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Airborne Infection Control - a Solution

Airborne Transmission

In addition to respiratory droplet secretions from pathogens, such as norovirus, airborne infection also embraces many "lighter than air" bacteria and viruses, MRSA and *C.difficile* spores, that are carried around hospital environments on minute dust particles.

These organisms are widely dispersed by natural, everyday air currents before precipitating on to susceptible hosts or surfaces and equipment, from whence they may be readily disturbed again. Intervening in this route of transmission will greatly improve environmental hygiene and significantly reduce the opportunity for infection.

Clinical Studies

A controlled clinical trial[1] against MRSA, was recently completed at Northwick Park NHS Trust in London. By intervening in the airborne cycle of transmission, Medixair successfully demonstrated positive and statistically significant results.

A second study[2] further demonstrated that airborne transmission also plays an important role in *Clostridium difficile* infection transmission. Following the placement of Medixair units within an orthopaedic trauma ward, *C.diff* infection rates were reduced by 80%; a performance that was maintained for a fifteen month period.

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1 A New Mobile Air Sterilisation Device Prevents the Airborne Spread of Methicillin Resistant Staphylococcus aureus
Nielsen et al ,

2 Clostridium difficile - Aerobiology and nosocomial transmission
Dr Peder Bo Nielsen MD FRCPath MSc DLSHTM DipHIC Northwick Park Hospital Harrow Middlesex HA1 3UJ UK

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Airborne Infection Control - a Solution

The Technology

Medixair is a 110w air sterilisation unit employing ultraviolet light. It is designed to de-contaminate the air within critical hospital environments. The machine is portable and extremely quiet when running. The patented technology packages a high amount of UV energy securely and safely into a single device that can be easily deployed within the patient environment.

Method of Use

In operation Medixair cleans hospital wards through the continuous decontamination of room air as it passes through the machine. Working at a rate of 25m^3 /hour, Medixair produces a stream of sterile air which dilutes environmental contamination, keeping equipment and surfaces cleaner. In this way cross infection is reduced by lowering the risk of pathogens entering the body.

Capable of generating fast results Medixair will, unlike other decontamination methods, provide continuous and sustainable protection. It is therefore an ideal complement to combat the return of contamination after deep cleaning.

Installed as a single unit in a side ward or as multiple units in open bays, Medixair will have an immediate and positive impact in terms of reducing rates of HCAI.

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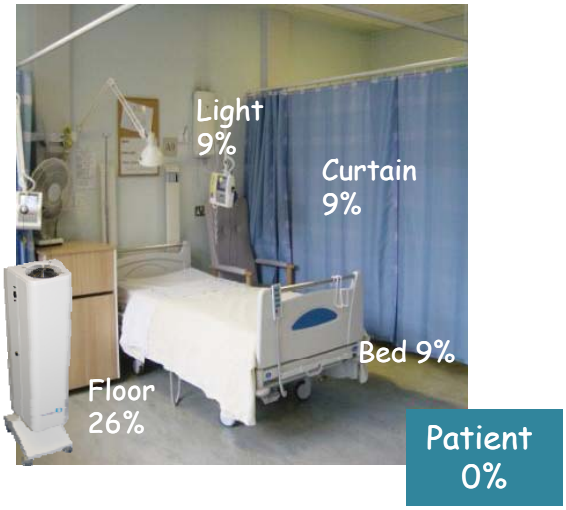
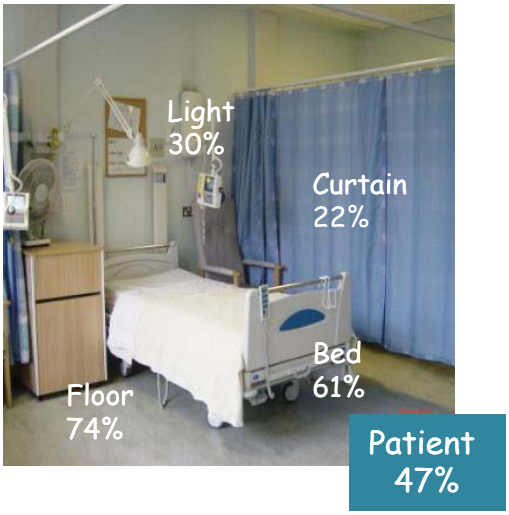
Northwest London NHS Trust
Northwick Park Hospital

Clinical data

MRSA Controlling Airborne Transmission[1]

UV-ROOM **Numbers = percentage of positive swabs over 13 weeks** **CONTROL**





Intervention in this cycle of transmission – using air sterilisation - has demonstrated statistically significant and positive results.

Clostridium difficile - Aerobiology and nosocomial transmission[2]

From July 2007, ten Ultraviolet air sterilisation units were place in an orthopaedic trauma ward; one in each side-room and one in each bay.

During the study period the hospital was engaged in an active programme against CDI.

The hygiene programme for the trauma ward was not distinct in any way from practices in the rest of the hospital - apart from the installation of Medixair air sterilisation units

	2006				2007				2008		
	Q1	*Q2*	*Q3*	*Q4*	*Q1*	*Q2*	*Q3*	*Q4*	*Q1*	*Q2*	*Q3*
Acute Trauma Ward	6	6	4	0	8	12	4	1	1	0	0
All Hospital Wards	76	79	84	47	62	93	64	38	44	49	50

The data indicates that the hospital reduced the average number of CDI cases per six months from 146 (Jan 06 to Jun 07) to 98 (Jul 07 to Sep 08), a reduction of 33%.

In the same time period the trauma ward achieved an 80% reduction; from 12 cases per six months to 2.4 cases.

pathogen solutions

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1 The Efficacy of a New Mobile Air Sterilisation Device on Airborne Spread of Meticillin-Resistant Staphylococcus aureus
Peder Bo Nielsen, MD, MSc, MRCPath. DipHIC et al
The article has completed a peer review by Journal of Hospital Infection and is pending publication
Presented at 8th Congress of the International Federation of Infection Control Budapest Hungary 2007

2 *Clostridium difficile* - Aerobiology and nosocomial transmission
Peder Bo Nielsen, MD, MSc, MRCPath. DipHIC et al
Presented at 32nd National Congress of Indian Association of Medical Microbiologist Oct 2008

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Rapid Review Panel
Recommendation 2

Smart Solutions For HCAI NHS
Winner 2009

Nominee 2009

Kill Energies
Bacteria and Virus

UV energy at 254nm has poor propagation. To overcome this problem Medixair applies unique design geometry to optimise the exposure of the air, under treatment, to the germicidal properties of the ultraviolet light.

Medixair produces 22,500µW.s.cm^{-2} of energy; sufficient to eradicate all viruses and bacteria, including many in their spore form

Virus	µW.s.cm^{-2}
Adenovirus 3	1,500
Bacteriophage (E. Coli virus)	3,000
Coxsackie virus A9	12,000
Coxsackie virus B1	15,500
Echovirus 1	11,000
Echovirus 2	12,000
Hepatitis A	11,000
Infectious hepatitis virus	8,000
Influenza	3,400
Poliovirus 1	11,000
Poliovirus 2	12,000
Poliovirus 3	10,000
Reovirus 1	15,400
Rotavirus SA11	7,800

Bacteria	µW.s.cm^{-2}
Agrobacterium tumefaciens	4,200
Bacillus anthracis	4,500
Bacillus aegaterium (Spore)	9,070
Bacillus aegaterium	3,750
Bacillus subtilis (spore)	12,000
Bacillus subtilis	7,100
Bacillus paratyphosus	3,200
Bacillus enteritidis	4,000
Corynebacterium diphteriae	3,750
Clostridium tetani	4,900
Clostridium botulinium	12,000
Dysentery bacilli	2,200
Eberthella typhosa	2,140
E. coli	5,400
Leptospira spp (Infectious Jaundice)	3,000
Legionella pneumophila	2,040
Legionella bozemanii	1,800
Legionella bumoffii	3,000
Legionella gormanii	2,500
Legionella micdadei	1,500
Legionella longbeachae	1,500
Listeria monocytogenes	3,400
Micrococcus candidus	6,050
Micrococcus sphaeroides	10,000

Bacteria	µW.s.cm^{-2}
Mycobacterrium tuberculosis	6,200
Neisseria catarrhalis	4,400
Phytomonas tumefaciens	4,400
Proteus vulgaris	3,000
Pseudomonas aeruginosa	5,500
Pseudomonas fluorescens	3,500
Salmonella enteritidis	7,600
Salmonella paratyphi	6,100
Salmonella typhimurium	8,000
Samonella typhosa	6,000
Sarcina lutea	19,700
Serratia marcesens	2,420
Shighella dysenteriae	4,200
Shigella paradysenterea	1,680
Shigella flexneri	1,700
Shigella sonnei	2,100
Spirillium rubsum	4,400
Staphylococcus albus	1,840
Staphylococcus aureus	2,600
Streptococcus haemolyticus(A)	6,700
Streptococcus haemolyticus(D)	9,500
Streptococcus lactis	6,150
Streptococcus viridans	2,000
Streptococcus pyrogenes	2,160

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