A new weapon against hospital bugs

Poor hand hygiene is a key factor in the high incidence of serious hospital acquired infections such as the MRSA 'superbug'. Eureka project E! 2997 Hand Sanitising is developing a novel hand cleansing system which promises a means of infection control that is highly effective, more convenient to use and less damaging to the skin than existing procedures.

Infection control is a major concern in the hospital environment where patients by definition are exceptionally vulnerable to increasingly antibiotic-resistant strains of bacteria such as the methicillin-resistant Staphylococcus aureus bacterium, commonly known as MRSA, and viruses like the Noro virus which causes so-called winter vomiting disease. About 300,000 patients a year contract a serious hospital-acquired infection in the UK – 5,000 of them fatally – at an estimated cost to the National Health Service of more than £1 billion.

Inadequate hand hygiene is known to be a major factor in transferring harmful microbes from staff to patients. Hand washing procedures currently used in hospitals include soap and water, alcohol rubs and surgical scrubs. However, hand washing and scrubbing being time-consuming and therefore inconvenient, busy staff often don't disinfect their hands as regularly as infection control protocol dictates, while the chemicals in surgical scrub solutions are often harmful to their skin. Alcohol rubs, while very effective against bacteria, can be harmful to the skin and ineffective against Noro virus.

These potentially life-threatening infections are not just a problem for hospitals, but in any environment where food and beverages are prepared and served, including manufacturing, retail outlets, bars and restaurants, passenger ships and aircraft.

Novel system

The three partners of Eureka project E! 2997 Hand Sanitising have combined their extensive experience in the healthcare and related industries to develop a novel, non-alcohol system. They claim it will reduce the time it takes to disinfect hands by up to 75 percent and uses an innovative disinfectant formulation that's considerably less harmful to the skin. The project's Norwegian lead partner, Mainsani AS, and Danish company Aks Teknik A/S are responsible for the design and development of the wall-mounted dispensing system, which sprays antimicrobial liquid onto the hands without any need to touch and contaminate the dispenser.

The Scandinavian partners approached UK company NewGenn Research Limited to develop and supply the formula for the antimicrobial liquid. Based near Bury St Edmunds, NewGenn Research specialises in developing and manufacturing new generation alcohol-free antimicrobial products and the development process has been supported by £500,000 funding from the DTI. 'Alcohol rubs are the norm in hospitals and can be effective,' says

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> **Dr Harley Farmer**
> NewGenn Research Limited

Technical Director Dr Harley Farmer, 'but it's not a good idea to use flammable solvents near patients, especially if they are experiencing respiratory distress.'

Dr Farmer believes that the infection control procedures employed by UK hospitals are, unwittingly, geared towards causing contamination and that a more holistic approach is needed to reduce the incidence of hospital-acquired infections. 'Healthcare-associated infections are caused by a multitude of factors, so a single product like a hand rub, regardless of its contents, will not break the infection cycle on its own. It requires a full range of products which are designed to work together – high level disinfectants for cleaning floors, beds and cabinets, multi-purpose wet wipes and ready-to-use trigger sprays and personal cleansers for the patients themselves.' Product compatibility is crucial where cleaning is followed by disinfection – if incompatible products are used to clean medical equipment, for example, the disinfectant can become de-activated.

The Hand Sanitising system should prove a vital new weapon in the fight against hospital infections. Natural plant oil constitutes the basis of NewGenn's non-alcohol antimicrobial liquid. Detergent and acidity modifiers are added to the oil's molecules, which are then given a positive charge. When the positively charged detergent molecule attaches itself to the negatively charged bacteria, a reaction occurs and the detergent kills the bacteria by dissolving them from the outside in. The NewGenn solution is equally effective at dissolving and killing fungi, yeasts and membrane-bound viruses such as Herpes, Hepatitis B and C and Sars. Smaller Noro-like viruses, however, have a tough outer coat made of tightly coiled proteins held together by ionic forces. The acidity modifiers in the solution inactivate the ionic forces, causing the coiled proteins to separate enough to let the detergent molecule into the virus, where it dissolves the virus from the inside out in seconds, rendering it non-infectious.

Excellent potential

With 100,000 or more hospitals in the western world alone, the commercial potential for project Hand Sanitising is excellent. First, though, Dr Farmer has to overcome the medical establishment's preference for alcohol-based cleaning products and encourage it to adopt as best practice the company's 'systems-based' approach to using compatible products, a philosophy new to the infection control field. 'We know our approach is capable of breaking infection cycles – we have proved it in veterinary surgeries and with the RSPCA and other animal charities, where infection cycles have been broken to the benefit of the animals. The challenge now is to do the same for humans in hospitals.'

Further information

For further information about project Hand Sanitising, please contact Dr Harley Farmer, NewGenn Research Limited
t: 01359 253840
e: harley.farmer@newgenn.com
www.newgenn.com

For further information about Eureka, the European collaborative R&D scheme, please contact Robert Cameron, DTI Eureka Unit
t: 020 7215 1707
e: robert.cameron@dti.gsi.gov.uk