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Health Canada saw danger to district

Study 5 years ago warned that residents were at high risk of infection

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Special to The Globe and Mail, Calgary

A study done by Health Canada five years ago clearly identified the Walkerton, Ont., area and neighbouring counties in Southwestern Ontario as a hot spot for infection caused by E. coli.

Dr. Pascal Michel, a veterinarian and epidemiologist with Health Canada in Montreal, mapped 3,000 reported cases of E. coli infection in the province from 1990 to 1995 and found that most cases occurred in rural areas in months of May, June and July.

Bruce County, in which Walkerton is located, and neighbouring Grey, Huron, Perth, Oxford and Middlesex counties recorded the highest incidence of infection from the deadly E. coli variety known as O157:H7, with more than four cases per 10,000 people, Dr. Michel said.

Agricultural counties in Central and Eastern Ontario, including Victoria, Frontenac and Renfrew, also reported very high rates of infection.

(In contrast, counties with large urban centres such as Toronto, Ottawa and Windsor had the lowest rates of infection.)

The Health Canada study was published last year in the medical journal *Epidemiology and Infection*, after Dr. Michel shared his findings with Ontario public-health officials in 1997.

He also found a strong and persistent association between E. coli infections and cattle density. Using a crude measure of cattle per hectare, it showed that "living in an agricultural region where cattle are could be an important risk factor."

In much of Southwestern Ontario, particularly in Bruce and Grey counties, cattle density can rise as high as 100 animals per hectare in industrial-style factory farms. The report also noted that 32 per cent of Ontario's rural wells exceeded acceptable standards for fecal contamination.

"The relationship between cattle density and the magnitude of E. coli was very significant," Dr. Michel said. "Lots of scientists have compiled evidence on this link."

Asked if he was surprised by the deadly Walkerton outbreak, Dr. Michel answered both yes and no.

"I was surprised by the scale of the event but no, I was not surprised by where it happened. We knew that we could expect more cases of infection in these counties than anywhere else in the province."

The findings confirm several scientific studies that implicate cattle manure as a chronic source of E. coli contamination of food and water in Scotland, the United States, Argentina and Canada.

"From a scientific perspective, there is need to pursue more information on the agricultural pressures on public health," Dr. Michel said.

For reasons unknown, about 100 strains of dangerous E. coli now live in healthy cattle, which shed the organisms in their manure throughout the summer months. Just a few (anywhere between 10 and 100) can start an infection that can lead to bloody diarrhea, kidney failure and death.

"Cattle manure and drinking water don't mix and we have known that for a long time," said Dr. Glen Armstrong, a medical microbiologist at the University of Alberta and an expert on the bug that hit almost one-quarter of Walkerton's 4,800 people.

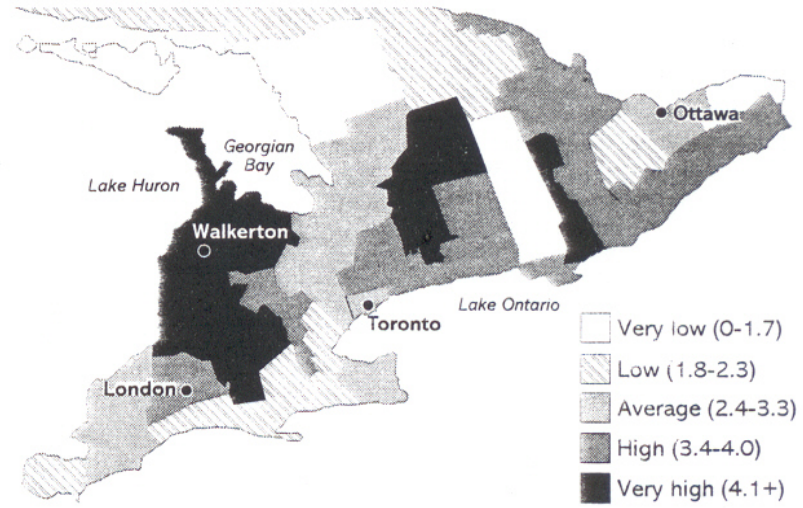
A 1996 outbreak in Japan that sickened 20,000 children and killed 13 was traced back to sprouts grown in water contami-

E. COLI INFECTIONS LINKED TO CATTLE DENSITY

A Health Canada study found infection from the deadly form of E. coli is highest in areas with a large density of cattle.

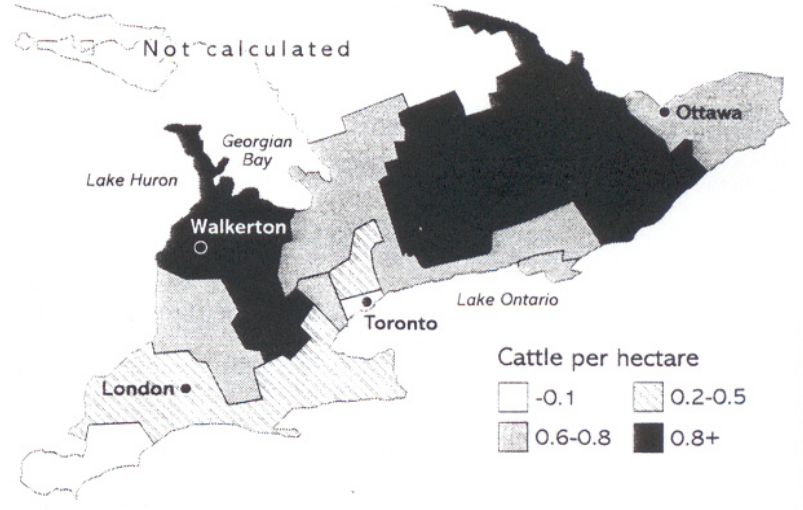
E. COLI INFECTIONS

Incidents of E. coli O157:H7 in Southern Ontario, per 10,000 people.



CATTLE DENSITY

Total number of cattle per cultivated area.



Source: Cambridge University Press

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nated by cattle manure, Dr. Armstrong said.

An earlier E. coli outbreak in Ontario, which killed two children in 1980, had similar origins. Scientists eventually linked that deadly episode to unpasteurized apple cider served on a well-fertilized farm.

The study concluded that factors responsible for spreading E. coli O157:H7 probably included "the contamination of surface water and shallow wells by cattle manure used as a fertilizer; working with or being in close contact with cattle; and consumption of food produced and processed locally."

Although E. coli O157:H7 can exist in water troughs for months, scientists know little about how it moves among cattle, water and humans. The bacteria also bear an uncanny resemblance to strains of E. coli that ravaged hospitals in the 1930s and 1940s and often accounted for 10 per cent of all baby deaths.

Health Canada is now conducting another study that will better highlight the risk of E. coli infections associated with intensive livestock developments.

REFERENCE: Michel, P., Wilson, J.B., Martin, S.W., Clarke, R.C., McEwen, S.A. and Gyles, C.L.: Temporal and geographical distributions of reported cases of *Escherichia coli* O157:H7 infection in Ontario. *Epidemiology and Infection* **122**(#2): April, 193-200 (1999). [DC Library electronic journal]

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