GOVERNMENT OF BERMUDA

Ministry of Health

Department of Health

Estimating the Burden of Acute Gastrointestinal Illness in Bermuda
PRELIMINARY RESULTS

Introduction

Acute gastrointestinal illness (AGI) is an important public health issue in Bermuda. Since reportable AGI data is known to represent only a small fraction of the total AGI in the community, the objective of this study was to determine the magnitude, distribution and estimate the burden and under-reporting rate for AGI and priority pathogens that cause foodborne diseases (FBD) in Bermuda.

Methods

A retrospective, cross-sectional household population survey was conducted by telephone using a random sample of households that was representative of the entire populace. Within each household further randomization occurred as the person with the next birthday was selected to participate in the study. The survey was conducted in two phases. Phase I in October 2011 and Phase II in February 2012 to capture the low and high AGI season respectively. A sample size of 1066 was calculated using *EpiInfo*. Completed surveys were secured at the Ministry of Health. All questionnaires were coded and data were entered in analyzed in *EpiInfo* (v 7).

The laboratory survey was conducted from October 2011 to November 2012. Diarrheal stool samples were tested for *Salmonella, Shigella, Campylobacter,* pathogenic *E. coli* (if bloody stool), norovirus and parasites.

Data from the population and laboratory surveys was used to determine underreporting levels and to calculate estimates of the burden and extent of underreporting of AGI and specific FBD pathogens, using the burden of illness model.

PRELIMINARY Results

A total of 861 of the 1220 questionnaires were completed. The response rate was 70%. Thirty percent (30%) of households could not be reached or declined to participate. The monthly prevalence of self reported AGI was 8.0 % (95% CI 6.3 - 10.1%). The yearly incidence rate was 1.0 episodes per person per year. The prevalence of AGI was highest in the <5 years age-group (33.3% [95%CI 7.5-70.7%]) and lowest in 5-14 year age-group (2.3% [95%CI 0.1-12.0%]). It was also higher among females (8.7% [6.5-11.5%]) than males (7.1% [4.7-10.7%]).

Only 10.1% (95% CI 4.2-19.8%) of the AGI cases sought medical care. Of those, only 1.4% (95% CI 0.1–7.8%) were asked to submit samples. The same percentage submitted samples. The most commonly reported additional symptoms were abdominal pain (58.0% [95%CI 30.2-54.5%]), nausea (44.9% [95% CI 32.9-57.4%]), and headache (39.1% [95% CI 27.6-51.6%]). The maximum number of stools per 24 hours ranged from 3 to 20 with a mean of 5 and a median of 3. The average number of days an individual suffered with AGI was 2 with a range of 1-8 days and a median of 2 days. Of the AGI cases, 49% reported

that they had to spend time at home due to their illness. The range of days spent at home was 1 –5 days, with an average of 2.5 days and a median of 1 day spent at home due to illness. Of these, 50% required another individual to look after them while ill. The range of days taking care of a case was 1-5 with an average of 2.5 and a median of 1.5 days. Most of the cases considered their AGI to be caused by contact with another sick person (33.3% [95%CI 22.4-45.7%]); 29.0% [95% CI 18.7-41.2%] of cases considered their illness to be from something they consumed; none of the cases believed that drinking water was the cause.

The predominant pathogens isolated through the laboratory survey was *Salmonella* (47.8%) followed by *Campylobacter* (23.9%) and norovirus (15.0%), indicating the etiology of FBD in Bermuda. The typing showed that 70.4% of the Salmonella isolates were *Salmonella mississippi*, a serotype not commonly found in Caribbean countries.

The underreporting of syndromic AGI was 90% giving an estimated burden of syndromic AGI of 5730 cases as compared to the 573 syndromic AGI cases reported. Using the reported laboratory confirmed AGI data, it was further determined that for every lab-confirmed case of AGI reported, there were 518 cases occurring in the population (underreporting factor of 518). When the burdens of specific pathogens were calculated, *Salmonella* had the highest estimated burden *(*3,978 cases). This was followed by Norovirus (estimated burden 2941 cases,) and then *Campylobacter* (estimated burden 1990 cases). This is different from the reported etiology and implies the significance of Norovirus as a major cause of AGI in Bermuda along with *Salmonella*.

The study also identified gaps in the surveillance system, primarily, the incomplete reporting of syndromic data. Another issue highlighted during the study concerned resourcing of kits for viral and parasitic pathogens and for typing of *Salmonella* isolates.

Conclusion

The burden of AGI study is the first of its kind in Bermuda and has provided evidence that AGI is a significant public health issue. The estimated burden of AGI and specific FBD pathogens are substantially higher than that reported to Ministry of Health highlighting the fact that these enteric pathogens pose a considerable health burden. [Further analysis is required to determine the economic burden of AGI in Bermuda taking into consideration costs of medical services and supplies, as well as working days lost by ill persons and their care-givers.]

It is recommended that in order to reduce the burden and morbidity associated with AGI in the population that the following measures be implemented:

- improved reporting of AGI to the Epidemiology and Surveillance Unit
- improved collection of stool specimens from persons with diarrhea
- continued testing of specimens for the wider range of pathogens
- improved procurement methods and funding for accessing laboratory media and supplies, in particular norovirus kits
- Implement pathogen specific measures for control of *Salmonella mississippi* and norovirus such advanced food safety training, further research to trace sources of infection, enhanced monitoring of imports and incoming illness