

Comprehensive Surveillance for Acute Gastroenteritis Outbreaks through NORS

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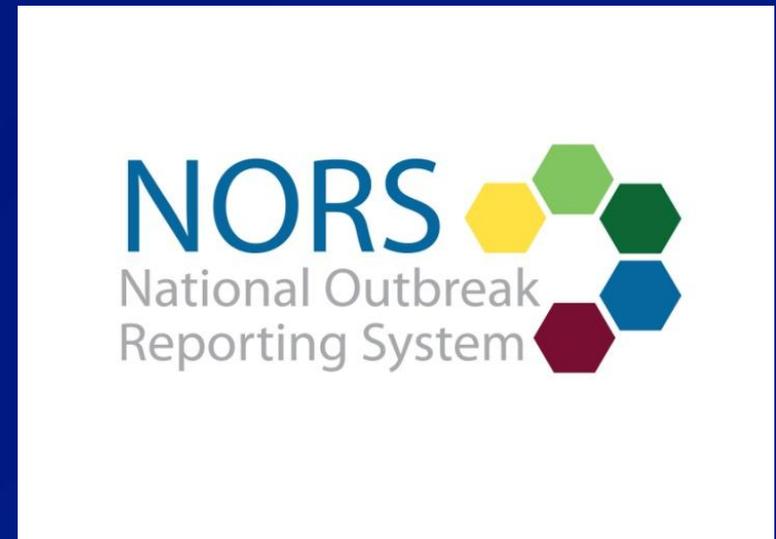
*Presented at the 8th Annual OutbreakNet Conference, Atlanta, GA
August 30, 2011*

Background

- **Acute gastroenteritis (AGE) outbreaks represent a substantial public health burden in the United States**
- **NORS launched in 2009 to enhance and expand upon previous surveillance systems**
 - **Foodborne Disease Outbreak Surveillance System (FDOSS)**
 - **Waterborne Disease and Outbreak Surveillance System (WBDOS)**
- **NORS is a web-based system for local, state, and territorial health departments to report outbreaks of:**
 - **Waterborne disease**
 - **Foodborne disease**
 - **AGE due to person-to-person transmission, animal contact, environmental contamination, and other/unknown modes**

Uses of NORS Data

- **Assess the national burden and temporal trends of AGE outbreaks**
- **Identify priority settings and populations for interventions**
- **Characterize AGE outbreaks, e.g.:**
 - **Etiology**
 - **Setting**
 - **Mode of transmission**



Methods

- **Summarized all AGE outbreaks in NORS with onset of illness during January 1, 2009-December 31, 2010**
 - Restricted to only finalized outbreaks as of August 2012
 - Excluded non-AGE outbreaks (e.g., listeriosis, legionellosis, Hepatitis A,)
- **Variables analyzed included:**
 - Primary mode of transmission
 - Etiology
 - Exposure setting
 - Number of illnesses, hospitalizations, and deaths
- **Data are preliminary and may change**

Number of AGE Outbreaks, Associated- Illnesses, Hospitalizations, and Deaths Reported to NORS, 2009-2010

Transmission Mode	Outbreaks (%)	Illnesses (%)	Hospitalizations (%)	Deaths (%)
Person-to-person	2,275 (51)	81,789 (67)	1,376 (43)	140 (81)
Foodborne	1,641 (36)	29,164 (24)	1,394 (44)	17 (10)
Animal Contact	61 (1)	913 (1)	98 (3)	0 (0)
Waterborne	39 (1)	1,229 (1)	63 (2)	1 (1)
Environmental	9 (0.2)	314 (0.3)	12 (0.4)	0 (0)
Unknown	471 (10)	8,194 (7)	246 (8)	14 (8)
Total	4,496 (100)	121,603 (100)	3,189 (100)	172 (100)

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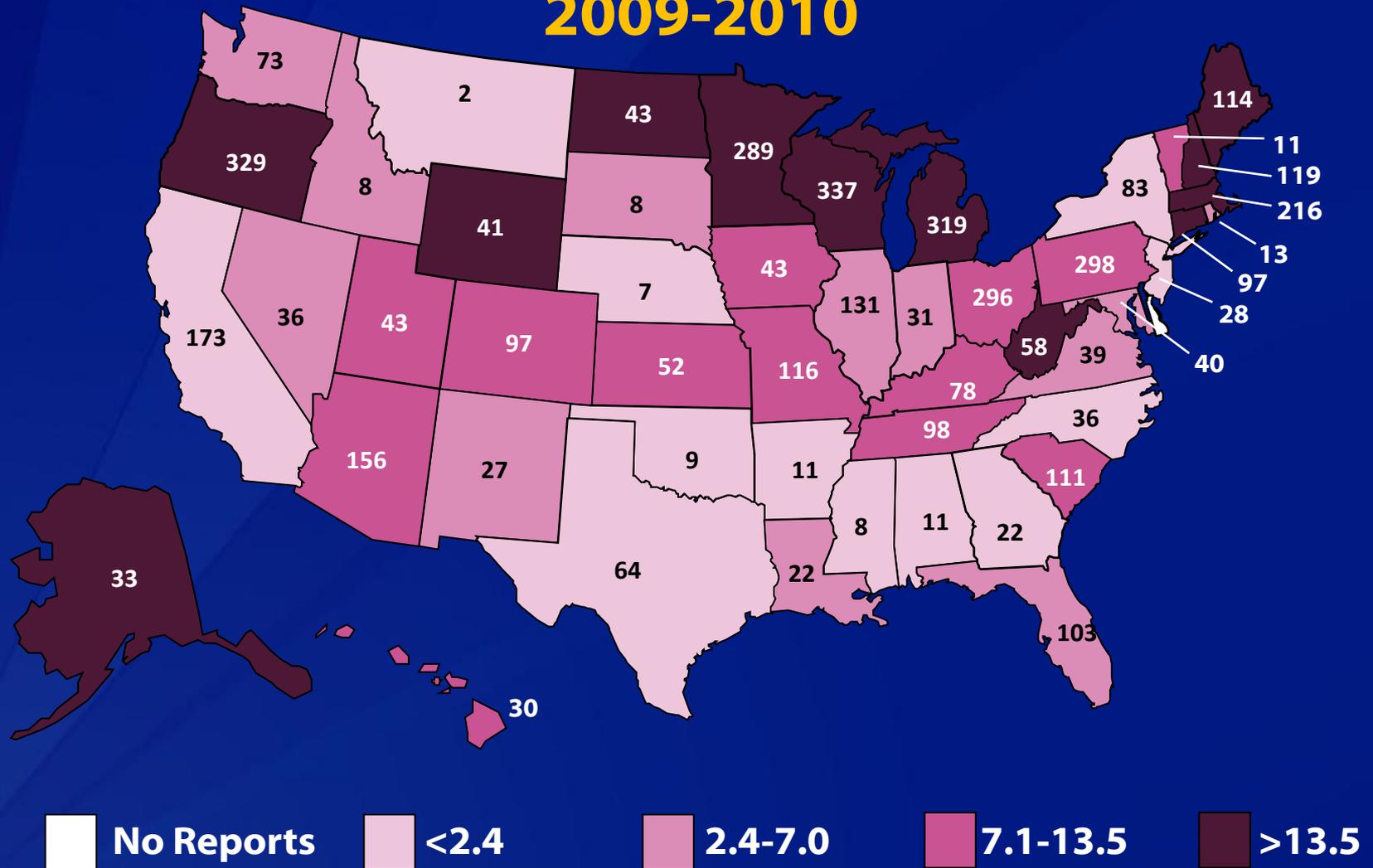
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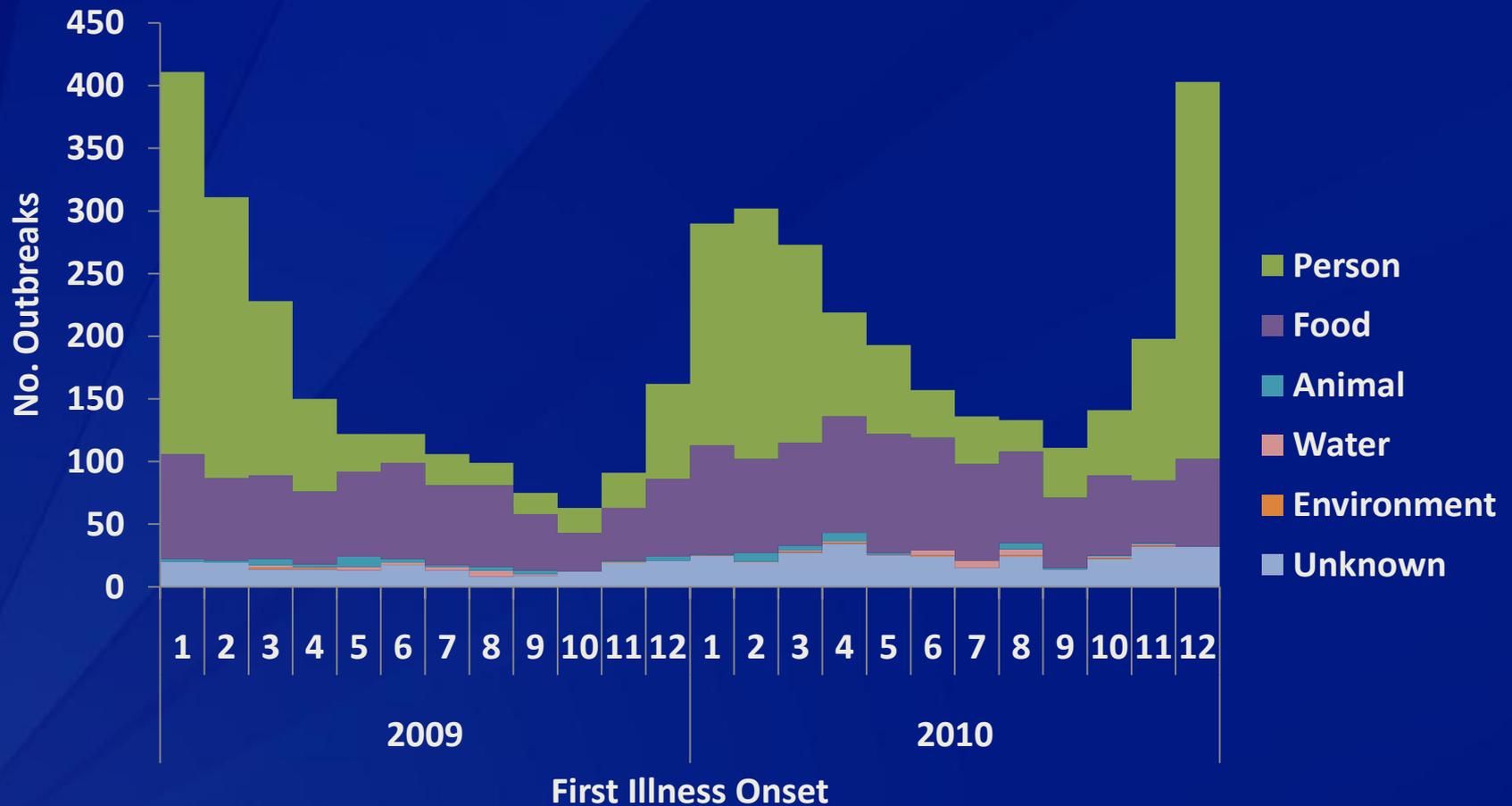
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Number and Rate (per million person-years) of AGE Outbreaks Reported to NORS by State, 2009-2010

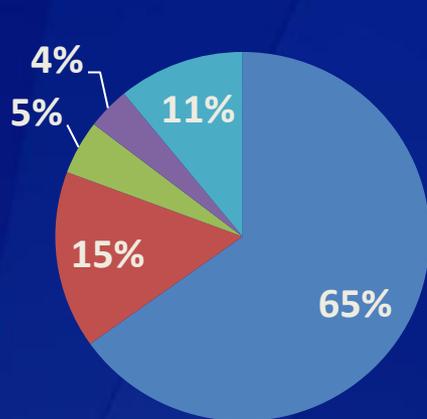


AGE Outbreaks Reported to NORS by Month and Transmission Mode, 2009-2010

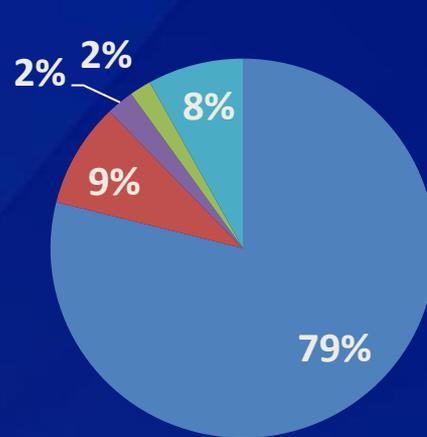


Etiology of AGE Outbreaks, Associated- Illnesses, Hospitalizations, and Deaths Reported to NORS, 2009-2010

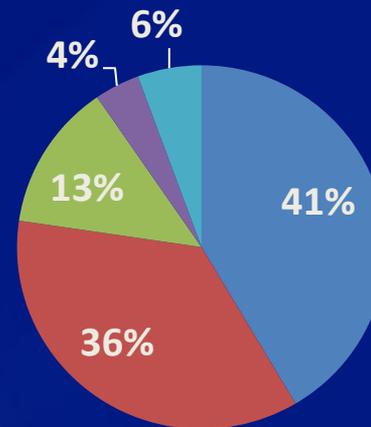
Outbreaks



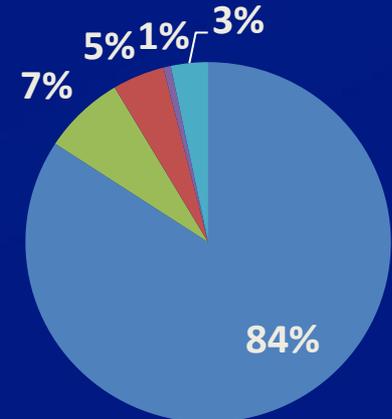
Illnesses



Hospitalizations



Deaths



■ Norovirus

■ Salmonella

■ E. coli

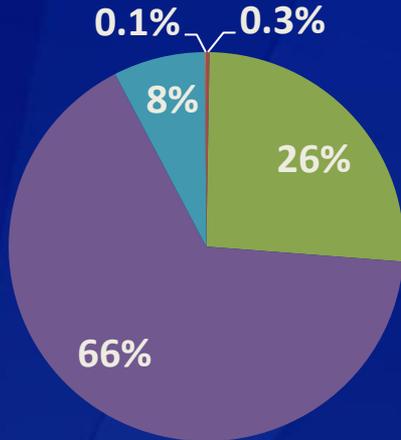
■ Shigella

■ Other

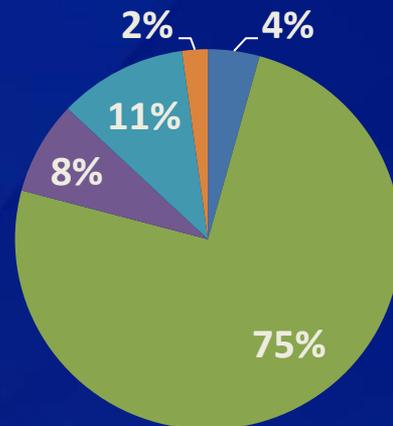
Note: Restricted to single etiology outbreaks (N=2,933)

Transmission Mode of AGE Outbreaks Reported to NORS by Etiology, 2009-2010

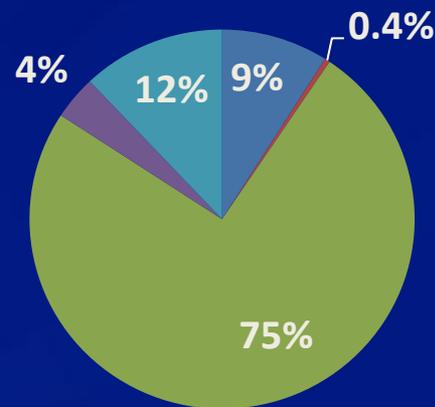
**Norovirus
(N=1910)**



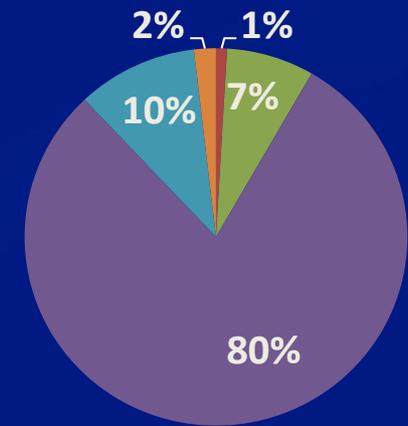
**E. coli
(N=139)**



**Salmonella
(N=456)**



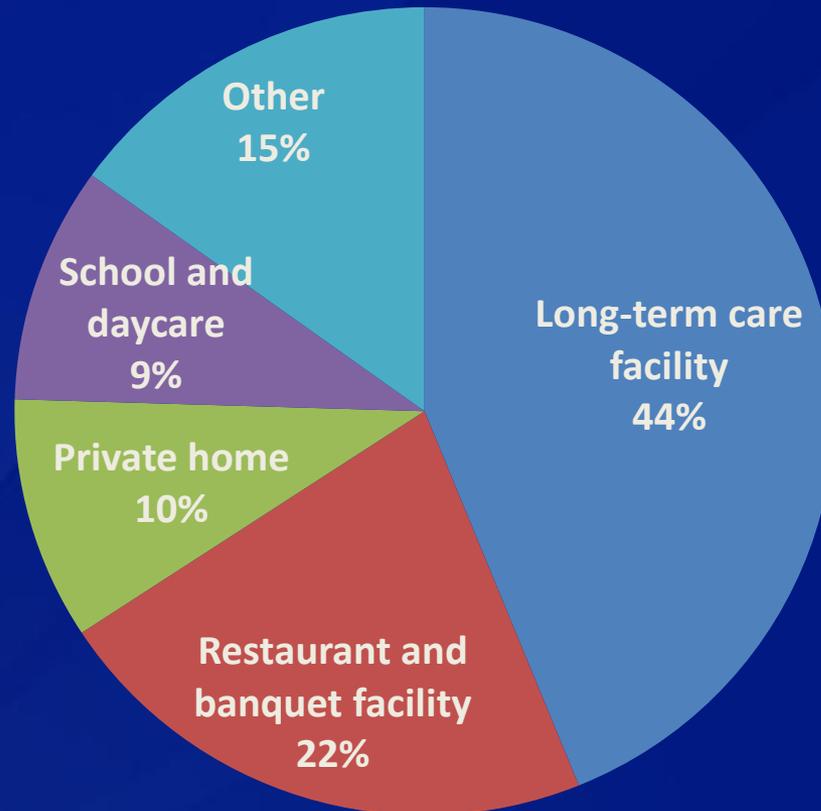
**Shigella
(N=108)**



■ Animal ■ Environment ■ Food ■ Person ■ Unknown ■ Water

Note: Restricted to single etiology outbreaks

Setting of Exposure in AGE Outbreaks Reported to NORS, 2009-2010



Note: Restricted to outbreaks with setting of exposure reported (N=3,245)

Limitations

- **Passive reporting system subject to underreporting and competing priorities, leading to variability**
 - Between reporting sites
 - Among different outbreak types
- **Variable uptake during first two years of NORS, thus data may not be generalizable across all sites**
- **Water data has not yet been formally closed out and should be considered preliminary**
- **NORS is a dynamic surveillance system and data may be modified at any time**

Conclusions

- **Norovirus is the leading cause of AGE outbreaks in the United States**
 - Also the leading cause of outbreak-associated hospitalizations and deaths
 - Salmonella, E. coli, and Shigella are other important contributors
- **Building upon its predecessors, NORS highlights the public health significance of AGE outbreaks not transmitted through food or water**
- **NORS represents the first comprehensive national system for AGE outbreak surveillance and provides valuable epidemiologic insights**
 - Role of different transmission routes for key AGE pathogens
 - Identify priority settings most impacted

Ongoing and Planned NORS Improvements

- **Improved data accessibility (Full Download)**
 - Data downloaded by state and local users in a variety of file formats and database structures
 - Data from each transmission mode accessed more readily across CDC management teams
- **Direct data upload from existing databases (NORS Direct)**
 - Eliminate double entry by state epidemiologists
 - Improve system acceptability and reporting rates
- **Extensive user interface changes (NORS 2.0)**
- **Direct integration with CaliciNet to enable real-time data exchange on norovirus outbreaks**

Acknowledgments

- **NORS P2P**
 - **Mary Wikswo**
- **NORS Food**
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 - **Shacara Johnson**
 - **Hannah Gould**
- **NORS Water**
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 - **Jonathan Yoder**
- **NORS IT**
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 - **Franky Maslim**
 - **Jason Price**
 - **Don Wade**
- **State, Local, and Territorials Health Departments**

EXTRA SLIDES

Top 5 Etiologies of AGE Outbreaks Reported to NORS, 2009-2010

	Outbreaks		Illnesses		Hospitalizations		Deaths	
1.	Norovirus	65%	Norovirus	79%	Norovirus	41%	Norovirus	84%
2.	Salmonella	16%	Salmonella	9%	Salmonella	36%	E. coli	7%
3.	E. coli	5%	C. perfringens	4%	E. coli	13%	Salmonella	5%
4.	Shigella	4%	Shigella	2%	Shigella	4%	C. perfringens	2%
5.	Campylobacter	2%	E. coli	2%	Campylobacter	2%	Shigella	1%
		91%		96%		96%		99%

Note: Restricted to single etiology outbreaks (N=2,933)