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Campylobacter jejuni Infection in Colorado: Unexplained Excess of Cases in Males

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Synopsis

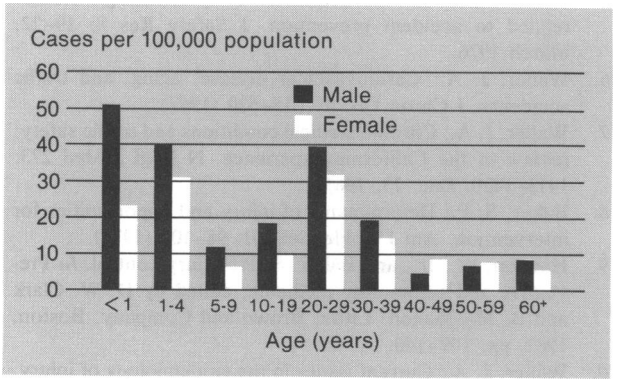
Between January 1, 1981, and December 31, 1982, the Colorado Department of Health received reports of 1,185 culture-confirmed cases of Campylobacter jejuni *infection. Incidence rates were highest among infants less than 1 year old and among persons aged 20–29 years. The distribution of cases by sex showed a predominance among males at all ages except 40–59 years, the most marked predominance occurring in infants under 1 year. The higher rates for males were also significant for all ages combined, for ages 10–19 years, and for ages 5–9 years.*

Neither Salmonella *nor* Shigella *infections reported in Colorado during the same period showed the preponderance among males found for* C. jejuni *infections.* Giardia *infections, however, showed a weak male predominance, especially among children less than 10 years old.*

The preponderance of C. jejuni *cases among males disclosed by this study was remarkable. The reasons for this phenomenon are not clear and need further research.*

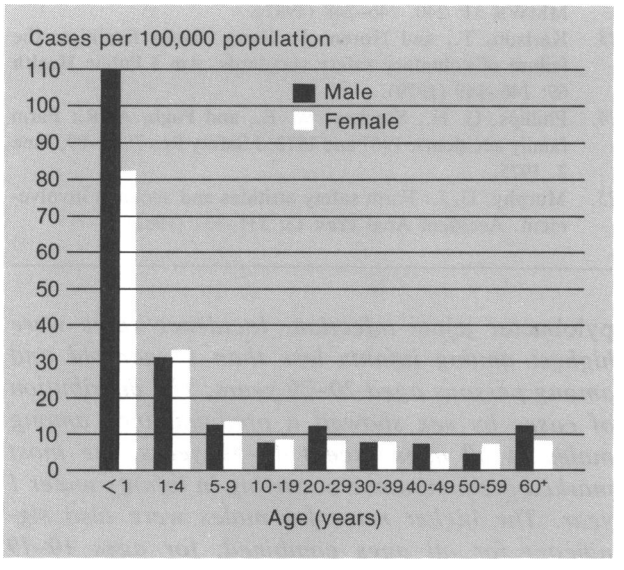
CAMPYLOBACTER JEJUNI is now well recognized as a common cause of enteritis in man (*1*). Cases have been linked to exposure to contaminated food (*2*), water (*3,4*), animals (*5,6*), and raw milk (*7,8*)

Figure 1. *Campylobacter* case rates[1] by age and sex, Colorado, January 1, 1981-December 31, 1982



[1]Culture-confirmed cases reported to the Colorado Department of Health.

Figure 2. *Salmonella* case rates[1] by age and sex, Colorado, January 1, 1981-December 31, 1982



[1]Culture-confirmed cases reported to the Colorado Department of Health.

and to person-to-person transmission (*9*). We describe here the epidemiology of *C. jejuni* infection in Colorado in 1981 and 1982.

Methods

Reports of stool-culture-confirmed *C. jejuni* infection are received by the Colorado Department of Health weekly from local health departments. These local health agencies receive reports from private physicians and from infection control nurses at hospitals in their jurisdictions. In addition, staff of 13 of the 15 major local health departments in the State make telephone contact weekly with a large proportion of the primary care practitioners in their counties. The Colorado Department of Health also receives reports of cultures positive for *C. jejuni* that have been referred to the State laboratory. Since January 1, 1981, reports from all these sources have included the patient's age (in years), sex, and name and the date of onset of symptoms. Three other common enteric infections—salmonellosis, shigellosis, and giardiasis—are reported through the same system.

We reviewed all reports of *C. jejuni, Salmonella, Shigella,* and *Giardia* infections received by the Colorado Department of Health between January 1, 1981, and December 31, 1982. Through a retrospective review of laboratory records from each hospital and private laboratory in metropolitan Denver, we also identified all persons with stool specimens positive for *C. jejuni* who were residents of metropolitan Denver (Denver, Jefferson, Adams, Arapahoe, and Boulder Counties) from June 1980 through June 1981. Patients' age, sex, and county of residence were ascertained from the laboratories or from physicians' office records.

Population data used in our study were from the 1980 U.S. Census.

Results

In the 1980–81 Denver-area laboratory survey, 276 cases of *C. jejuni* infection were collected. Eleven of 25 cases that occurred in the first year of life involved infants aged 0–3 months, for an estimated rate of 91.6 per 100,000 population per year (based on estimated births in metropolitan Denver in a 3-month period).

There were 1,185 culture-confirmed cases of *C. jejuni* infection reported to the Colorado Department of Health in 1981 and 1982. Annual incidence rates by age and sex are shown in figure 1. Rates were highest among infants less than 1 year of age (37.5 per 100,000 population) and among persons aged 20–29 (36.0 per 100,000).

The distribution of *C. jejuni* cases by sex showed a predominance among males at all ages except 40–59 years. The most marked predominance occurred in infants under age 1: the annual case rate for this age group was more than twice as high for male infants (50.9 per 100,000 population) as for females (23.5 per 100,000) ($\chi^2 = 4.82, P < .02$). The higher rates for males were also significant for all ages combined ($P < .001$), for ages 10–19 years ($P < .02$), and for ages 5–9 years ($P < .05$), but not for other age groups.

Age and sex data for cases of salmonellosis, shigellosis, and giardiasis, obtained from the same disease reporting system, are shown in figures 2, 3, and

4. Numbers of these infections and *C. jejuni* infections are given in the table on page 336.

Although *Campylobacter* infections had their highest incidence among children less than 1 year old, the proportion of *Salmonella* infections among infants was higher than that of *Campylobacter* infections. Neither *Salmonella* nor *Shigella* infections showed the degree of preponderance among males found for *Campylobacter* infections. *Giardia* infections did show a weak male preponderance, especially among children less than 10 years old.

The distribution of *Campylobacter* cases by month (figure 5) showed a peak in late summer; numbers of cases were about twice as high in September as in the lowest winter month. (Seasonal patterns in figure 5 are superimposed on a trend of increasing numbers of reported cases—a trend probably caused by the increasing availability and use of culture facilities in local hospitals and laboratories.)

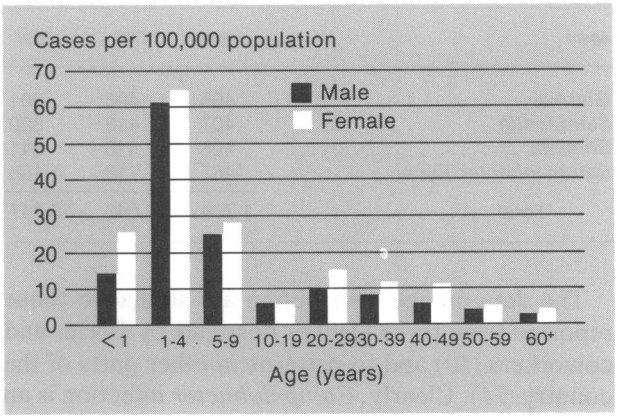
Discussion

Campylobacter jejuni infections were reported almost twice as frequently in Colorado in 1982 as either *Salmonella* or *Shigella* infections. The data presented here are taken from the same surveillance system. While coverage by the surveillance system is undoubtedly not uniform across the State, there is no reason to believe that this coverage is any more complete for *Campylobacter* than for *Giardia, Salmonella,* and *Shigella*; indeed, many laboratories in the State still do not culture for *Campylobacter* at all or do not do so as part of the routine stool culture.

The age distribution of patients with *Campylobacter* infections was generally similar to that of patients with the other common enteric infections, but all these infections differed in detail: shigellosis and giardiasis had their highest incidence among toddlers, salmonellosis had its highest incidence among infants, and giardiasis was common among infants.

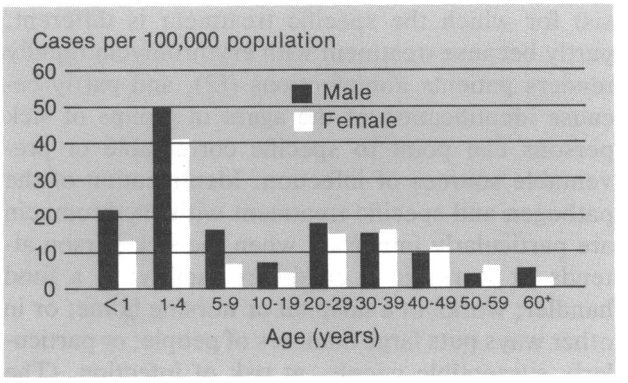
The preponderance of *Campylobacter* cases among males was remarkable. The close match of case rates for men and women in their twenties might have been a consequence of mothers caring for sick children. The predominance of cases among male infants and toddlers was unlikely to be a consequence of selective culturing of stool specimens from boys, since male predominance was not evident for *Shigella* or *Salmonella*. The reasons for this phenomenon are not at all clear and will need to be elucidated by further work.

Figure 3. *Shigella* case rates[1] by age and sex, Colorado, January 1, 1981-December 31, 1982



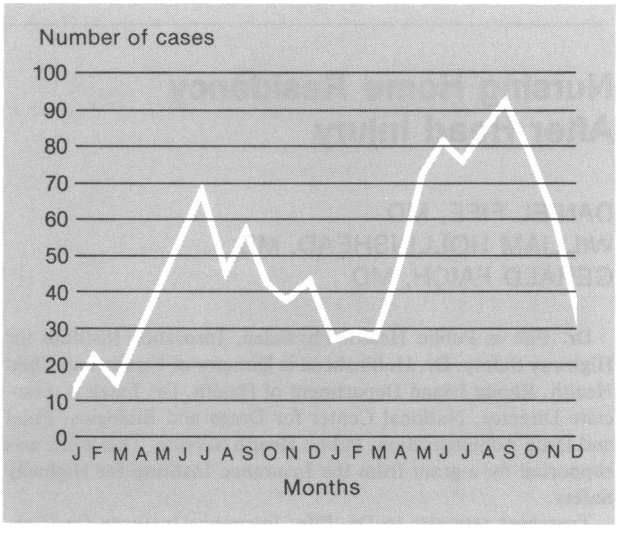
[1]Culture-confirmed cases reported to the Colorado Department of Health.

Figure 4. *Giardia* case rates[1] by age and sex, Colorado, January 1, 1981 - December 31, 1982



[1]Culture-confirmed cases reported to the Colorado Department of Health.

Figure 5. *Campylobacter* cases[1] by month, Colorado, January 1, 1981-December 31, 1982



[1]Culture-confirmed cases reported to the Colorado Department of Health.

Cases of selected enteric infections reported to the Colorado Department of Health, January 1, 1981–December 31, 1982

Agent	1981	1982	Total
Giardia	405	496	901
Salmonella	407	413	820
Shigella	425	416	841
Campylobacter jejuni	467	718	1,185
Total	1,704	2,043	3,747

The data on age distribution are similar to those reported from three Denver hospitals by Blaser and coworkers (*10*) and to patterns in other parts of the country (*11*). Clearly, *Campylobacter* infection is an important cause of infectious diarrhea in Colorado. Specific identification of the organism in persons ill with diarrhea (including bloody diarrhea) and fever is important, partly to distinguish the illness from other illnesses (for example, shigellosis and giardiasis) for which the specific treatment is different, partly because treatment with erythromycin rapidly renders patients noninfectious (*12*), and partly because identification of the agent in groups of sick persons can point to specific correctable or preventable sources of infection. Identification of the pathogen and specific treatment with erythromycin are particularly important when the sick person attends or works in a child-care facility; is a food handler; works in a hospital or nursing home; or in other ways puts large numbers of people, or particularly susceptible people, at risk of infection. (The value of treating asymptomatic convalescent carriers has not been established.) Followup of individual, apparently unconnected cases may lead to identification of unrecognized outbreaks in child-care centers or may uncover contaminated public water supplies or sources of contaminated food or milk.

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Nursing Home Residency After Head Injury

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Synopsis

A survey of 93 nursing homes in and near Rhode Island in May 1982 identified all head-injured patients who were State residents. Nineteen were identified, of whom ten were injured in motor vehicle crashes. The median age was 35 years. The median time since injury was 3 years and increased with age. The prevalence of such patients was 2 per 100,000 population.

Except for a recent survey by the Connecticut Department of Health, little is known about the prevalence or duration of nursing home residency