



Using our brains to save and improve the lives of workers

Evaluating the Protection Offered by Surgical Masks against Influenza Bioaerosols



The Client

Health and Safety Executive.

The Problem

The UK is preparing for a potential pandemic of influenza. The main route of transmission of influenza virus is believed to be via direct contact with large droplets from the nose and throat of an infected person generated during coughing and sneezing. The relative importance of small infectious droplets that are breathed in (respiratory aerosols) to influenza transmission is considered to be minor, but it cannot be ruled out. The current UK Pandemic Influenza Infection Control Guidance recommends that procedures likely to generate aerosols should be minimised or, where unavoidable, health care workers should wear appropriate respiratory protection. Health care workers who are in close contact with patients should wear surgical masks to reduce exposure to large droplets.



The use of surgical masks by health care workers is standard practice to limit the spread of disease during outbreaks of seasonal influenza. However, surgical masks are intended to protect the patient from the wearer. In recent years, surgical masks have been advocated for use as a protective barrier to protect the wearer, but they are not intended to provide protection against infectious aerosols. Work undertaken by HSL aimed to evaluate the relative levels of protection provided by both surgical masks and respirators against aerosols.

What we did

This study focussed on the effectiveness of surgical masks against a range of airborne particles. We used separate tests to measure the reduction in levels of inert particles and live aerosolised influenza virus mitigated by surgical masks and properly fitted respirators.

Outcome/Benefits

- Live viruses could be detected in the air behind all surgical masks tested.
- Surgical masks on average provide around a 6-fold reduction in exposure to live aerosolised virus.
- The level of protection provided varied depending on the design and construction of the mask and many of the surgical masks on the NHS logistics list that we tested offered considerably less protection than this.
- By contrast, properly fitted respirators could provide at least a 100-fold reduction.

This work will assist those responsible for undertaking national risk assessments for pandemic influenza outbreaks to better and more cost effectively equip and protect front-line medical staff when dealing with such an outbreak.