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Novel Devices to Control Infection

Occupational hygienists at the Hong Kong University of Science and Technology (HKUST) have developed a range of mobile infection control devices for use in hospitals and ambulances, that will serve to protect medical and health professionals against the spread of respiratory infectious diseases such as SARS.

These novel innovations include an **Infection Control at Source (ICAS)** device. This is a negative pressure unit capable of capturing the bioaerosols generated by patients, thereby reducing the risk of medical professionals being infected while conducting hazardous procedures such as intubation, bronchoscopy and tracheotomy. The unit consists of a capture hood placed right over the patient's head and a glove port through which doctors access the nose and mouth of the patient. Contaminated exhaust air is disinfected and micro-organism-free air released back into the ward.



ICAS device

Another innovation, the **Isotent**, is ideal for single-bed isolation or medical procedures for individual patients. It contains and extracts any bioaerosols generated by the patient inside the tent. A miniaturized version of the isotent, the **Mini-isotent**, has also been designed for use in ambulances protecting paramedical professionals from possible infections while resuscitating and transporting patients who present the symptoms of respiratory illness.



Isotent

Other infection control prototypes include an **Isohood**, a portable hood that fits over the patient's head to confine and extract bioaerosols emitted, ideal for use in lifts or within buildings while transporting patients; and a **Hood Adapter**, essentially transforming a Powered Air Purifying Respirator (PAPR) hood into an airline respirator by connecting it to the hospital compressed air system via a hose and specially designed adapter. This provides a safe and reliable supply of air for medical professionals as they perform stationary and emergency procedures.



Mini-isotent

"All of these devices are portable, easy to use and maintain, and do not require facility modifications, thereby providing cost-effective solutions to infection control in wards and ambulances. They are all designed to confine biological hazards at the source, which is the most effective way to control the spread of infectious diseases," said Dr Joseph Kwan, Director of HKUST's Safety and Environmental Protection Office, who is coordinating efforts on the research project.

The devices have been developed with the professional advice from the medical sector. The respiratory physician and infection control team from Haven of Hope Hospital and Tseung Kwan O Hospital have provided input to test the clinical application of some of the devices in high risk procedures like cardiopulmonary resuscitation and bronchoscopy, while the Fire Services



Isohood

Department has evaluated the use of Mini-isotent in ambulances. Dr Kwan's team of biological hazard control specialists will further modify the devices where possible to better meet the needs of various clinical procedures. Large-scale production is also being considered.



Hood Adapter