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Cyclospora in Guatemala: Further Considerations

We are pleased to learn that researchers have continued to study the epidemiology of *Cyclospora cayetanensis* in Guatemala (8). Many questions remain that can only be answered through systematic epidemiologic investigations. Nevertheless, several features of cyclosporiasis have been consistently reported: marked seasonality, high prevalence in children younger than 15 years compared with that in adults, and higher rates among persons with gastroenteritis than in those without gastrointestinal symptoms (1–3, 5, 6). Bearing these patterns in mind, and cognizant of the fact that the authors drew different conclusions, we submit that a careful review of the report by Dr. Pratdesaba and colleagues shows that their data are in fact consistent with those previously published from Guatemala, Nepal, and Peru.

Pratdesaba et al. studied three groups of persons they postulated to be at higher than average risk for cyclosporiasis: human immunodeficiency virus (HIV) and AIDS patients, malnourished children, and raspberry farm workers. Previous work suggests that HIV and AIDS patients have an elevated risk of cyclosporiasis (7). However, there are no published data concerning the risk of cyclosporiasis in malnourished children without gastroenteritis, and our data suggest that raspberry farm workers have the same level of risk as the general population in Guatemala (2). The authors do not mention gastrointestinal symptoms, so we assume that most of their participants did not have diarrheal illness. The overall prevalence of *C. cayetanensis* infection in their study population (1.5%) is entirely consistent with the prevalence we found in 1997-1998 among persons without gastroenteritis (1.1%) (2). The fact that we found somewhat more infection among farm workers may reflect the young ages of workers in our study (median age, 16 years; range, 9 to 73 years) compared with those of subjects in the study of Pratdesaba et al. (median age, 29 years; range, 15 to 61 years). In our study, three of the four farm workers with cyclosporiasis were younger than age 15.

Finally, it is difficult to draw definitive conclusions from the data presented by Pratdesaba et al. because of the small sample size (474 specimens collected over 1 year, a mean of 40 per month) and lack of information on monthly *C. cayetanensis* prevalence rates. Because of the marked seasonality of cyclosporiasis, the distribution of specimens by month would have a substantial effect on the prevalence when averaged over the year. In our surveillance study, we screened 5,552 specimens, a mean of 463 per month. Of the 126 cases of cyclosporiasis we detected, 90% occurred between May and July (2). Thus, variation in the proportion of specimens screened during the high and low *Cyclospora* incidence seasons could substantially alter the apparent overall prevalence. Epidemiologic data suggest that *Cyclospora* infection is endemic in Guatemala, but key information is lacking and can only be gathered through ongoing, longitudinal cyclosporiasis surveillance. We had such a system in place but were required to suspend work in an untimely manner, and it is encouraging to see that Pratdesaba et al. recognize and emphasize the need for longitudinal studies.

Lastly, to be able to resolve the problem of cyclosporiasis outbreaks associated with imported produce, such as raspberries, it is essential that the sources of contamination be identified (4). This will require the development of sensitive detection methods for produce and water, as well as rigorous environmental studies at the sites of production.

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Authors' Reply

We read with great interest the letter sent to the editor regarding our paper about *Cyclospora cayetanensis* in risk groups in Guatemala (5).

As is widely known, *C. cayetanensis* and other opportunistic parasites infect people with immune depression (3). Human immunodeficiency virus (HIV) and AIDS patients are clearly a group with high risk to acquire cyclosporiasis (4). Even though the presence of this parasite has not been extensively studied in malnourished children, it is also known that moderate and severe malnutrition affect the immune system and cause immune depression (2, 6) which may favor the development of cyclosporiasis. We also included the farm workers because they could be considered as one of the possible causes of contamination of the berries.

Regarding the question about clinical symptoms, all of the children and 49% of the HIV and AIDS patients included in our report had diarrhea at the time of sampling. Five of the specimens from the group of HIV and AIDS patients positive for *C. cayetanensis* were diarrheal.

Although our report includes information about a 1-year surveillance, it also states that the samples from the farm workers were analyzed during the harvest season, which coincides with the rainy season in Guatemala. As we mentioned in our report (5), we analyzed 206 samples during this season, a number which is comparable to the number of samples from

farm workers analyzed by Bern et al. (1). We agree with the authors of the letter that the different results in this population may be due to the age difference.

Even though the samples sizes were different, most of the samples of both studies (1, 5) came from hospitals and health centers. This fact may have introduced a selection and accessibility bias and, as stated before (5), may not reflect the true prevalence of *C. cayetanensis* in Guatemala.

Finally, we agree that the situation of cyclosporiasis in Guatemala will only be clarified with a longitudinal study of at least 2 years of duration, in which factors like age, source of contamination, rainfall, etc., are considered.

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