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**New and Newer Enteric Pathogens:  
Stages in Our Knowledge**

Our understanding of *Campylobacter jejuni* has finally passed through the main stages needed to characterize a human bacterial enteric pathogen. The initial passage was neither rapid nor steady. Bacteria of the genus now known as *Campylobacter* were first isolated in 1909<sup>1</sup>; for over 30 years thereafter, these organisms were little known outside the veterinary literature. An outbreak, possibly of *Campylobacter jejuni*, was investigated in 1942,<sup>2</sup> and extraintestinal isolates were recovered from humans in 1947.<sup>3</sup> In her review in 1957,<sup>4</sup> E. O. King suggested the need for more extended investigations, but these were not easily possible until DeKeyser showed in 1972 that isolation from stool was facilitated by using filtration.<sup>5</sup> Using the filtration technique, Butzler showed a high frequency of isolation of *Campylobacter* from stools of persons with enteric illness, and suggested that they were common pathogens.<sup>6</sup> Even this knowledge was insufficient to stimulate routine searches for *Campylobacter* until Skirrow confirmed Butzler's results using antimicrobial-containing media, a laboratory technique that was practical for use by hospital laboratories.<sup>7</sup>

Since knowledge about *C. jejuni* has passed through the stages of identification, association with illness, and easy and frequent use of procedures for laboratory isolation, risk factors and appropriate control measures now can be more readily ascertained. In this issue of the Journal, Hopkins, *et al.*,<sup>8</sup> present data which corroborate previous studies showing an increased risk of infection following exposure to untreated water,<sup>9-11</sup> raw milk,<sup>12</sup> and undercooked chicken.<sup>13</sup> The Hopkins study is part of the recent remarkable expansion of our knowledge of *Campylobacter* epidemiology, reflected in the dramatic increase in listings in the *Index Medicus*, which show two entries for human infections in 1972, three entries in 1976, 37 entries in 1979, and 155 entries in 1982. After the long, sputtering history of our understanding of this organism, *Campylobacter jejuni* is now recognized as the most commonly identified bacterial cause of human diarrhea in many countries, and has an established place as an enteric pathogen.

Other bacterial species can be found at various stages of identification as enteric pathogens, and some of these may emerge in the future as important causes of diarrhea. Many have yet to be strongly associated with illness; others are still too difficult to isolate and identify in hospital laboratories.

In the first stage of our identification of a new enteric pathogen, many bacterial isolates are classified as new species or genera before it is clear that they have any role in human illness. In the family Enterobacteriaceae, new species continue to be discerned, including *Cedecea davisae* found in gallbladders<sup>14</sup> and wounds,<sup>15</sup> and *Cedecea neteri* found in blood.<sup>16</sup> Other new genera isolated from humans in the past several years include *Ewingella*, *Erwinia*, *Kluyvera*, and *Rahnella*.<sup>\*</sup> New species more often emerge from old rather than new genera, e.g., *Citrobacter amaloniticus* in human feces,<sup>17</sup> *Enterobacter gergoviae* in the urinary tract,<sup>18</sup> or *Escherichia vulneris* from various extraintestinal sites.<sup>19</sup> All these bacterial genera and species are presently of unknown importance as causes of human disease.

\* Farmer JJ III, Davis BR, Hickman-Brenner FW, *et al*: Biochemical identification of new species and biogroups of *Enterobacteriaceae* isolated from clinical specimens. Manuscript in preparation.

The second stage in the development of our knowledge of a bacterial enteric pathogen occurs when the association of infection with enteric illness is sufficiently strong to arouse the interest of the scientific community, so that the organism is searched for in studies of diarrhea. One organism at this stage is *Aeromonas hydrophila*, which is known as a pathogen of fish and reptiles, but has also been recovered from various sites in humans since 1961.<sup>20</sup> Numerous studies have shown that *Aeromonas* is isolated more frequently from persons with diarrhea than from those without diarrhea,\*\* but it has yet to be implicated as an important cause of enteric disease in the United States. *Plesiomonas shigelloides*, a species closely related to *Aeromonas*, has been infrequently studied. Although no exotoxin or virulence factor has been identified for *Plesiomonas*, there are accumulating reports of isolation of this organism from patients with enteric illness. Another bacterium associated with diarrhea but not well studied is *Edwardsiella tarda*. Identified as a cause of "jungle diarrhea," *E. tarda* has been frequently recovered from diarrheal patients in Malaysia<sup>21</sup> and Zaire.<sup>22</sup> Like *Aeromonas* and *Plesiomonas*, its role as a bacterial enteric pathogen in the United States is not known.

As was the case with *Campylobacter*, the third stage in the development of knowledge about a bacterial enteric pathogen—easy and frequent use of procedures for laboratory isolation—is often achieved slowly, if at all. Various *E. coli* have been shown to be pathogens, including enterotoxigenic *E. coli* (ETEC), enteropathogenic *E. coli* (EPEC),<sup>23</sup> *E. coli* 0157:H7 which causes hemorrhagic colitis,<sup>24</sup> and enteroinvasive *E. coli* (EIEC).<sup>25</sup> Identification of these *E. coli* requires the ability to do detailed serotyping, to test for the production of heat-labile and heat-stable enterotoxin, and to test for invasiveness. Only large reference laboratories possess the abilities to perform such tests; hence, the further development of knowledge about *E. coli* epidemiology has been hampered.

In the fourth stage of our understanding a bacterial enteric pathogen, risk factors can be determined because hospital laboratories are looking routinely for the agent when they study stools from persons with diarrhea. *Campylobacter jejuni* is now one of this group, along with bacteria such as *Salmonella* and *Shigella*.

Some bacteria, long known, have recently passed from the second stage directly into the fourth stage, and have been shown to be strongly related to a few, highly specific risk factors. Good examples are several members of the genus *Vibrio*. Even though they are not often looked for routinely in hospital laboratories, sufficient data have been developed, by case-control studies, to identify hepatobiliary disease as an important risk factor for *Vibrio vulnificus* infections,<sup>26</sup> and undercooked or raw shellfish (usually oysters) as important vehicles of transmission for *V. cholerae* non-01, *V. parahemolyticus*, *V. mimicus*, *V. hollisae* and *V. vulnificus*.<sup>27</sup>

After the fourth stage, the technology which made the organism easily identified often leads to the identification of other similar but distinctive species or genera, and the stages of development begin again. This is the situation with *Campylobacter*. We presently recognize some nalidixic-acid-resistant thermophilic *Campylobacters* ("NARTCs")

as a new species, *Campylobacter laridis*.<sup>28</sup> Also, there are *Campylobacter*-like organisms ("CLOs") which have recently been recovered from homosexuals.\*\*\* In their turn, these microorganisms will pass through the same series of stages which will lead to their final recognition—or exclusion—as bacterial enteric pathogens.

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## 1983: Editor's Report

There have been three important changes in the Journal working force during 1983: Kenneth Rothman has joined us to provide your editor with needed expert assistance; George Annas has taken over from William Curran as Editor of the Public Health and the Law section; and Mary Arnold has succeeded Michel Ibrahim as the Chair of the Editorial Board. We continue to receive five or six times as many unsolicited manuscripts as we can publish—in 1983 we received 780, the largest number yet.

Another change, which readers may or may not have noticed, is that the Journal is now set in slightly smaller type and is far more parsimonious with its white space. This enables us to publish more pieces in each issue without increasing costs and to maintain the same acceptance rate in spite of an increased number of submissions. The change in format began in July; those interested can compare the June and July issues (for "Book Corner" compare May to June).

One Journal-related change which did not materialize in 1983 was a plan for a section called *Notes from the Field* to be published in our sister publication, *The Nation's Health*.<sup>1</sup> The Journal's Editorial Board has reconsidered this decision; we now plan to inaugurate a *Notes from the Field* column as a regular section of the Journal in 1984.

We published, in 1983, 100 Articles, 47 Public Health Briefs, 12 Commentaries, eight Different Views, three Public Health and the Law and one Public Health Then and Now columns, 32 editorials, and 32 letters (not including author responses). Of the 780 unsolicited manuscripts we received in 1983, about 20 per cent were rejected by the Editor without being sent out for review. There are many reasons for such a decision. Journal policy precludes publication of editorials which do not take off from an article in the same issue of the Journal (although such submissions sometimes are suitable for our Commentary or Different Views section). Policy also precludes publication of manuscripts that describe a program or a curriculum but do not attempt to evaluate it. Such manuscripts may be newsworthy items for public health field personnel, however; and recognition of this fact led the Editorial Board to decide to include a *Notes from the Field* section in forthcoming issues of the Journal. Other reasons for rejection without review include: inappropriateness for our readership, subject and findings not new or covered by other papers we have published, and a variety of oddities that must drift in unsolicited to the offices of many journals and magazines.

Although many aspects of Journal policy and procedure have been discussed before in this annual accountability report,<sup>2-5</sup> others have not been laid out, and this is an opportunity to fill the gap. The breadth of disciplines and interest areas of our readership is equaled by few other professional journals. Our 15-member Editorial Board is appointed by the Association's Executive Board for a three year term with one consecutive reappointment permitted. Its

members have invariably served as reviewers. The Journal is the principal scientific publication of the American Public Health Association, and the Editorial Board is expected to reflect the scientific disciplines and interest areas represented in the modern field of public health. Since there are more disciplines and areas of interest within the Association than Editorial Board positions, some rotation of interest areas/disciplines occurs. The Editorial Board sets Journal policy, keeps tabs on the Editor, and reviews selected manuscripts. Our reviewers, who number well over 500 (see p 216) cover the broader span of disciplines and interest areas in the entire public health field.

Over half the papers we published deal with chronic disease, health care services, maternal and child health, population and occupational health; another quarter deal with communicable diseases, statistical methods, and health education.

Eighty per cent of the unsolicited manuscripts we receive are reviewed first by others: 17 per cent by one reviewer only (usually a member of the Editorial Board), 78 per cent by two reviewers, and 5 per cent by three or more reviewers (usually when opinions differ markedly or the Editor is not satisfied with the review). The peer review process, with author anonymity preserved when this is possible, has been discussed previously in these pages.<sup>6,7</sup> All papers are read by the Editor or Assistant Editor. When two reviewers recommend rejection and spell out their reasons, the reading may be quite cursory and the letter to the author very brief; in other cases the reading and sometimes the letter to the author may be quite extensive with the editors, in effect, acting as additional reviewers. Prior to accepting a paper—virtually all papers are revised at least once—the text is read carefully and edited for clarity, conciseness and English usage. The final copy editing and layout are efficiently handled by Doyne Bailey and Michelle Horton, respectively, in Washington, DC.

In conclusion, I want to take this opportunity to correct two misperceptions of the Journal which have come to my attention. The first is a belief that a 1,000 word Public Health Brief or a Commentary is less important than a "full length article." Neither the length nor the fact that it is not classified as an article establishes the importance of a published paper. Briefs, Commentaries (as well as Editorials, Different Views, Public Health and the Law, Public Health Then and Now, and even some letters to the editor) are indexed in *Index Medicus* and other indexing publications. Placement in one or the other section of the Journal is a matter of editorial convenience rather than an indication of importance.

The second misperception is that the Journal does not want and will not publish "policy" papers, i.e., papers not based on statistically sound scientific research. This misapprehension may have arisen because, since 1975, when this