Virginia Department of Corrections  
CQI Public Meeting  
11 Feb 2022 at 1:00 P.M.

Join ZoomGov Meeting  
https://www.zoomgov.com/j/1603506539?pwd=WmNYd1AvQzhZdjjZ0YjjDTIYrU1IXUT09  
Meeting ID: 160 350 6539  
Passcode: 880134  
To call in: 646-828-7666  Meeting ID: 1603506539#

Agenda:

I. Call to order – Mark Amonette, MD

II. Roll Call of Committee Members – Mark Amonette, MD

III. Instructions/housekeeping for virtual meeting-Jeffrey Dillman

IV. Old Business/Recap of Last Meeting - Dr. Herrick

V. New Business
   a. Targeted Wastewater Surveillance in Virginia Correctional Facilities-Meghan Mayfield and Robert Tolbert

VI. Public Comment-2 minutes each up to 5 members of the public
   i. in chat box indicate you would like to make a comment
   ii. for others on phone or over 5 members, make comment to healthservicesinquiries@vadoc.virginia.gov and the comment will be made part of the meeting minutes

VII. Actions for next quarter-Dr. Amonette/Dr. Herrick

VIII. Adjournment – Dr. Amonette, MD

Health Services Unit: A healthy body and healthy mind leads to healthy choices.
TARGETED WASTEWATER SURVEILLANCE IN VIRGINIA CORRECTIONAL FACILITIES

As a Complementary Method for Screening of COVID-19

Presenters: Meghan Mayfield & Robert Tolbert
Points for discussion:
Topics and highlights

- Inception
- Benefits
- Challenges
- Implementation
- Partnerships
- Results
Overview of targeted wastewater surveillance at VADOC facilities

To detect SARS-CoV-2 RNA in wastewater samples and use the analytical results to assist the Department in the clinical decision making process regarding COVID PPT testing as well as other diversion methods for containment of infected staff and inmates.

• VADOC saw that HRSD had just completed a 26 week study of COVID wastewater surveillance. [COVID-19 Surveillance in Southeastern Virginia using wastewater-based epidemiology]

• Summer of 2020; confirmation of detection of SARS-CoV-2 RNA in wastewater reported in Australia, China, France, Israel, Italy, Japan, Netherlands, Spain and the US.

• At that time there was no record of using a closed loop wastewater system such as that from a congregate care setting like corrections to run wastewater surveillance for COVID

• VADOC contacted HRSD to begin the testing of our facilities

• We started with 3 assay testing as well as dual composite/grab sample gathering from several locations. After several rounds we found that grab samples at predicted peak flow and N1 assay testing were as accurate as the CDC recommended 3 assay/composite sampling.

• Developed sampling plan and transport plan for 40 facilities, including JSA for employees and detailed individualized sampling plans due to differences in wastewater layouts
Inception

October 2020
Getting the Ball Rolling

- VADOC contacted HRSD to begin the testing of our facilities, November 2020

- We started with 3 assay testing as well as dual composite/grab sample gathering from several locations. After several rounds we found that grab samples as predicted peak flow and N1 assay testing were as accurate as the CDC recommended 3 assay/composite sampling.

- Developed sampling plan and runner plan for 40 facilities, including JSA for employees and detailed individualized sampling plans due to differences in wastewater layouts.

- We had to determine staffing needs and who would be running/delivering the tests to the labs within the required timeframe

- Form a Wastewater COVID team with VADOC Health Services to review results and make clinical decisions
## The Decision Process

The Environmental Team and Health Services has to work very closely together to ensure we have reliable quantitative data from weekly wastewater testing for COVID.

- **Sample wastewater, deliver to lab.** Provide population and WW flow rates to lab.
- **Lab reports both quantitative results and predictive results for number of infected individuals.**
- **VADOC COVID**
  - Wastewater team meets and goes over results.
  - Facility Risk Factor report reviewed, data reviewed for trends or new information.
- **All internal data reviewed** (# existing cases, State and county positivity rate, Staff # cases, etc.) and if data points to new or climbing cases PPT is performed.
- **New wastewater sample pulled during PPT testing and then used to create statistical analysis/correlation.**
Proven Benefits

Non-Invasive Insight
Allows for the monitoring of the health of a large population without having to drill down, saving the Department staffing, time and funding.

Early Warning Signs
In the earliest stages we were only able to look at viral load and then trends for week to week. After getting comfortable with the data and honing the estimated population number infected estimates we were able to spot where we had potential issues at Institutions to make clinical decisions (turned into focused monitoring).

Focused Monitoring
VADOC was able to progress to looking at trends as well as the application of a estimate of cases tool developed by Raul Gonzales from HRSD and further developed with the magnitude of our data paired with clinical testing data.

Cost Effectiveness
VADOC was spending between $60 and $200 per test for monitoring. PPT testing is between $60 and $160 per test.

Safety & Security
Allowed VADOC to continue to meet its mission for safety and security for inmates and staff. VADOC has over 11,000 employees as well as over 23,000 incarcerated inmates; therefore, detecting COVID early in these populations is critical. Many of these inmates are in sensitive populations such as infirmaries, geriatric settings, or dormitory housing where an outbreak of COVID could have serious consequences.
CHALLENGES

Making our Challenges Opportunities
Challenges Faced

Funding
Initially there was no funding source for the testing. We had to heavily pursue partnerships, reduced cost, cost sharing, grant applications, Federal applications, etc.

Staffing
The VADOC and the Infrastructure & Environmental Management Unit, like most State Agencies was feeling the pain of reduced levels of staff, high vacancies, vehicle shortages, as well as time shortages.

Data Comfort & Trust
We had to learn how to trust the data, build internal relationships with Units to trust each other's professional opinions within our core competencies
IMPLEMENTATION

Analyzing Analytical Results to Control Outbreaks
How Lab Results are Used

New Cases
Results may indicate positive unknown cases. This would act as a trigger to possibly initiate Point Prevalence Testing as determined by Health Services

Known Cases
Results are compared against known cases. Large discrepancies may initiate further Point Prevalence Testing

Trending Data
Weekly results can be trended to determine if the number of cases are increasing or decreasing. This provides evidence that the control measures to limit the infection rate are effective at each facility.
Partnerships

Engaging our community and taking advantage of available resources
VADOC as a Collaborate and Innovative Agency

We began using wastewater as a predictive epidemiological tool at a time when this testing was in its infancy and only a few laboratories in the US were able to perform this type of testing. We used the available research and data in collaboration with our data and team to be one of the first locations, as well as one of the first correctional agencies in the United States, to use these data to develop reactionary clinical testing and quarantine requirements.

- **HRSD and Dr. Raul Gonzales** on the wastewater testing, cost sharing, and data exchange. Dr. Gonzales was better able to refine his predictor tool using VADOC data and we had the advantage of being able to directly use the data and predictive number. Initially 20 sites, and then all 40 sites.

- **Virginia Tech** provided initial qualitative testing using research students and their internal laboratory for 20 of our sites.

- **The VDH** provided funding for a short period for the testing at HRSD in exchange for access to data and providing data to CDC for future use and use in studying.

- **The Water Environment Foundation with the CDC** saw that VADOC was completing weekly laboratory testing for COVID surveillance and asked us to participate in a pilot program for the LuminUltra. LuminUltra has simplified the process, resulting in an easy-to-use test that gets you results in hours, with no specialized equipment or lab expertise required.

- **Internal partners** such as the Health Services Unit, Deloitte, Tulane

- **DCLS State laboratory** for transitioning with us from HRSD
LuminUltra Monitor

New technology being tested for accuracy in determining the concentration of the SARS-CoV-2 concentration in wastewater samples. VADOC was chosen to participate in this study with nine other companies in the US. VADOC was the only correctional department chosen.

How Does it Work

The LuminUltra process involves extracting and concentrating the RNA of the COVID virus. Based upon the amount of RNA extracted, the GeneCount software will give a qualitative result of the concentration of RNA genes that were extracted and able to be copied. Qualitative data would then have to be plugged into a trial formula to determine quantitative data which is an estimate of infected individuals. HRSD developed this formula.

Results & Locations

Results are being sent to the WEF and the CDC. Results are also compared against results received from HRSD. Bland, Deerfield, Fluvanna, State Farm, and St. Brides are currently conducting testing with the LuminUltra.
POSITIVE RESULTS

DEFEATING COVID-19

KEY THINGS TO KNOW ABOUT THE CORONAVIRUS

INFRASTRUCTURE & ENVIRONMENTAL MANAGEMENT

THE VIRGINIA DEPARTMENT OF CORRECTIONS

December 2021
### Case Studies / Successes

VADOC has had tangible successes from the surveillance of the wastewater data

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>WW Predicted</th>
<th>PPT Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nottoway</td>
<td>4/27/21</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Red Onion</td>
<td>5/24/21 (first of the UK variant)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Greensville</td>
<td>02/23/21</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>River North</td>
<td>04/05/21</td>
<td>1553</td>
<td>88</td>
</tr>
<tr>
<td>Dillwyn</td>
<td>9/28/21</td>
<td>36</td>
<td>13</td>
</tr>
</tbody>
</table>

The Virginia Department of Corrections, December 2021
Confirmed that wastewater lab results were a predictive indicator of infection rates and a clear early signal of positive cases to be confirmed through PPT testing.

**Statistical Significance**

**Data Validation**

**Sussex II |**

**Simple linear regression results:**

- Dependent Variable: N_test (Copies/100mL)
- Independent Variable: Reported daily cases (day of sample)
- \( \text{N}_\text{test (Copies/100mL)} = -1397.0331 + 1207.781 \text{ Reported daily cases (day of sample)} \)
- Sample size: 45
- R (correlation coefficient) = 0.53968002
- R-sq = 0.29125452
- Estimate of error standard deviation: 41183

**Parameter estimates:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Std. Err.</th>
<th>Alternative</th>
<th>DF</th>
<th>T-Stat</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1397.0331</td>
<td>6542.0507</td>
<td>= 0</td>
<td>43</td>
<td>-0.21354666</td>
<td>0.8319</td>
</tr>
<tr>
<td>Slope</td>
<td>1207.781</td>
<td>287.31797</td>
<td>≠ 0</td>
<td>43</td>
<td>4.203639</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

**Analysis of variance table for regression model:**

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F-stat</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>1</td>
<td>2.99700003e10</td>
<td>2.99700003e10</td>
<td>17.670581</td>
<td>0.0001</td>
</tr>
<tr>
<td>Error</td>
<td>43</td>
<td>7.292968e10</td>
<td>1.6960395e9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>1.028997e11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Correlation of Data**

Confirmed wastewater results were significantly inline with increased cases. Wastewater results showed a clear predictive function and there is a strong justification to use results as a control measure.
Questions?

Contacts
Meghan Mayfield:
meghan.mayfield@vadoc.virginia.gov
757-439-3645

Robert Tolbert
robert.tolbert@vadoc.virginia.gov
804-441-5075