Canadian Journal of Microbiology
Revue canadienne de microbiologie

Identification of *Shigella flexneri* isolates carrying Shiga Toxin 1-producing gene in Quebec, Canada linked to travel to Haiti.

Journal:	<i>Canadian Journal of Microbiology</i>
Manuscript ID	cjm-2015-0538.R1
Manuscript Type:	Letter
Date Submitted by the Author:	01-Sep-2015
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Keyword:	<i>Shigella flexneri </i>, shiga toxin 1 gene

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Identification of *Shigella flexneri* isolates carrying Shiga Toxin 1-producing gene in Quebec, Canada linked to travel to Haiti.

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Running title: *Shigella flexneri* carrying Stx1 in Quebec, Canada

Letter to the Editor

Shiga toxins (Stx1 and Stx2, also called verocytotoxins) are commonly associated with Shiga toxin-producing *E. coli* (STEC) and *Shigella dysenteriae* type 1 (Tesh and O'Brien 1991). Recent studies have documented cases of *stx* carriage in other *Shigella* species, including *S. sonnei* linked to travel to Morocco (Nyholm et al. 2015) and *S. flexneri* with travel history to Caribbean (Gray et al. 2015; Gray et al. 2014). More than forty percent of Shigellosis cases are travel-related in the province of Quebec (Trepanier et al. 2014). Therefore, a retrospective laboratory study was performed by the laboratoire de santé publique du Québec to assess the presence of *stx* gene among the 210 strains of *Shigella* isolated between 2013 and 2014. The collection included 131 *S. sonnei*, 75 *S. flexneri*, 3 *S. boydii* and 1 *S. dysenteriae* type 12. PCR targeting *stx1* and *stx2* was performed according to Paton and Paton (Paton and Paton 1998). Three isolates of *S. flexneri* isolated from stool were positive for *stx1* gene and belonged to serotype 2a (n=2) and serotype y, (n=1). The amplified fragments were sequenced and identity was confirmed.

Cases of shigellosis are systematically investigated as provincial regulations of notifiable diseases permits. The first case was a 62-year-old man of Haitian origin living in Montreal (isolate ID123699). He was admitted to a hospital for bloody diarrhea, fever, and abdominal pain. Empirical antimicrobial treatment with ciprofloxacin was prescribed and the patient was discharged 2 days after admission. The second case was a 55-year-old man of Haitian origin living in Montreal (Isolate ID132104). Ciprofloxacin was prescribed in an outpatient clinic where he consulted for bloody diarrhea, fever, and abdominal pain. Both cases developed diarrhea the day before their return from Haiti. The third case was a 55-year-old man of Haitian origin living in Montreal (Isolate ID124391). The patient had a non-acute clinical illness with occasional blood in his stool without fever or abdominal pain. He was treated with ciprofloxacin. Travel

information was unavailable and epidemiological links were not obtainable. No clinical complications including hemolytic uremic syndrome (HUS) was observed in any of the three patients. Two patients reported foreign travel to Haiti, confirming the finding of Gray et al. (Gray et al. 2014) regarding the local emergence of these strains.

Pulsed-field gel electrophoresis (PFGE) with XbaI and BlnI enzymes did not demonstrate any close genetic link between the three strains.

Treatment of STEC infection consists of supportive care and the use of antibiotics remains a matter of debate. In contrast, *Shigella* infections require antibiotic treatment in many instances and early antimicrobial administration was associated with decreased Stx concentrations in stool and a lowered risk of HUS in stx1-*S. dysenteriae* infections (Bennish et al. 2006). In this study, the 3 patients were successfully treated with ciprofloxacin without complications and this supports handling Stx1-producing *S. flexneri* in a similar way to *S. dysenteriae*.

With this recent introduction of *S. flexneri* isolates carrying Shiga Toxin 1 to Canada, identification of Stx production in *Shigella spp.* should be furthered studied in order to clarify implications in virulence, treatment, and infection prevention and control management.

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