Clinical Lab-Based Surveillance for Norovirus: New Opportunities through NREVSS

Aron J. Hall, DVM, MSPH, Dipl ACVPM
Norovirus Epidemiology Team Lead
Viral Gastroenteritis Branch
Division of Viral Diseases, NCIRD, CDC

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Norovirus in the News

‘We haven’t had anything like this before’: Norovirus has spread to at least 10 schools in Salt Lake County

Case count in Canadian oyster norovirus outbreak doubles

The case count in a norovirus outbreak traced to oyster farms in British Columbia, Canada, has more than doubled in a week.

Chipotle says sick staffer spread norovirus, causing $1 billion market cap loss

Published: July 26, 2017 8:11 a.m. ET

Norovirus Outbreak Craps Up Track And Field World Championships

A Possible Chink In The Armor Of Satan's Bioweapon: Norovirus
## Norovirus Vaccine Candidates

<table>
<thead>
<tr>
<th>Virus Like Particle (VLP)</th>
<th>Preclinical</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daiichi Sankyo Company, Limited &amp; UMN Pharma Inc., Japan</td>
<td>GII.3, GII.4, rotavirus VP6</td>
<td>Intramuscular Injection</td>
<td>Trials in mice</td>
<td>Takeda Pharmaceutical Company Limited</td>
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<tr>
<td>Chinese Academy of Sciences</td>
<td>GII.4, Enterovirus 71</td>
<td>Intraperitoneal Injection</td>
<td>Trials in mice</td>
<td>Gl.1/GII.4</td>
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<tr>
<td>Arizona State University</td>
<td>GII.4</td>
<td>Intranasal</td>
<td>Trials in mice</td>
<td>Intramuscular injection</td>
</tr>
<tr>
<td>Chinese Centers for Disease Control and Prevention</td>
<td>GII.4</td>
<td>Intranasal</td>
<td>Trials in mice</td>
<td>Trials in children 6 weeks through 8 years of age, adults, the elderly &gt;60 years, and military recruits</td>
</tr>
<tr>
<td>Vaxart, Inc.</td>
<td>GI.1</td>
<td>Oral Pill</td>
<td></td>
<td>Trials in healthy adults</td>
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<tr>
<td>Cincinnati Children's Hospital Medical Center &amp; University of Cincinnati</td>
<td>GII.4, Hepatitis E, Astrovirus</td>
<td>Intranasal</td>
<td>Trials in mice</td>
<td></td>
</tr>
</tbody>
</table>

**Mattison 2018 ERV**
Voluntary clinical laboratory-based surveillance system

Prospectively monitoring respiratory and enteric virus activity in the U.S. since 1989
- Respiratory: respiratory syncytial virus, human parainfluenza viruses 1-4, human metapneumovirus, rhinovirus, respiratory adenoviruses, enterovirus, influenza
- Enteric: rotavirus, enteric adenovirus, norovirus (added in July 2018)

Collects only aggregate weekly number of tests performed and the aggregate number of positive tests detected
- Participating laboratories spend approximately *five minutes* per week to report the required data for this surveillance system
- Can be reported through web-based portal directly by clinical labs or via state health department “pass through”
NREVSS Norovirus Lab Testing Practices Assessment, June 2018

- Targeted 108 NREVSS labs that report rotavirus tests
- Survey Monkey questionnaire assessing:
  - Type of laboratory
  - Type(s) of specimens tested (e.g., respiratory, stool, both)
  - Does lab currently perform testing for norovirus on-site? If so:
    - Year implemented norovirus testing
    - Norovirus test(s) used
    - Reason(s) for performing norovirus test(s)
- Of 108 labs queried, results available for 53 (49%), of which 35 (66%) reported performing on-site testing for norovirus
NREVSS Norovirus Lab Testing Practices Assessment: Lab Types and Specimen Types Tested

**Lab types**
- Community hospital laboratory, 21 (39%)
- Pediatric hospital laboratory, 10 (19%)
- University hospital laboratory, 9 (17%)
- Privately owned hospital laboratory, 8 (15%)
- Reference laboratory, 3 (6%)
- Other, 2 (4%)

**Specimen types tested**
- Respiratory and stool specimens, 42 (79%)
- Stool specimens only, 9 (17%)
- Respiratory specimens only, 1 (2%)
- Missing, 1 (2%)
NREVSS Norovirus Lab Testing Practices Assessment: On-site Norovirus Testing by Lab Type

- Community hospital laboratory
- Pediatric hospital laboratory
- University hospital laboratory
- Privately owned hospital laboratory
- Reference laboratory
- Other

- On-site testing
- No on-site testing

No. of Labs

0 2 4 6 8 10 12 14 16 18 20 22 24 26

N.  

on-site testing 

No on-site testing
NREVSS Norovirus Lab Testing Practices Assessment: Year Labs Began On-site Testing for Norovirus
NREVSS Norovirus Lab Testing Practices Assessment: Assays Used for On-site Norovirus Lab Testing

- **FilmArray™ Gastrointestinal Panel (BioFire/BioMerieux)**
- **Verigene® Enteric Pathogens Test (Nanosphere/Luminex)**
- **PCR assay developed ‘in house’ or a published PCR method**
- **GeneXpert® Xpert Norovirus Test (Cepheid)**
- **xTAG® Gastrointestinal Pathogen Panel (Luminex)**
- **RIDASCREEN**
NREVSS Norovirus Lab Testing Practices Assessment: Reasons for On-site Norovirus Testing

Other reasons specified include: “Included in enteric panel or can be ordered individually;” “When there is a specific request for PCR stool panel;” “As part of a general stool panel or can be ordered specifically.”
Number of labs reporting norovirus tests by week, NREVSS, July 7, 2018 – February 23, 2019
Norovirus prevalence and number of tests conducted by week, NREVSS, July 7, 2018 – February 23, 2019

Norovirus prevalence (%) and Number of tests conducted

Week ending
Location of labs reporting norovirus tests (N=63) by total number of norovirus tests reported (N=56,639), NREVSS, July 7 2018 – February 23, 2019

- 63 labs reported norovirus testing
- States with most reporting labs: WI (15), TX (6), FL (3), MO (3), MT (3), OH (3)
- 56,639 total norovirus tests reported to date
Next Steps

- NREVSS Enhanced: New ELC Funding Opportunity

- Objectives:
  1. Establish and/or increase participation in clinical laboratory reporting of diagnostic testing of sporadic norovirus cases though NREVSS
  2. Collect corresponding demographic and clinical data on patients tested for sporadic norovirus at clinical laboratories
  3. Submit aliquots/residual norovirus-positive stool specimens from clinical laboratories to public health laboratories for genotyping

- Current pilot in 3 states (MN, TN, WI)
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- Sue Gerber

Pilot State Partners (MN, TN, WI)

Participating Clinical Labs

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348
www.cdc.gov/norovirus

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.