Risk Assessment Elements

**Pre-flight**
- Known passenger?
- Outbreak status in the departure country/region
- Health questionnaire
- Temp screening
- Testing
- Immunity passports
- Crew health initiatives

**In Flight**
- Number of guests
- Use of face coverings
- Meal service

**At Destination**
- Aircraft cleaning / disinfection
Disinfection / Cleaning Strategies

- Technical approach
  - Risk stratification determines the level of response: from cleaning to deep disinfection
  - Risk reduction with pre-flight, in-flight and post-flight elements
  - Crew health surveillance

- Perception approach
  - Communication
  - Visibility
Understand the Tools to Provide a Solution

- **SPORICIDE**
  - "< 0 organisms"
- **DISINFECTANT**
  - "Clean significant reduction"
- **SANITIZER**
  - "Looks clean/some reduction"

- Manual Clean
- Dwell Time
- Sticky Residues
Log Reduction = Risk Reduction

Levels of Disinfection Difficulty

- **Extremely Hard to kill**
  - Prions
  - Bacterial Spores: C. difficile, C. botulinum, Staphylococcus aureus, Bacillus anthracis, Bacillus cereus
  - Mycobacteria: M. tuberculosis, M. avium
  - Viruses without envelopes: Norovirus, Rotavirus, Rhabdovirus, Parvovirus, Papillomavirus, Herpes Simplex, Adenovirus
  - Fungi includes fungal spores: Aspergillus fumigatus, A. flavus, A. niger, Candida albicans
  - Gram negative bacteria: Pseudomonas, Acinetobacter, Klebsiella, E. coli, Enterobacter, Legionella
  - Gram positive bacteria: Staphylococcus, Enterococcus, Streptococcus, Clostridium, vegetative rods
  - Influenza: H5N1, H7N9, HIV, RSV, Coronavirus
  - CMV, HSV, Measles, Mumps, Rubella, VZV (Varicella-Zoster) Shingles, Chickenpox

- **Easy to kill**
  - Hep A: 5-100 virus CFU ID
  - Measles: 1-100 virus CFU ID
  - Norovirus: 10-100 CFU ID
  - S-23 ID enveloped viruses

*CFU ID: Colony-forming units in a minimum infectious dose of specified pathogen.
The Residue Conundrum

Is it Safe?

Is it Corrosive?
Liability release: Prove your efforts 99.9999%

- Reduce Liability
- Create Confidence
- Enable Safety of Workplace & Space

FDA and EPA Reliable method of testing:
Geobacillus Stearothermophilus – bacterial spore
99.9999% (six log reduction coupon)
Complete decontamination: 6 log reduction & proof with each cycle

Decontaminate...
- Aircraft and its contents
- In the presence of soil load
- Under obstacles
- No Residues
NBAA News Hour: Sanitizing Your Business Aircraft During COVID-19, Part 2

Stewart D'Leon, Moderator
Director, Technical Operations
National Business Aviation Association (NBAA)

Dr. Paulo Alves
Global Director Aviation Health
MedAire

Frances M. Gristead
CEO, CURIS® System
Founder, Pathogend Services

Greg Hamelink
Sr. Manager Flight Operations & Maintenance
Stryker Corp.

Chris Schultheis, M.S.
President
Midwest Pathogend Services

Nathan Winkle
Founder and President
Thoroughbred Aviation, LLC