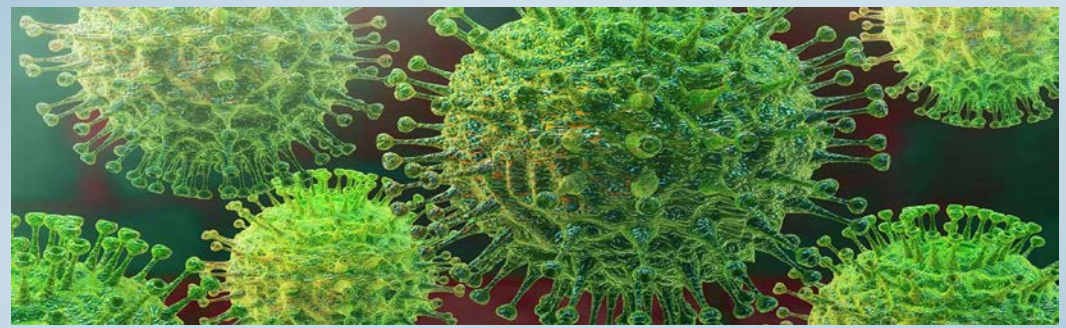
Charles P. Gerba
Department of Environmental Science

THE UNIVERSITY OF ARIZONA
WEST CENTER
WATER & ENERGY SUSTAINABLE TECHNOLOGY

Life in the 21st Century

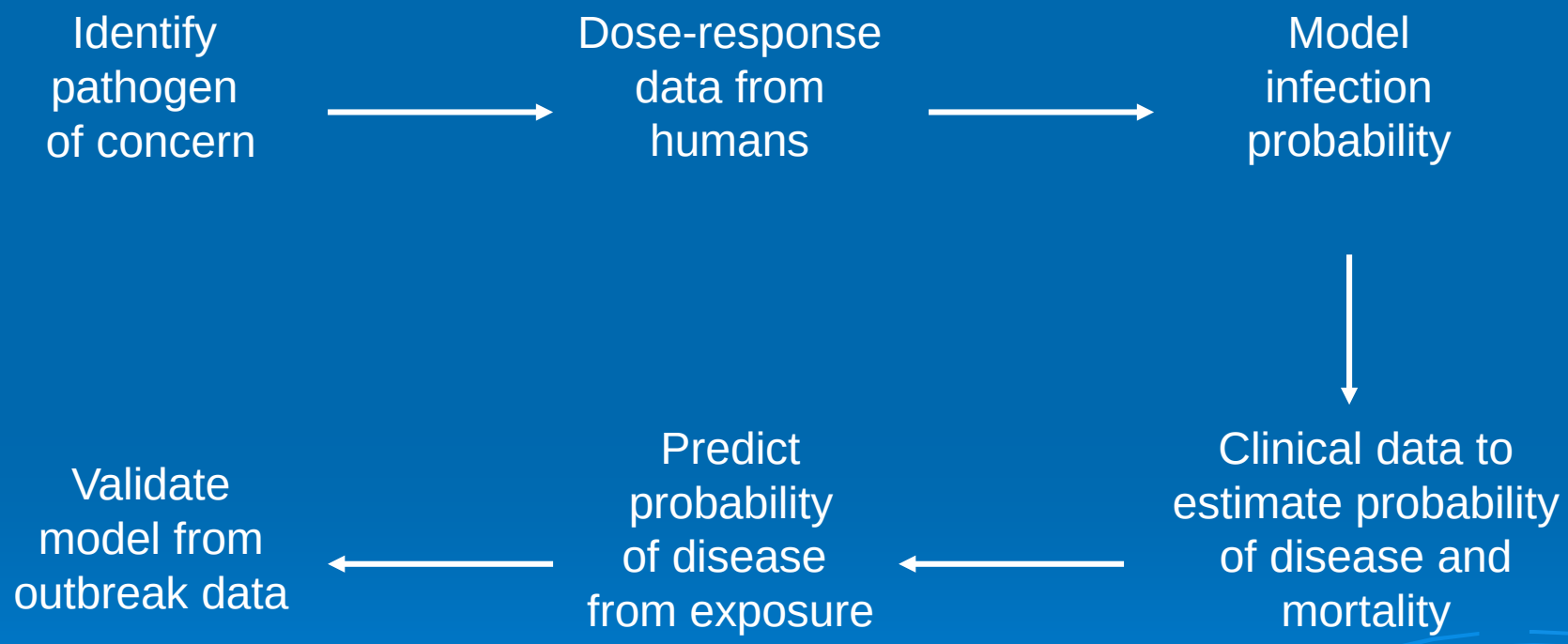
- We share more common surfaces (fomites) with more different people than ever before in history
- As a result, we share more germs with more people than at any time in history
- The “perfect storm” for transmission of CoVid-19



Quantitative Microbial Risk Assessment is an approach that allows the expression of risks in a quantitative fashion in terms of infection, illness, or mortality from microbial pathogens

*Allows us to quantify the impact of infections from environmental interventions on diease transmission

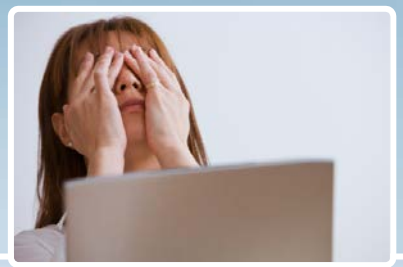
Quantitative Microbial Risk Assessment



In office building 50% of the fomites and hands of employees within 4 hours with be contaminated if a person enters with a viral infection

Pathogen falls on fomites e.g. phone, computer

Person picks up pathogen through contaminated fomite



Person touches nose or eyes with contaminated fingers and becomes infected with pathogen

Sick person sneezes, coughs and pathogens fall on fomite or get aerosolized

Studies on transfer of Coronavirus (229E) from surfaces to fingers

- For use in quantitative microbial risk assessment
- No previous data on finger transfer of enveloped viruses
  - Laminate 6.5%
  - Glass 4%
  - Glazed Porcelain 49%
  - Formica 26%

Developing a “Toolbox” of environmental interventions

Persistent quats

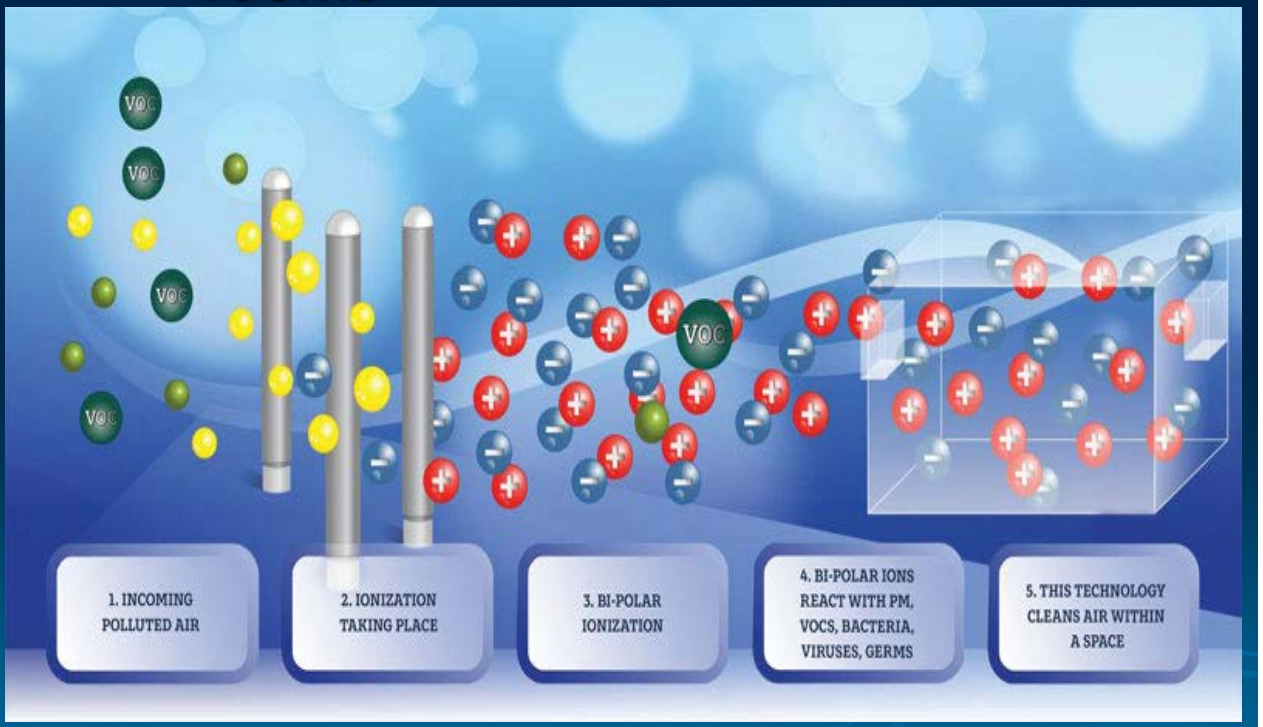
Anti-viral Polymeric Silinated Quats – last from 48 hrs to 90 days

Coatings and paints

Anti-viral copper containing paints

Developing a "Toolbox" of environmental interventions for Aerosols

- Bi-polar ionization can be used to disinfect air when people in the rooms
- 254 vs 222 nm
- 222 nm can be used with people in the room



Bi-polar Ionization

UV light

Studies on thermal disinfection of SARS-CoV-2 on different surfaces – How do you inactivate SARS-CoV2 in a Flight Deck ?

- Greater inactivation on metal surfaces vs plastic
- Greater inactivation at 50-60% RH than at <20% RH
- Temperatures of 40 to 55 C for 1 to 2 hours