PPE & COVID-19



TAREK HAYAT, MANAGING DIRECTOR

COVID 19 Breaking the Chain

The PPE Challenge in sub zero environments



Tarek Hayat MBA RN Managing Director Goldfreeze Ltd A&E Nurse Specialist tarek@goldfreeze.co.uk



A



Key Exploration Areas

What is the hazard we need PPE for?

Developing & adapting procedures and guidance



Monitoring and interventions



PPE solutions



The Chain of Infection



Systemic Effect of COVID

Lĭ

- Heart Clearly defined
- Black intercostal spatial definition
- Diaphragm obvious and equal on both side

Community Acquired Pneumonia

- Image more opaque
- Lower lobe inflammation/consolidation (red circle) can be single or bilateral
- Reduced lung capacity
- Increased respiratory effort
- Person is very unwell, weak, requires IV antibiotics and oxygen therapy



Severe COVID infection – Healthy Male



COVID – The Infection with no rules

- Profuse & acute inflammation of both lungs
- Significant reduction in lung capacity
- High respiratory effort
- High oxygen demand
- Reduced organ oxygenation
- Long-term scaring and fibrosis of lung tissue if survived
- Multi organ damage Heart, Kidneys
- Effects of 'Long COVID'



Procedures, Guidance & Monitoring





Unique Challenge of COVID to the Cold Chain

Growing Evidence That COVID thrives in the cold

- 1. The virus hangs in dry air longer
- 2. Cold air helps a virus remain active and able to infect
- 3. Cold air reduces our systemic ability to resist pathogens
- 4. Proximity transmission is higher in an enclosed cold area

Furness, C (2020), University of Toronto



Unique Challenges of the Cold Chain Face coverings problematic due to moisture build up

Use of face shields impractical due to condensation

Hand washing and sanitisation not possible in gloved hands

Build-up of moisture on the surface of cold store clothing

Close proximity of work in food processing & manufacture at chill temperatures

Longer dissipation time of airborne droplets in cold air

Traditional sharing of cold store ppe

Ventilation challenge in coldstore

PPE Risk Reduction

Respiratory transmission

Use of face coverings. How? Moisture build-up and freezing problematic

Use of distance – Essential

Early detection of raised body temperature – use of thermal equipment

Awareness of atmospheric droplets from breathing/talking

Development inherent antiviral fabrics and treatments eg Viraloff

Development of cold store respiratory solutions - forced air not an option due to battery failure in the cold

Discussions with the BAS over their breathing solutions in Antarctica

COVID benefits from physics in the cold (vapour-liquidice) – Protection therefore requires creative solutions



PPE Risk Reduction

Moisture Management (Disinfection) •

Disinfection of clothing - drying cabinets, ionization devices or ozone, cold plasma, UV light - washing/dry cleaning

Disinfection of rest areas where colleagues remain in PPE

Colleagues to change out of Coldstore PPE when visiting other site areas

Touch Transmission

PPE not to be shared

Storage of PPE in colleague lockers

Hand hygiene outside the cold store

Infection Control culture

Feedback from cold chain colleagues indicates a high degree of success in COVID risk management.



PPE Future Development

• Process Automation

Personal

Anti viral fabrics & material treatments eg Viraloff Respiratory solutions – key area of research Vaccines

Environmental

PPE management & storage Ventilation COVID Colleague Risk Assessment Business process development

• Technological

Use of disinfection technology – eg UV lighting on entry and exit to cold environments Smarter clothing eg Internal temperature sensors PPE to develop as part of an industry wide solution – combination of textiles and tech





• COVID has no rules

Summary

- It thrives in cold environments
 For cold temperature PPE, COVID uses the laws of physics against us solid/liquid/gas
- It is a unique challenge
- Cold chain colleagues are managing remarkably well
- PPE in the future will require a more technical and solution focused approach
- More research needs to be done on the effects of COVID on cold store colleagues





Any Questions?

www.goldfreeze.com