Protecting the U.S. Workforce from Aerosol Transmissible Infectious Disease Outbreaks with High Public Health Consequences: A Control Banding Approach

Lisa M Brosseau, ScD, CIH
Professor (retired)
Margaret Sietsema, Lew Radonovich, Frank J. Hearl, Edward M. Fisher, Lisa M. Brosseau, Ronald E. Shaffer and Lisa M. Koonin

"A control banding framework for protecting the US workforce from aerosol transmissible infectious disease outbreaks with high public health consequences."

Background

• Previous outbreaks and pandemics highlighted the importance of protecting many different types of jobs – not just healthcare

• Demand for respiratory protection will far exceed supply

GOAL: Classify jobs into “Control Bands” to prioritize PPE for highest risk categories
Categorizing Risk

Risk

- $\approx (\text{toxicity})(\text{exposure level})$

Toxicity

- Most relevant quantitative health outcome is the infectious dose (number of organisms required to induce infection)
  - Usually not known until well after
  - Use Risk Group as surrogate
Risk Group Definitions*

- **Risk Group R1** - Agents not associated with disease in healthy adult humans
- **Risk Group R2** - Agents associated with human disease that is rarely serious and for which preventive or therapeutic interventions are often available
- **Risk Group R3** - Agents associated with serious or lethal human disease for which preventive or therapeutic interventions may be available
- **Risk Group R4** - Agents likely to cause serious or lethal human disease for which preventive or therapeutic interventions are not usually available

Accounts for both the degree of harm and the availability of prophylaxis:  [https://my.absa.org/Riskgroups](https://my.absa.org/Riskgroups)

*Modified from NIH*
Exposure = Likelihood \times Duration

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Daily Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D1 (0-3 hours)</td>
</tr>
<tr>
<td>L1 (Unlikely Exposure)</td>
<td>E1</td>
</tr>
<tr>
<td>L2 (Possible Exposure)</td>
<td>E2</td>
</tr>
<tr>
<td>L3 (Likely Exposure)</td>
<td>E2</td>
</tr>
</tbody>
</table>
## Control Band

<table>
<thead>
<tr>
<th>Exposure Rank</th>
<th>Risk Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R1</td>
</tr>
<tr>
<td><strong>E1</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>E2</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>E3</strong></td>
<td>A</td>
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</tbody>
</table>
Aim to Lower Exposure Level

Risk = (toxicity)(exposure level)

Can not change risk (inherent to organism)

Must reduce exposure level to reduce risk
Control Methods

FIRST - Source Controls
• isolation, social distancing

NEXT - Pathway Controls
• ventilation, barriers

LAST - Receptor Controls
• personal protective equipment
## Aim to Lower Exposure Level

**GOAL:**
Reduce exposure to E1 levels by selecting additional control strategies from the source and pathway categories and reducing reliance on PPE

<table>
<thead>
<tr>
<th>Band</th>
<th>Control Options</th>
</tr>
</thead>
</table>
| A    | Source – Do these first!  
      | Pathway – May be prudent  
      | Receptor – Not necessary |
| B    | Source – Do these first!  May require multiple options  
      | Pathway – Do these next & may require multiple options  
      | Receptor – Only if source and pathway controls are not effective |
| C    | Source – Do these first!  May require multiple options  
      | Pathway – Do these next & may require multiple options  
      | Receptor - May be prudent |