coronavirus
Managing COVID-19 in Facilities

Presented By

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Agenda

- Background
- Coronavirus & COVID-19?
- Transmission of COVID-19
- Environmental Management
- Considerations/Next Steps
- Questions & Answers

Source: World Health Organization
Background

- Founded in 1984
- 3 Specialized Divisions
  - Building Sciences, EDLab, Building Remediation
- 600 Million+ Square Feet of Experience
  - 10,000+ Buildings Serviced
  - Government, Education, Healthcare, Commercial
- Industry Standard Certifications & Affiliations
- Cooperative Contracts, GSA Contract
Coronavirus & COVID-19?

- Coronavirus = Type of Virus
- Spherical or Pleomorphic Envelope
- Looks Like a Crown (Latin = Corona)
- Contains Single-Stranded RNA
- Zoonotic in Nature (from animals)
- 2019-nCoV-2 = Current Strain
- COVID-19 = Disease by 2019-nCoV-2

Source: Wikimedia Commons
How is it Transmitted?

- **Person to Person, Within 6 Ft**
- **Aerosol/Airborne**
  - Respiratory Droplets from Coughs or Sneezes
  - Genetic Material or Virion*
- **Non-Airborne Transmission**
  - Contact With Contaminated Surfaces/Objects
  - Hand to Face Contact

*Source: Nature Medicine volume 18, pages 1468–1470 (2012)*

*Santarpia, et al: medRxiv 2020*
COVID-19 Spread Prevention

- Increase Personal Hygiene
- Adopt Solitude
  - Social Distancing
  - Quarantine
  - Isolation
- Self Defense
  - Personal Protection Equipment
- Manage Anxiety & Stress
Environmental Concerns

- High Touch Surfaces/Objects
- Surface Viability
  - Up to 9 days*
- HVAC & Air Conveyance System**
- Underlying Building & IAQ Issues
  - Temperature & Relative Humidity
  - Airflow & Pressurization
  - Particulates, Other

**Santarpia, et al: medRxiv 2020
Importance of Relative Humidity

  - 50% RH Influenza virus loses virulence
  - 55% RH lethal to *Pneumococcus* Bacteria (Pneumonia)

- Microbiomes of the Built Environment
  - 50% RH kills 100% of airborne Influenza within 24 hours

- RH has a greater effect on viral inactivation*

Importance of Relative Humidity

Optimum Range to Minimize Contaminants

- Bacteria
- Viruses
- Fungi
- Mites
- Respiratory Infections
- Allergic Rhinitis & Asthma
- Chemical Interactions
- Ozone Productions

Percent of Relative Humidity

Decrease = Reduced Impact

Optimum Zone
Environmental Management

FIND | FOCUS | FIX

- Building Hygiene & Performance
- Planning & Important Data
- Cleanliness Verification
- Disinfectants for Emerging Pathogens (DEP)
- Engineered Multi-Level Approach
  - PURE-Decon
    - Intensive Topical Cleaning
  - PURE-Steam
  - PURE-Duct
Building Hygiene & Performance

Common Conditions Observed in HVAC Systems
Planning & Important Data

- Scenario or Situation Briefing
- Proactive or Reactive?
- Building Use, Age & Condition
- Total & Situational Square Footage
- Approximate Number of Occupants
- HVAC System Schedule, Including Ductwork
- Stakeholder, Point(s) of Contact Information
Cleanliness Verification

- **2020-Ec Vb-1 (Surface Cleanliness Verification)**
  - Rapid Protein Detection (RPD)
  - Biological Indicator Molecules (BIM)
  - Microbiological Contact Plate M-CCO (Fungi)
  - Microbiological Contact Plate B-CCO (Bacteria)

- **2020-Ec Vb-2 (Air Cleanliness Verification)**
  - Bioaerosol-M-CCO
  - Bioaerosol-B-CCO
  - Spore Trap
Disinfectants for Emerging Pathogens

- EPA Emerging Pathogen Policy, Application Fast Track & Registration
- Organisms & Disinfectant Efficacy
- Current Demand & Supply Chain
- Specific Applications
  - Electrostatic Spray
  - Topical Cleaning
  - Ductwork
  - Evaporator Coils
## Disinfectants for Emerging Pathogens

### Most Susceptible to Disinfectants

<table>
<thead>
<tr>
<th>ENVELOPED VIRUSES</th>
<th>BACTERIA</th>
<th>FUNGI</th>
<th>NON-ENVELOPED VIRUSES</th>
<th>SPORES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV type 1 (HIV-1)</td>
<td>Pseudomonas aeruginosa</td>
<td>Trichophyton mentagrophytes</td>
<td>Norovirus</td>
<td>Clostridium difficile spores</td>
</tr>
<tr>
<td>Influenza A (Hong Kong)</td>
<td>Staphylococcus aureus</td>
<td></td>
<td>Rhinovirus type 37</td>
<td></td>
</tr>
<tr>
<td>Avian Influenza A (HSN1)</td>
<td>Staphylococcus aureus (MRSA)</td>
<td></td>
<td>Minute Virus of Mice</td>
<td></td>
</tr>
<tr>
<td>Swine Influenza A (H1N1)</td>
<td>Escherichia coli</td>
<td></td>
<td>Feline Calicivirus</td>
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<tr>
<td>Coronaviruses</td>
<td>Salmonella enterica</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Proteus mirabilis</td>
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<tr>
<td></td>
<td>Enterobacter aerogenes</td>
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</tr>
</tbody>
</table>

### Most Resistant to Disinfectants

- Norovirus
- Rhinovirus type 37
- Minute Virus of Mice
- Feline Calicivirus

**NOTE:** Since SARS CoV-2 is a novel (new) virus, DEPs efficacy testing and results are currently ongoing. However, it is still an enveloped Coronavirus and is expected to be as susceptible to disinfection as other strains.
PURE-Decon Hand-Held

- Proactive, Routine
- Agile, Tactical Method
- Portable Electrostatic Sprayer
- EPA Registered DEP
- Focused on High Touch Surfaces
- No Harmful Byproducts After Use
PURE-Decon Indoor Environment

- Containment Set-up Protocols
- Portable Electrostatic Sprayer/Mister
- EPA Registered DEP
- Treatment of Enclosed Space
- Disinfects Anywhere Mist Permeates
  - Hard to Reach Surfaces
- No Harmful Byproducts After Use
How It Works: Electrostatic Spray

Uses an air compressor for quiet, powerful liquid flow

An electrode introduces an attractive charge and atomizes the solution. The particles are both attracted to and uniformly coat surface.

Charged particles are attracted to surfaces. Solution reaches and wraps around surfaces.

FORCE STRONGER THAN GRAVITY

Each surface is uniformly coated with solution.
PURE-Steam HVAC/Coil Cleaning

- Detailed Spec: 14 Point Checklist
- Eco-Friendly, Green Clean Institute
- Steam at up to 350° F, 176° C
- Improves Hygiene & Performance
- Reporting: M&V Testing, Data, Photos
PURE-Steam HVAC/Coil Cleaning

Before

After
PURE-Duct Cleaning

- Containment Set-up Protocols
- No Cross Contamination
- Particulate Monitoring
- Mechanical Experience: Access
- NADCA & VSMR Certified
- Reporting: Testing Data & Photo Log
PURE-Duct Cleaning

Before

After
Engineered Multi-Level Approach

<table>
<thead>
<tr>
<th>Levels Build on Previous Levels</th>
<th>Components Added/Subtracted Based on Project Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL I: Tactical electrostatic spraying, high touch areas + HVAC grills</td>
<td></td>
</tr>
<tr>
<td>LEVEL II + LI: spraying the ducts + steam cleaning AHU &amp; coils</td>
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<tr>
<td>LEVEL III + LII: HVAC cleaning + terminal boxes + basic topical cleaning</td>
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<tr>
<td>LEVEL IV + LIII: HVAC cleaning + more thorough topical cleaning (computers, décor, books, etc.)</td>
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</tr>
<tr>
<td>LEVEL V + LIV: HVAC cleaning + most thorough topical cleaning (kitchens, toilets, showers, etc.)</td>
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NOTE: Work Orders/Project Specifications will contain full scope of work.
Considerations/Next Steps

- GSA: Simplified Acquisition Procedure (SAP), up to $250k no Bid
- Stafford Act (sec. 502) & FEMA
- Cooperative Purchasing, Start Now!
- Current COVID-19 Related Issues?
- Plans Relative to Our Services?
- Referral Other Stakeholders
- Site Visit to Look at Specific Need(s)
Questions & Answers

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