washing and wearing gowns and gloves are important infection control measures, whereas the aerosol dissemination of influenza virus necessitates masks to prevent spread. A large prospective study using viral cultures as well as serology is needed to assess more accurately the scope of this problem in older persons.

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## Hepatitis C Virus in Patients with Cryoglobulinemia Type II

COLLEAGUES—The association between cryoglobulinemia and hepatitis B virus (HBV) infection has been described [1]. Cryoglobulins have been found in 6%–43% of patients with chronic liver diseases, whether or not the liver disease was due to HBV [2]. Such cryoglobulins are most often of the mixed type without a monoclonal component [3]. This association is even stronger when the analysis is reversed: Two-thirds of patients with mixed essential cryoglobulinemia have a liver disease or abnormalities in liver function tests [1, 2]. Type II cryoglobulinemia is characterized by the presence in the cryoprecipitate of a monoclonal immunoglobulin that binds to Fc portions of polyclonal IgG; most often this monoclonal component is an IgM$\kappa$. Of those with this type of cryoglobulinemia, >50% have some liver disease, including cryptogenic chronic hepatitis or HBV chronic hepatitis [1, 2]. Although this high incidence has not been found everywhere [1], the association between chronic liver disease and cryoglobulins of type II is unlikely to be fortuitous.

Serologic markers for HBV and hepatitis C virus (HCV) antibodies [4] were measured in 10 patients with cryoglobulinemia type II (all: IgM$\kappa$/polyclonal IgG). Six patients had positive markers for hepatitis B, and three had HCV antibodies detected by enzyme-linked immunosorbent assay (Ortho HCV ELISA; Ortho Pharmaceutical, Raritan, NJ; optical density at 490 nm: 1.7, 1.02, and >2 for a cutoff of 0.45.

Only 1 of 3 patients with antibodies to HCV had hepatitis B markers: a 33-year-old man with a history of drug addiction. He had antibodies to hepatitis B surface antigen (HBsAg) but was negative for HBsAg. He had moderately elevated transaminases, and liver biopsy showed chronic fibrosing hepatitis with a negative stain for hepatitis B core antigen by immunofluorescence. The most likely diagnosis was chronic HCV hepatitis [5].

The second patient, a 44-year-old man, had membranoproliferative glomerulonephritis, which was treated successfully with steroids and cyclophosphamide, and persistently elevated transaminase levels of 4 years duration. He declined liver biopsy. The last patient was 68 years old and, except for purpura, had no complaints. Liver function tests showed a slight increase in $\gamma$-glutamyltransferase (59 units/l; normal, <42 units/l) and alkaline phosphatase (131 units/l; normal, <125 units/l); however, transaminases were normal.

Although the number of patients is small, our observation suggests an association between HCV and cryoglobulinemia type II. The emergence of a monoclonal rheumatoid factor has been linked to chronic viral infection (Epstein-Barr virus [6], HBV [1]), which might participate in the activation process leading to the uncontrolled proliferation of a B cell clone. Hepatitis C virus may have a similar effect.

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## *Campylobacter jejuni* versus *Campylobacter coli* in Developing Countries: How Accurate Are Prevalence Estimates?

COLLEAGUES—*Campylobacter* species are an important cause of infectious diarrhea, especially endemic diarrhea among children of developing countries and adults traveling to these areas. Because *Campylobacter coli* is generally thought to occur in <5% of human *Campylobacter* infections, most clinical laboratories do not attempt to distinguish between *C. coli* and *Campylobacter jejuni* [1]. Unspeciated *Campylobacter* isolates from diarrhea surveys are commonly reported as "*Campylobacter* spp.," "*C. jejuni/coli*," or simply "*C. jejuni*." As a result, the frequency of *C. coli* infections and its relative importance as a diarrheal agent are unknown for many areas of the world.

During 1984–1989, 513 diarrheic and 379 nondiarrheic stool specimens from adult US citizens living in or visiting Lima, Peru, were tested for presence of *Campylobacter* and other common bacterial enteropathogens. On the whole, *Campylobacter* organisms were a less important cause of diarrhea than anticipated, being isolated from 6.1% of cases and 2.1% of controls, accounting for only 17% of all enteropathogens isolated from patients with diarrhea. *Campylobacter* isolates were speciated according to their ability to hydrolyze hippurate [1]. The isolation frequency for *C. jejuni* was 2.5% from stools of diarrheic individuals and 1.3% from control stools. *C. coli*, however, was less frequently isolated from cases (0.8%) than from controls (1.6%), suggesting *C. jejuni* may be the only important cause of *Campylobacter*-associated diarrhea in adult travelers to Peru. Furthermore, because 36% of *Campylobacter* isolates were *C. coli*, the true frequency of *C. jejuni*-associated diarrhea could have been overestimated by 144% if it had been assumed that most isolates were *C. jejuni*.

These limited results indicate American adults living in or traveling to Peru are at relatively low risk of developing *Campylobacter*-associated diarrhea. Not surprisingly, most of the risk is attributable to *C. jejuni*. However, the high proportion of *C. coli* isolates among all *Campylobacter* species isolated suggests that infection or transient colonization by this organism may be much more common in many areas of the world than previously considered. For Peru and other countries where *C. coli* is prevalent, the unexpectedly high proportion of *C. coli* among all *Campylobacter* isolates could lead to inflated estimates of the relative importance of *C. jejuni* if each species is not considered separately. To establish whether this phenomenon occurs in other geographic regions, we encourage diarrheal disease investigators to report *Campylobacter* isolates according to species.

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Informed consent was obtained from participants; the US Navy's guidelines for use of human subjects were followed.

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