

# Shigella: Wash your hands of the whole dirty business

**Background and epidemiology:** In May 2002 more than 700 Ontario residents contracted shigellosis and suffered through the Victoria Day long weekend with fever, abdominal cramps and watery diarrhea. By current accounts, the source was most likely a commercially prepared pasta salad made in Toronto and distributed throughout the province.<sup>1</sup> In 2001 about 860 cases of shigellosis were reported in Canada.<sup>2</sup> Ontario's 700 cases in 2002 might secure *Shigella's* position as the third most common cause of bacterial foodborne infections in North America, after *Salmonella* and *Campylobacter*.<sup>2,3</sup>

*Shigella* bacteria are gram-negative, nonmotile, non-encapsulated bacilli and are members of the family Enterobacteriaceae and tribe Escherichiae. There are 4 species — *S. dysenteriae* (group A), *S. flexneri* (group B), *S. boydii* (group C) and *S. sonnei* (group D) — distinguished by their biochemical properties, specific polysaccharide antigens and phage or colicin susceptibility.<sup>4</sup> *S. sonnei* accounts for over two-thirds of shigellosis cases in North America, and *S. flexneri* accounts for almost all the rest. This distribution differs from that in impoverished countries, where, along with *S. flexneri*, *S. dysenteriae* causes more than 600 000 deaths per year.<sup>5</sup>

Humans and higher primates are the natural reservoirs of *Shigella* infections. Transmission is by the fecal-oral route. The 3 main ways of contracting shigellosis are by eating contaminated food (i.e., food washed in fecally contaminated water or handled by a person with poor hygiene), drinking contaminated water and person-to-person contact such as anal sexual contact. The pathogens can be transferred by flies, fingers, feces, food and fomites (any contaminated object such as a cutting board, door handle or toys).<sup>6</sup> High-risk groups include children in day-care centres, homosexual men, people in custodial institutions, migrant workers, travellers to developing countries and people in certain communities living on First Nations reserves.<sup>5</sup>

The most important aspect of shigellosis pathogenesis from a public health perspective is its extremely low infective dose, as low as 10 to 100 organisms.<sup>4</sup> Once ingested the organism survives gastric acidity and invades the colonic mucosa, resulting in mucosal abscesses and ulceration. Some species produce enterotoxin or Shiga toxin. The incubation period is 1–7 days, but symptoms usually appear 12–50 hours after exposure.<sup>4</sup> The agent is typically shed in the feces for up to 4 weeks after infection. Rarely does an asymptomatic carrier state persist for months.

**Clinical management:** The infection begins with fever, fatigue, anorexia and malaise. Soon thereafter watery diarrhea, cramps and tenesmus develop; the diarrhea may become bloody and progress to dysentery. Infection is more severe in malnourished children, elderly people and immunocompromised people. Possible complications include severe dehydration, intestinal perforation, toxic mega colon, septicemia, seizures, Reiter's syndrome and hemolytic uremic syndrome.<sup>4</sup>

*Shigella* species may be difficult to isolate from fecal, food and water samples. A freshly passed stool sample is the specimen of choice. It should be refrigerated in a fecal transport, such as buffered glycerol in saline. Serologic testing is necessary to determine the subgroup.<sup>4</sup>

The emphasis for treatment should be on avoiding dehydration. Antibiotics are often not indicated in previously well people with mild infections, who usually recover quickly (within a week or 2) on their own. They should be prescribed selectively for only the more severe cases, given the high prevalence of multidrug-resistant strains, which vary by species and geographic location.<sup>5,7</sup> Antibiotics commonly used for treatment are ampicillin, trimethoprim-sulfamethoxazole, nalidixic acid and ciprofloxacin.<sup>7</sup>

**Prevention:** Shigellosis is a reportable disease. Physicians suspecting this diag-

nosis should contact their local public health unit to initiate investigations into its source. The importance of hand washing with soap and strict hygiene



Health Canada

## Hygiene is critical for food preparation.

for food preparation, particularly after activities such as bowel movements, changing diapers and anal sexual contact, cannot be overemphasized.

With the emergence of multidrug-resistant strains, the World Health Organization has identified the urgent need for an effective and safe vaccine against diarrhea due to *Shigella*, with special emphasis on a vaccine against *S. dysenteriae*.<sup>5</sup> More than 600 000 deaths each year make international efforts to ensure clean water and safe food in impoverished countries a global priority.

Erica Weir  
CMAJ

## References

1. *Shigella sonnei* infection: Ontario (update). *Infectious Diseases News Brief* 2002 June 21. Available: [www.hc-sc.gc.ca/pphb-dgspsp/bid-bmi/dsd-dsm/nb-ab/2002/nb2502\\_e.html](http://www.hc-sc.gc.ca/pphb-dgspsp/bid-bmi/dsd-dsm/nb-ab/2002/nb2502_e.html) (accessed 2002 July 4).
2. Notifiable diseases summary (preliminary). *Can Commun Dis Rep* 2002;28(11):94-5. Available: [www.hc-sc.gc.ca/pphb-dgspsp/publicat/ccdr-rmtc/02vol28/dr2811e.html](http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/ccdr-rmtc/02vol28/dr2811e.html) (accessed 2002 July 4).
3. Preliminary FoodNet data on the incidence of foodborne illnesses — selected sites, United States, 2001. *MMWR Morb Mortal Wkly Rep* 2002;51(15):325-9.
4. Edwards BH. *Salmonella* and *Shigella* species. *Clin Lab Med* 1999;19:469-87.
5. *Shigella* vaccine research and development. *Can Commun Dis Rep* 1997;23(8). Available: [www.hc-sc.gc.ca/hpb/lcdc/publicat/ccdr/97vol23/dr2308eb.html](http://www.hc-sc.gc.ca/hpb/lcdc/publicat/ccdr/97vol23/dr2308eb.html) (accessed 2002 July 4).
6. Food safety facts on *Shigella* [fact sheet]. Ottawa: Canadian Food Inspection Agency; Sept 2001. Available: [www.inspection.gc.ca/english/corpaffr/foodfacts/shige.shtml](http://www.inspection.gc.ca/english/corpaffr/foodfacts/shige.shtml) (accessed 2002 July 4).
7. Frequently asked questions about shigellosis. Atlanta: US Center for Disease Control and Prevention. Available: [www.cdc.gov/ncidod/dbmd/disease](http://www.cdc.gov/ncidod/dbmd/disease)