Comprehensive Surveillance for Acute Gastroenteritis Outbreaks through NORS

Aron J. Hall, DVM, MSPH, DACVPM
CDC Viral Gastroenteritis Team
ajhall@cdc.gov

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 (WBDOSS)

• 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

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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

No. Outbreaks

First Illness Onset

2009

2010

Person

Food

Animal

Water

Environment

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

Outbreaks: 65%
- Norovirus: 15%
- Salmonella: 4%
- E. coli: 5%
- Shigella: 11%
- Other: 4%

Illnesses: 79%
- Norovirus: 9%
- Salmonella: 2%
- E. coli: 8%
- Shigella: 2%
- Other: 15%

Hospitalizations: 41%
- Norovirus: 13%
- Salmonella: 6%
- E. coli: 4%
- Shigella: 7%
- Other: 3%

Deaths: 84%
- Norovirus: 7%
- Salmonella: 1%
- E. coli: 5%
- Shigella: 3%
- Other: 1%

Note: Restricted to single etiology outbreaks (N=2,933)
Transmission Mode of AGE Outbreaks Reported to NORS by Etiology, 2009-2010

Norovirus (N=1910)
- Food: 66%
- Person: 26%
- Unknown: 8%
- Environment: 11%
- Animal: 2%
- Water: 0.3%
- Other: 0.1%

E. coli (N=139)
- Food: 75%
- Person: 4%
- Unknown: 4%
- Environment: 12%
- Animal: 8%
- Other: 0.3%

Salmonella (N=456)
- Food: 75%
- Person: 9%
- Unknown: 0.4%
- Environment: 12%
- Animal: 4%
- Other: 2%

Shigella (N=108)
- Food: 80%
- Person: 7%
- Unknown: 1%
- Environment: 10%
- Animal: 2%
- Other: 0.3%

Note: Restricted to single etiology outbreaks
Setting of Exposure in AGE Outbreaks Reported to NORS, 2009-2010

- Long-term care facility: 44%
- Restaurant and banquet facility: 22%
- Private home: 10%
- School and daycare: 9%
- Other: 15%

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
  – Karunya Manikonda
  – Karen Herman
  – Amie Nisler
  – Kelly Walsh
  – Elisabeth Mungai
  – Shacara Johnson
  – Hannah Gould

• NORS Water
  – Virginia Roberts
  – Jonathan Yoder

• NORS IT
  – Rickey Zachary
  – Franky Maslim
  – Jason Price
  – Don Wade

• State, Local, and Territorials Health Departments
Top 5 Etiologies of AGE Outbreaks Reported to NORS, 2009-2010

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<td>79%</td>
<td>41%</td>
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<tr>
<td>Salmonella</td>
<td>16%</td>
<td>9%</td>
<td>36%</td>
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<tr>
<td>E. coli</td>
<td>5%</td>
<td>4%</td>
<td>13%</td>
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<tr>
<td>Shigella</td>
<td>4%</td>
<td>2%</td>
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