NSAGI

National Studies on Acute Gastrointestinal Illness

Report of the 2002

Canadian Public Health Reporting Study (Pilot)

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Quantifying the Efficacy of Canada's National Surveillance System for Enteric Diseases

Prepared by the James Flint, for
The Division of Enteric, Foodborne and Waterborne Diseases
Centre for Infectious Disease Prevention and Control
Population and Public Health Branch
Health Canada

INTRODUCTION

Thanks to improved hygiene and a good understanding on how to prevent disease, deaths and serious illnesses attributed to acute gastrointestinal illnesses (AGI) in Canada are relatively rare occurrences. However, changes in food production and distribution, changes in eating behaviours, aging populations, increasing populations with compromised immune systems, climate change, antimicrobial resistance and microbial adaptation are some of the trends that have and will continue to favour the emergence of enteric pathogens capable of causing serious infections. Even though the current proportion of deaths and hospitalizations may be low compared to rates in the developing world, the sheer magnitude of self-limited episodes of AGI results in a significant burden to the Canadian public, both in financial and human terms.

To develop policies to contain and reduce AGI in Canada, surveillance data needs to reflect the actual situation as best it can. In Canada, a passive surveillance system is in place to monitor enteric disease trends. Only a fraction of the cases occurring in the human population are captured by the provincial and national databases in the passive surveillance system. Considering the critical steps required for an individual case to be captured, the under-reporting of illnesses is expected and, in some cases, uncontrollable. The following chain of events must occur for a case to be captured by national surveillance:

A. *The person with an AGI must seek medical care,*
B. *The medical care provider must request the submission of a stool specimen,*
C. *The ill individual must provide a specimen,*
D. *The specimen must be transported intact, within an appropriate time period and using the correct transport media to a local laboratory,*
E. *The laboratory must test for the pathogen causing the illness (if in fact the illness is caused by an infectious agent),*
F. *The test used must be sensitive and specific enough to detect the pathogen (if in fact the specimen contains the etiologic agent),*
G. *The positive identification must be reported to the local public health unit (either directly or via the patients physician),*
H. *The public health unit must enter the case into their surveillance database,*
I. *The case must contain all the required information (i.e. a presumptive laboratory identification may need to be updated with a confirmed identification),*
J. *The public health unit must report the case to the provincial health authority, and*
K. *The provincial health authority must report the case to the national health authority.*

This study describes and quantifies the proportion of cases captured at the public health unit interface. It is one of a number of studies focusing on all the critical points in the enteric disease reporting chain. By quantifying the under-reporting within the national surveillance system, adjustments can be made to enhance the accuracy of disease estimates. In addition, the burden of disease attributed to AGI can be more precisely calculated and interventions appropriately targeted.

METHODS

In January 2002, paper based survey's were sent to all health units in two Canadian provinces. The survey was designed to ascertain information on the system used to report AGI illnesses, the frequency with which cases were reported to health units by physicians and laboratories, reporting practices and the proportion of cases not captured.

Data was entered into EpiData 2.0 and exported to Microsoft Excel for analysis.

RESULTS

The response rates for province A and province B were 95% and 92% respectively.

The average size of the population served by an individual health unit in province A was 222,305 (range 50,000 – 587,353) and in province B, 311,311 (range 43,000 – 250,000). In one province, 94% of health units used a database called PHIS (public health Information System) to record disease data. The remaining health units used a regional spreadsheet. In province B, 100% of health units used RDIS (Reportable Disease Information System). Both PHIS and RDIS are computer-based databases capable of electronically transferring data.

Health units in both provinces mostly received their AGI reports solely from a laboratory (Table 1). Reports from physicians alone were low in both provinces.

Table 1. Summary of the proportion of laboratory confirmed AGI cases reported to the health unit by a physician and/or laboratory.

	Province A			Province B		
	average	min	max	average	min	max
Both a Physical and Laboratory	7%	0%	93%	16%	0%	100%
Only a Physician	2%	0%	10%	3%	0%	20%
Only a Laboratory	91%	5%	100%	81%	0%	100%
Other[†]	<1%	0%	1%	1%	0%	13%

[†]Other includes: individuals calling, other health units, long-term care facilities, infection control nurses and hospitals.

Once a report is received by a Heath unit in province A, 67% indicated entering the report into an electronic database within 2 days, 11% did so within a month and none took longer than a month. In province B, 53% of health units entered reports within two days, 24% did so within a month and, likewise, none more than a month.

When a health unit receives a report from a patient living in their province but not their health unit area, 98% of health units indicated forwarding the report to the health unit in which the patient lived. The remaining 2% indicated entering the report into their own database and reporting it to the province. When a report came from a patient residing in another province, the health units indicated doing the following:

- 44% forwarded the report to the health unit where the case resides,
- 21% forwarded the report to the provincial health authority where the case resides,
- 18% forwarded the report to both the provincial health authority and the health unit where the case lives,
- 8% indicated reporting the case to their provincial health authority who would in turn refer the report to the province health authority in which the case resides,
- 4% indicated forwarding it to the health unit where case resided and/or their own provincial health authority for subsequent referral,
- 4% referred the report to the provincial health authority of the patient residence and their own provincial health authority, and
- 2% indicated entering report in their own database, but not reporting to the province.

Nearly 80% of all health units indicated receiving additional pathogen information (such as species, serotype or phagetype) from a laboratory after the case has been reported to the province. If this was the case, the majority of health units (80%) indicated that they would update their database with this information and 29% of these health units also forwarded the additional information to the province.

When asked about mechanisms to prevent repeat laboratory reports from a single case being counted as multiple cases or episodes, 87% of health units indicated having a mechanism in place, 10% did not and 4% did not know.

The recording of outbreak related cases in the health unit's database varied (Table 2). The majority of health units use a separate outbreak module to record laboratory confirmed and epidemilogically linked outbreak isolates. The percentage of health units that indicated *only* entering outbreak isolates in the general case registry (indistinguishable from non-outbreak related cases) for laboratory confirmed cases was 15%.

Table 2. Recording of outbreak cases in health unit's electronic database (note, more than one option could be selected by each health unit).

	Laboratory confirmed outbreak related cases			**Epidemiologically linked outbreak cases (non-laboratory confirmed)**		
	ALL	**Prov. A**	**Prov. B**	**ALL**	**Prov. A**	**Prov. B**
Outbreak module	67%	79%	44%	56%	28%	71%
General case registry, flagged as outbreak related	44%	53%	28%	19%	6%	26%
General case registry (indistinguishable)	15%	3%	39%	10%	22%	3%
Other	4%	0%	11%	8%	17%	3%
Not recorded	na	na	na	23%	33%	18%
Not applicable	4%	6%	0%	0%	0%	0%
Don't know	2%	3%	0%	4%	11%	0%

If *sporadic* AGI cases are reported *without* a pathogen identified, the majority (75%) of health units will not report these cases to the provincial health authority (Table 3). Thirteen percent of health units indicated reporting the case as a "foodborne illness".

Table 3. Reporting of non-outbreak related cases without a pathogen identified.

	All	Prov. A	Prov. B
Foodborne illness(es)	13%	6%	18%
Other[†]	4%	6%	3%
Not reported unless pathogenic agent identified	75%	83%	71%
Do not receive reports without pathogen identified	6%	6%	6%
Don't know	2%	0%	3%

[†]Included reporting the results of interviews or investigations to the provincial health authority

If an *outbreak* related AGI cases are reported *without* an etiologic agent being identified, only 25% indicated not reporting these cases to the provincial health authority. The majority of health units reported the outbreak as a "gastrointestinal outbreak/epidemic" or reported an aggregate number and indicated that the agent was unknown (Table 4).

Table 4. Reporting of outbreak related case without a pathogen identified.

	ALL	Prov. A	Prov. B
Foodborne illness(es)	15%	0%	24%
Gastrointestinal outbreak/epidemic	35%	28%	38%
Aggregate #, agent = unknown	35%	22%	41%
Aggregate number, agent field left blank	4%	0%	6%
Other[†]	8%	17%	3%
Not reported unless agent identified	25%	28%	24%
Don't know	6%	11%	3%

[†]Included reporting the results of interviews or investigations to the provincial health authority

Of all the individual cases of acute gastrointestinal illness reported to individual health units in the year 2001 (including suspected, laboratory confirmed and outbreak cases), approximately 11% (range 0% - 90%) were not reported to the provincial health authority. Reasons included:

- An etiologic agent was never identified (62%),
- The case did not meet the case definition for a reportable disease or condition (58%),
- A suspected etiologic agent was identified but never confirmed (15%),
- The case was never entered into the database and therefore not report (14%),
- Key information on the case was missing (6%), and
- Other, including case belonged to another province and case was self reported with no laboratory submission, (6%).

Seventeen percent of health units indicated that *all* cases reported to them were reported to the provincial health authority. On average, 3% (range 0% - 25%) of cases reported to health units were not entered into enteric disease databases at all.

The overall proportion of *laboratory confirmed* cases that were *not* reported to the provincial health authority is summarized in Table 5. Overall, 5% of confirmed cases were not reported to the province.

Table 5. Proportion of specific AGI cases not reported from health units to the provincial health authority.

	Total # reports received	Total # reported to province	Number not reported	Percentage not reported
Campylobacter	6712	6498	214	3%
Pathogenic *E. coli*	482	453	29	6%
Salmonella	3060	2965	95	3%
Salmonella typhi	96	93	3	3%
Shigella	471	465	6	1%
Cryptosporidium	366	352	14	4%
Cyclospora	86	77	9	10%
Giardia	2704	2526	178	7%
Rotavirus	593	578	15	3%
Calicivirus/NLV, SRSV	2330	2070	260	11%
Hepatitis A	270	247	23	9%
TOTAL	**17170**	**16324**	**846**	**5%**

DISCUSSION

The public health unit is one possible 'interface' in the enteric disease reporting chain that determines the overall proportion of cases entering provincial and national surveillance databases. From this study, it is clear that health units successfully perform their valuable role in the national surveillance program for enteric diseases. The majority (89%) of *all* cases reported to a health unit, and 95% of *laboratory confirmed* cases, will remain in the surveillance system and be captured at the provincial level.

Variations in how individual health units deal with AGI reports could potentially influence the accuracy of surveillance data. Given the fact that the reporting of infectious disease comes under provincial jurisdiction, discordant legislation will naturally result in some discrepancies in reporting policies and practices. However, to reduce unnecessary inter-provincial and intra-provincial variations, reporting guidelines developed by a provincial/federal working group would be a valuable exercise.