

# Simplicity, Data Quality, and Limited Resources: Evaluation of the Giardia Surveillance System in Maine

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## BACKGROUND

- Giardiasis is a diarrheal illness caused by the parasite *Giardia intestinalis*
  - Swallowing as few as 10 cysts may cause illness
- The infected can be asymptomatic or symptoms can last 1-2+ weeks, including:
  - diarrhea, abdominal cramps, gas, nausea/vomiting, fatigue and dehydration
- Transmission risks: child care settings, recreational water or swimming, drinking contaminated or untreated water, travel to giardia-endemic countries, oral-anal sexual practices<sup>1</sup>

## OBJECTIVES

- Surveillance system:** Monitor trends of giardia incidence among Maine (ME) residents as part of state surveillance efforts
  - Currently unable to differentiate between cases identified through refugee screenings vs. those ill due to a Maine exposure
- Evaluation:** Assess effectiveness and efficiency of the surveillance system to guide public health action, considering resource and capacity limitations
  - e.g. assess burden of disease, incidence, identify clusters, control potential outbreaks, target prevention measures; identify strengths and weaknesses

## Giardia in Maine

- Maine ranks #1 in the US for percentage of households on private wells (~50%)<sup>2</sup>
- Tourism is one of largest industries- contributes to recreational water exposures
- ME hosted 2.7+ million visitors in 2012; the resident population is ~1.3 million<sup>3</sup>

Figure 1. Incidence of giardiasis, by year - Maine and US, 2007-2013

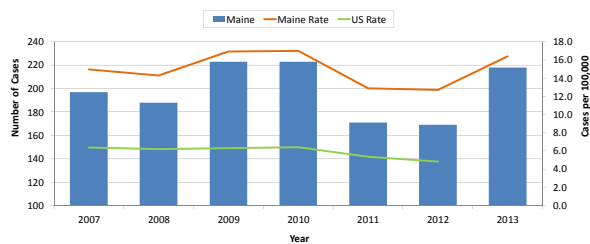


Fig 2. Incidence of giardia, by month - Maine

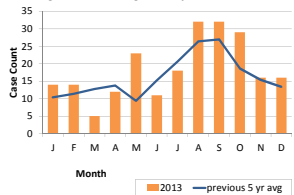
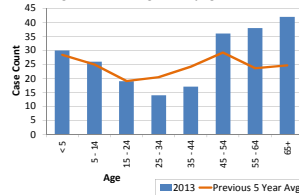


Fig 3. Incidence of giardia, by age - Maine

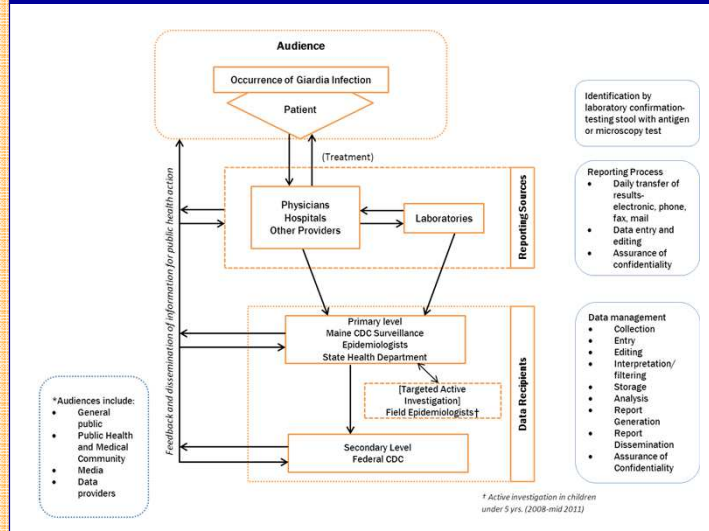


- National trends comparison:
  - Incidence rate for ME is steadily over double the national rate (Figure 1)
    - Identified need for increased surveillance priority
  - Seasonality: highest incidence August-October in ME, while July-September for the US (Figure 2)
  - Children still in diapers also disproportionately affected in ME, but also a high incidence in the older population- especially in 65+ (Figure 3)
  - Equal distribution in males and females in ME; more common in males for US<sup>4</sup>

## METHODS

- Evaluation conducted according to CDC's Updated Guidelines for Evaluating Public Health Surveillance Systems<sup>5</sup>
  - Analysis of completeness in reporting and duration between report dates; assessment of operations and business processes; qualitative stakeholder interviews
- Maine does not investigate cases of giardia; only laboratory data is entered into Maine NEDSS Base System (NBS)
- Case definition: meet the clinical description and the criteria for laboratory confirmation (2011)<sup>6</sup>
  - Maine did not adopt new clinical component in 2011; retained lab-only definition for cases

## Figure 4. Giardia Surveillance System Data Flow



## Table 1. System Data Quality and Timeliness

Data Quality: Completeness		Timeliness of Reporting		
Demographic Fields	Percent Complete	Year	Entry -1 week	Entry -48 hours
Date of Birth	99.7%	2010	100%	97.4%
Sex	100%	2011	97.6%	89.9%
County of Residence	100%	2012	98.8%	74.7%
Race	84.5%	2013	98.2%	86.4%
<b>Investigative Fields</b>				
Case Status	100%			
Reporting Status	99%			
Physician/Provider	100%			
<b>Reporting Fields</b>				
MMWR Week	100%			
MMWR Year	100%			
Specimen Collection Date	87.3%			
Earliest Report Date	100%			
Investigation Start Date	99.7%			

- 0.6 days (SD=2.5; median 0) → average difference between Earliest reported to state date to Case closing date
  - fields are proxies for time from report receipt to the time of entry into Maine NBS due to exclusively passive surveillance

## CONCLUSIONS

- The undeveloped nature of this system and the department's limited resources have allowed giardia to lose priority amongst other reportable conditions despite its high incidence
- Although Maine's system is effective at enumerating reported cases, there is little effect on policy decisions or disease control interventions
  - Tracking at the most basic level does not allow for characterization of state-specific risk factors
- Identified need to clearly define objectives for giardia surveillance in order to adapt the system requirements and business processes

## Questions Raised

- Why is the incidence of giardia in Maine over two times the national rate?
- How can Maine detect clusters and respond?
- With current resources, how will giardia's increasing significance be addressed?
- Is it feasible for the program to comply with the updated 2011 case definition?
  - What changes in system processes and data flow would occur as a result?

## NEXT STEPS

- Initiated enhanced surveillance project in June 2014 to assess feasibility of implementing 2011 CSTE case definition change- including clinical aspect
  - Considering limited capacity and potential benefits
  - Will define costs to the program and usefulness of additional data beyond fields populated by laboratory reports
- Partner with Maine Drinking Water Program to GIS map geospatial and temporal variation in reported cases
- Evaluation identified possible discrepancies between ordered test and indicated lab result (e.g. order and result labelled O&P, but tested antigen); to investigate further

## SOURCES

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\*Not assessed due to lack of data: Sensitivity, Positive Predictive Value