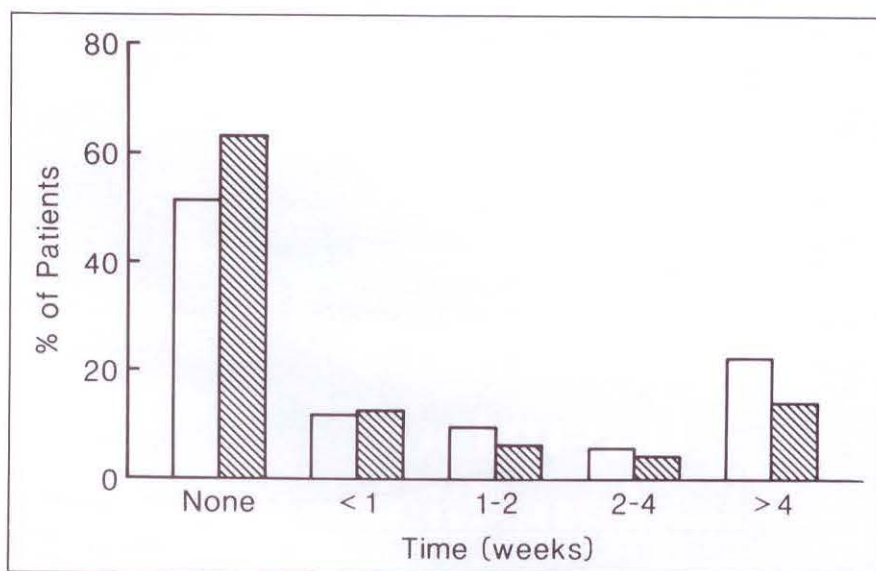


Figure 3) Percentage of patients with Crohn's disease (□) or ulcerative colitis (▨) losing time from work outside the home in one year

IBD patients would be at least \$15.8 million at 1985 prices. However, the cost for health care for patients with IBD is highest early in the disease, falling markedly with duration of disease, both with respect to hospital (Figure 4) and physician costs (Figure 5). Although the number of admissions to hospital each year remains relatively stable over time (Figure 6), the length of hospitalization tends to fall with duration of disease (Figure 7). The continued care of these patients would then shift to the community, with patients consulting their doctor only slightly more than once per year (Figure 8).

DISCUSSION

It is all but impossible to calculate the total cost of an illness to society; how can a dollar value be put on a person's pain and suffering? Therefore, the cost must be estimated using items which have a monetary value. Information on drug costs was not available for this study, which could be substantial in the treatment of chronic digestive disorders such as IBD, nor were details on laboratory fees for outpatients. Nonetheless, from the available information it appears that the direct costs of IBD are high and will probably increase.

The large number of physician costs

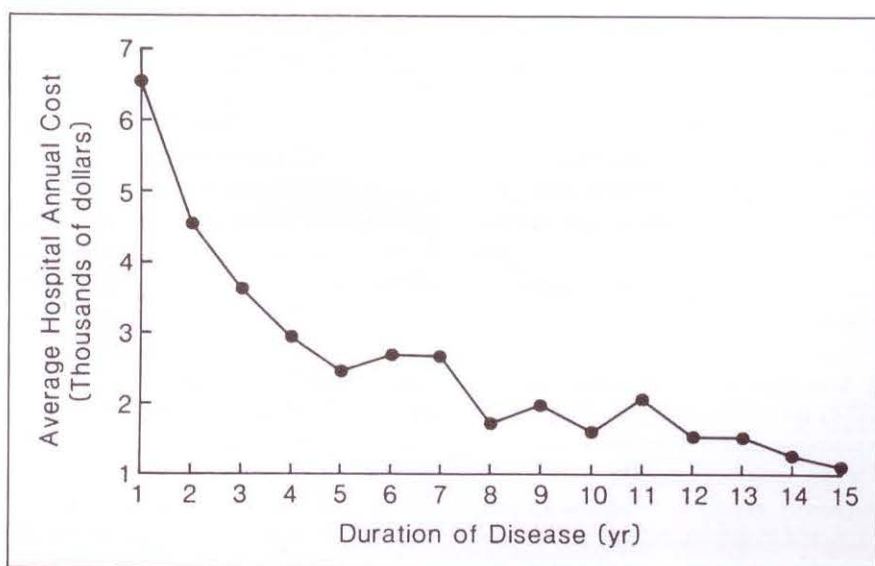


Figure 4) Effect of duration of IBD on average hospital annual cost

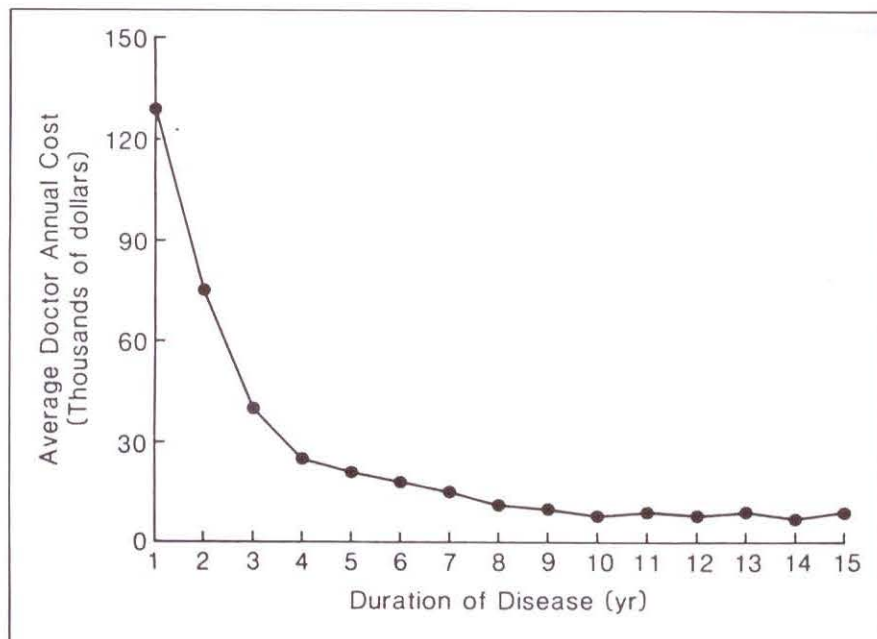


Figure 5) Effect of duration of IBD on average doctor annual cost

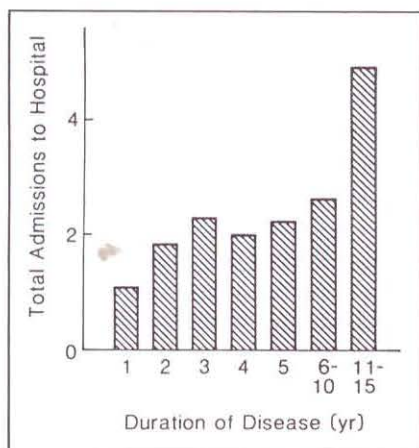


Figure 6) Effect of duration of IBD on total admissions to hospital

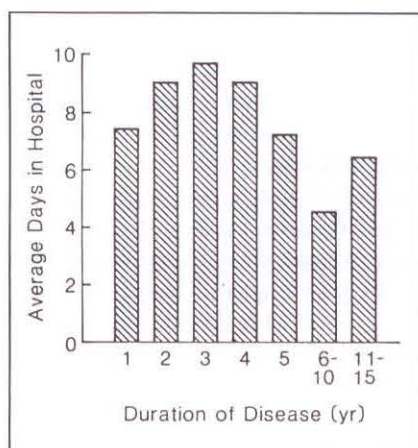


Figure 7) Effect of duration of IBD on average days in hospital

in the 15-to 24-year-old age group is probably caused by the high incidence of IBD in this group. Because the majority of patients in this group would be relatively newly diagnosed they would have recently undergone extensive testing and possible surgical procedures during the early stages of their disease. This trend was observed in Copenhagen (3), among Crohn's disease patients. In the first two years after diagnosis, 53% of the patients had surgery while the rate was 3% per year after four years. This would explain the relatively stable cost in the other age groups, who might require only outpatient treatment. A similar finding was noted in this study, with a decrease over time in hospital and physician related costs (Figures 4 and 5), shorter

periods in hospital despite continued need for hospitalization (Figures 6 and 7) and continued need to consult physicians on an annual basis (Figure 8).

While most patients require only outpatient treatment, a few of the more seriously affected people need intensive hospital treatment. For both diseases, 7% of the patients accounted for 69% of the total time in hospital. There was a similar situation for time incapacitated per year, with 20% of the patients accounting for 89% of the total time lost. Again, a similar trend was observed in the Copenhagen studies in that 75% of Crohn's patients and about 90% of ulcerative colitis patients were capable of full-time work (3,4). In this study, 72% of Crohn's patients and 82% of ulcerative

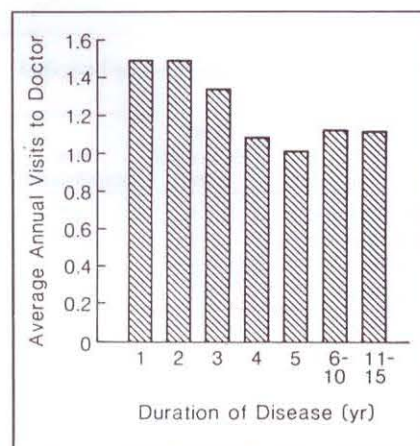


Figure 8) Effect of duration of IBD on annual visits to a doctor

colitis patients were incapacitated less than two weeks per year. This suggests that if a person has a mild or moderate form of the disease, it should not affect his or her ability to work outside the home. These figures lead to the suggestion that, except for the few severely afflicted individuals, the indirect cost of the illness may not necessarily be as large as the direct cost.

The percentage of the health care budget used to diagnose and treat IBD will double over the 15 year period from 1985 to 2000 (Table 2). This increase is a reflection of the growing prevalence of the disease in Alberta. In the year 2000 it is expected that there will be over 12,000 cases of IBD. This underscores the need for continued and expanded research into the cause, prevention and treatment of IBD.

REFERENCES

1. Thomson, ABR, Pinchbeck BR, Kirdeikis J. The epidemiology of inflammatory bowel disease in northern Alberta, Canada. *J Clin Gastroenterol.* (In press)
2. Tolpin HG, Bentkover JD. Economic cost of illness: Decision-making applications and practical considerations. *Adv Health Econ Health Ser Res* 1983;4:165-98.
3. Binder V, Hendriksen C, Kreiner S. Prognosis in Crohn's disease based on results from a regional patient group from the county of Copenhagen. *Gut* 1985;26:146-50.
4. Hendriksen C, Kreiner S, Binder V. Long-term prognosis in ulcerative colitis - based on results from a regional patient group from the county of Copenhagen. *Gut* 1985;26:158-63.



Hindawi
Submit your manuscripts at
<http://www.hindawi.com>

