Infection Prevention in the Covid-19 Era: What to Focus on for the Future

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Disclosures

• No financial and non-financial disclosures
• These ideas are mine alone, not official policy
Three Areas of Focus

1. Surveillance
2. Respiratory protection
3. Teamwork
Surveillance

1. Incorporate molecular diagnostics
2. Build electronic data systems and communicate widely
3. Embrace predictive analytics
NYULH Covid-19 Variant Surveillance

Delta Dominates

- Delta
- Eta/Iota
- Alpha
- Gamma
- Lambda
- Mu
- Other
But regional surveillance is a critical need!

**NYSDOH Pilot Project: Technology and Genomic Microbiology Platform for State-Wide Surveillance and Control of Antimicrobial Resistance**

Molecular testing identifies pathogens of interest.
But regional surveillance is a critical need!

NYSDOH Pilot Project: Technology and Genomic Microbiology Platform for State-Wide Surveillance and Control of Antimicrobial Resistance

DOH identifies clusters and trends

Facility B notified when patient admitted with pathogen of interest isolated at Facility A or C
Covid-19 Hospitalizations Remain Low
Covid-19 Rate by Patient Zip Code

Over past 7 days:
• Rate per 10,000 NYU Patients over past 7 days
• Number of patients with acute infection

As of October 14, 2021
Covid-19 Rate by Patient Zip Code

# of patients with low Covid-19 PCR cycle threshold

- 1
- 2-3

Covid-19 rate/10,000 patients

- 0
- 1
- 2-3
- 4-6
- 7-10
- 11+

As of October 14, 2021
Predict the future?

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Using Machine Learning and the Electronic Health Record to Predict Complicated *Clostridium difficile* Infection

Benjamin Y. Li, Joeeh Oh, Vincent B. Young, Krishna Rao, and Joanna Winn

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Respiratory Protection

1. Question the dogma: airborne vs droplet
2. Can we get to a simple and safe approach?
3. Personal Protective Equipment training: our new annual health assessment
Epidemiologic triangle

Pathogen

Host

Environment
Appendix A: updates in September 2018

<table>
<thead>
<tr>
<th>Respiratory virus</th>
<th>Isolation Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenovirus</td>
<td>Droplet+Contact</td>
</tr>
<tr>
<td>Coronavirus (not Covid-19, SARS, MERS)</td>
<td>Standard</td>
</tr>
<tr>
<td>Covid-19, SARS, MERS</td>
<td>Airborne+Contact</td>
</tr>
<tr>
<td>Enterovirus</td>
<td>Standard</td>
</tr>
<tr>
<td>Human metapneumovirus</td>
<td>Contact</td>
</tr>
<tr>
<td>Parainfluenza</td>
<td>Contact (kids)</td>
</tr>
<tr>
<td>Pathogenic or novel influenza</td>
<td>Airborne</td>
</tr>
<tr>
<td>Rhinovirus</td>
<td>Droplet</td>
</tr>
<tr>
<td>RSV</td>
<td>Contact (kids, immunocompromised adults)</td>
</tr>
<tr>
<td>Seasonal influenza</td>
<td>Droplet</td>
</tr>
<tr>
<td>Pneumonia, viral, adults, not covered elsewhere</td>
<td>Standard</td>
</tr>
</tbody>
</table>
Exposure to Influenza Virus Aerosols During Routine Patient Care

Bischoff et al, JID, 2013
Measurements of Airborne Influenza Virus in Aerosol Particles from Human Coughs

Viral Particle copies per cough

Patient

Lindsley et al, PLOSone, 2010
Particle size, µm
Anatomical deposition site

M. tuberculosis

Cystic fibrosis, P. aeruginosa

Fennelly, Lancet Resp Med, 2020
What is an aerosol generating procedure?

VII. Aerosol Generating Procedures and Environmental Controls

1. Aerosol generating procedures.
   a. The CDC definition of an aerosol generating procedures is:
      i. Endotracheal intubation or extubation
      ii. Non-invasive and manual ventilation such as BiPAP, CPAP or bag valve mask ventilation
      iii. CPR
      iv. Bronchoscopy
      v. Sputum induction
      vi. Open suctioning of airways
   b. The NYULH definition of an aerosol generating procedure includes those defined by the CDC plus the following:
      i. Administration of nebulized medication not in closed respiratory circuits
      ii. High flow oxygen delivery
      iii. Tracheostomy collar oxygen delivery
      iv. Oral, airway and sinus surgery
      v. Dental cleaning
      vi. Pulmonary function testing or spirometry
      vii. Nasopharyngeal and upper GI endoscopy
      viii. Activities when a patient not consistently wearing a face mask is breathing heavily or coughing, such as:
         1. Exercise stress testing
         2. Cardiac rehabilitation therapy
         3. Metabolic testing
         4. Swallow studies
Can we get to a simple and safe approach to respiratory protection?

Assumptions:

- Aerosol generation by patients is variable, but “superspreading” occurs and may include particles <5 μm in size
- The full spectrum of aerosol generating procedures is unknown
- The epidemiologic triangle can help us determine risk:
  - Is the microbe pathogenic?
  - Is the host at risk?
  - Is the environment promoting transmission?
Can we get to a simple and safe approach to respiratory protection?

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If the answer is yes:

- Perhaps the simplest and safest approach is respirators (not masks) for PPE
- Respirator (and PPE) training should be a key annual health assessment
Teamwork

The IDEAL TEAM PLAYER

HOW TO RECOGNIZE AND CULTIVATE THE THREE ESSENTIAL VIRTUES

A LEADERSHIP FABLE

PATRICK LENCIONI

Patrick Lencioni
Teamwork

1. Humble
   - Be confident of our abilities and expertise
   - Define success collectively
   - Applaud colleagues
**Teamwork**

1. **Humble**
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2. **Hungry**
   - Look for more to learn
   - Assume more responsibility
   - Think about the next step
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3. Smart
   - Have good “common sense” about people
   - Understand group dynamics
   - Listen and ask good questions
Thank you!