COVID-19 serology at Wadsworth: Meeting public health needs

May 13, 2020

Jill Taylor
Director, Wadsworth Center
NYSDOH
Wadsworth’s role

• Qualification of potential plasma donors
  – New York Blood Center
  – Westchester County
  – Mt Sinai

• Ensuring safety of first responders

• Monitoring exposure in the population

• Understanding the immune response
Assays at Wadsworth

FDA-EUA approved (first generation)
- Total Antibody Microsphere Immunoassay (MIA): venous blood
  - SARS-CoV-1 N antigen
  - SARS-CoV-2 N antigen
  - SARS-CoV-2 RBD antigen

CLEP-approved
- IgG MIA using bloodspots as sample source
  - SARS-CoV-2 N antigen
  - SARS-CoV-2 spike antigen

- Plaque reduction neutralization assay
  - BEI USA-WA1/2020 strain of SARS-CoV-2
  - Vero E6 cells
Reactivity of Human COVID-19 Samples with SARS CoV-1/2 N proteins
Serological assays: Things to consider

- **Specificity**
  - Cross reactivity to other respiratory antigens

- **Sensitivity:**
  - Timing of collection
Relationship between Antibody Levels and Neutralizing Activity

SARS CoV-2 RBD

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<thead>
<tr>
<th>PRNT&lt;sub&gt;50&lt;/sub&gt; Inverse Dilution</th>
<th>MIA MFI</th>
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<tr>
<td>&lt;80</td>
<td>6 SD</td>
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<td>3 SD</td>
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SARS CoV-2 N Protein

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Stringency: How high should we set the bar for a neutralizing antibody response?
Timing: Development of neutralizing antibody response

Days after Onset of Symptoms

Percent High Neutralizers

Normalized antibody levels

- PRNT 50
- PRNT90
- CoV N Antibodies
COVID-19 Antibody Responses in 2 Hospitalized Patients

Patient 83

Patient 76

Days After Onset of Symptoms

Relative Antibody Production

N- IgG

RBD- IgG

N- IgM

RBD- IgM

N- IgA

RBD- IgA
### Seroprevalence studies using blood spot assay at 5/8/20

<table>
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<th>Population</th>
<th>Percent prevalence</th>
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<td>Grocery store random collection:</td>
<td>13.9% to 19.9%</td>
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<tr>
<td>15,883</td>
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<tr>
<td>First responder (FDNY and NYPD):</td>
<td>17.1% &amp; 10.5%</td>
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<td>2268</td>
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<td>Essential state workforce:</td>
<td>14.2%</td>
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<tr>
<td>(includes transit workers) 3927</td>
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<tr>
<td>Health Care Workers</td>
<td>12.2%</td>
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<tr>
<td>5951</td>
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<td><strong>Total:</strong> 28,029</td>
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Governor Cuomo Press Conferences 5/2/20 and 5/9/20
Interpretation of serology assays?

Yes

• Seroprevalence studies
• Evidence of prior infection

More study needed

• Return to work without PPE
• Immune status
Many hands….

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Cherie Koetzner
Anne Walsh
Karen Kulas
Kyle Carson
Mary Marchewka
Kelly Howard
Jennifer Yates
Susan Wong
Jayne Kenneally
Ashley Cukrovany
June Chan
Scott Brunt

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**Columbia**
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Adolfo Firpo-Betancourt
Jeffrey Jhang
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