Seasonal Changes in Prevalence of Acute Gastrointestinal Illness in Rigolet, Nunatsiavut, Canada

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Background

- Diarrhea is a major driver of burden of illness in Canada and is the second leading cause of death in children globally.[1]
- Acute gastrointestinal illness (AGI), including diarrhea and vomiting, can be caused by parasitic, viral or bacterial pathogens in food, water and the environment.
- AGI is often seasonal and affected by weather patterns.[2]
- Climate change might impact AGI incidence in the North.[2]
- Inuit are at increased risk of climate-sensitive health outcomes due to their close relationship with the land.[3,4]

Goals and Objectives

The goal of this project was to determine if there is an impact of seasonal change on the incidence of AGI in Rigolet, Nunatsiavut. Specific objectives were to:

1. Estimate the incidence of AGI in each season in Rigolet; and
2. Examine associations between AGI and season of survey.

Materials and Methods

- An AGI case was defined as a patient with vomiting and/or diarrhea not related to pregnancy, alcohol, drugs, or chronic conditions such as colitis, diverticulitis, Crohn's disease, irritable bowel syndrome.
- Data were collected in 6 census surveys in Rigolet (Fig. 1; Sept 2011, Feb 2012, May 2012, July 2012, Sept 2012, May 2013).
- Univariable logistic regression was used to examine the potential associations between:
  - Season and AGI, controlling for repeated measures using a random effect (RE); and
  - Season and AGI excluding cases with concurrent respiratory symptoms, controlling for repeated measures using an RE.
- Analysis and diagnostics were conducted in STATA-IC 13.[6]

Figure 1. Location of Rigolet, Nunatsiavut, Canada.[7]

Key Points

- Incidence of self-reported AGI in the Canadian North is the highest reported in the global literature, and might be affected by weather and seasons.[2]
- Incidence of AGI was significantly higher in winter months in Rigolet, Nunatsiavut.
- When excluding cases with concurrent respiratory symptoms, AGI did not peak in winter in Rigolet, Nunatsiavut.

Preliminary Results

- 1,363 surveys were completed over the 6 periods;15.7% of participants reported AGI (Response rate: 87%-96%).
- Incidence rates for AGI ranged widely, peaking in winter (Fig. 2).

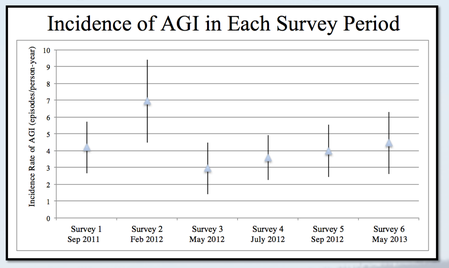

Figure 2. Incidence of AGI in each survey in Rigolet with 95% confidence intervals.

- The average unadjusted incidence rate of AGI was **4.39** episodes/person-year or adjusted to **2.71** episodes/person-year when excluding respiratory cases.
- Incidence of AGI in the winter months was significantly higher than in other seasons (Table 1).
- Gender was forced into models as a known AGI factor
- When excluding respiratory cases, season was no longer significant (Table 1).

Variable	Odd's Ratio for AGI (All Cases)	Odd's Ratio for AGI (No resp. cases)
Season		
Summer	REF	REF
Fall	1.011	0.087
Winter	**2.673**	0.428
Spring	0.821	0.296
Sex		
Male	REF	REF
Female	**1.77**	**1.57**

Table 1. Model of seasonal change in AGI incidence with all cases and with respiratory cases excluded (**$p<0.05$** represented in bold).

Discussion

- Canada's Arctic has the highest internationally recorded rates of AGI,[2] and a significantly higher peak in winter.
- The peak of AGI in the winter was eliminated when excluding cases with concurrent respiratory symptoms. The high rate of AGI in winter may be due to respiratory infections (such as influenza) and less related to environmental factors.
- Although this study is a census, sample size is small, which limits statistical power and generalizability.
- This study was limited by its cross-sectional nature which assumes a 2-week period is representative of the entire year.

Conclusion

- The incidence of AGI in the North is high, particularly in winter.
- Control of infectious respiratory infections may reduce the incidence of AGI in Rigolet during winter months.

Next Steps

- Examine associations between AGI and potential risk factors while controlling for seasonality.
- Design, implement and evaluate a plan for information sharing with stakeholders and community members in Rigolet.

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