



**GUIDELINES FOR THE  
PREVENTION OF INFECTION  
AND DECONTAMINATION OF  
RESPIRATORY EQUIPMENT  
IN NORTHERN IRELAND**

August 2006

These guidelines have been published by the Clinical Resource Efficiency Support Team (CREST), which is a small team of health care professionals established under the auspices of the Central Medical Advisory Committee in 1988. The aims of CREST are to promote clinical efficiency in the Health Service in Northern Ireland, while ensuring the highest possible standard of clinical practice is maintained.

The guidelines have been produced by a sub-group of health care professionals from varied backgrounds including Medical (Primary and Secondary care), Nursing, Management and Public Health, chaired by Mrs Elizabeth Qua OBE. CREST wishes to thank them and all those who contributed in any way to the development of these guidelines.

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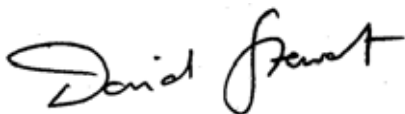
## **FOREWORD**

Control of Healthcare Associated Infections (HCAIs) is a major priority for the HPSS. In March 2006 the DHSSPS launched Changing the Culture, An Action Plan for the Prevention and Control of Healthcare Associated Infections in Northern Ireland 2006/2009. A key message of this action plan is that protecting patients and staff from infection is everyone's responsibility. Effective action to reduce HCAI requires healthcare workers, our service users and the general public to change our thinking and culture so that we all recognise we have a role in relation to infection prevention.

Infection control has been at the core of the development of these CREST guidelines, which focus on the maintenance of the highest possible standards in relation to respiratory equipment. We recommend that all staff should adhere to the good infection control principles within these guidelines. The guidelines have been built on, and further developed the original excellent EHSSB standards for respiratory equipment for acute facilities.

Under the auspices of the Clinical Resource Efficiency Support Team (CREST), a sub-group of health care professionals, chaired by Mrs Elizabeth Qua OBE was established to produce guidelines for the Prevention of Infection and Decontamination of Respiratory Equipment in Northern Ireland.

CREST would like to thank Mrs Qua, the members of the sub-group and all those who contributed in any way to the production of these guidelines.



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## **GUIDELINES FOR THE PREVENTION OF INFECTION AND DECONTAMINATION OF RESPIRATORY EQUIPMENT IN NORTHERN IRELAND**

### **INFECTION CONTROL**

One big infection control challenge identified throughout all of the recent literature is to encourage healthcare workers, our service users and the general public to change our thinking and culture so that we all recognise that everyone has a role in relation to infection prevention and control.

Healthcare Associated Infections (HCAIs) are a priority for the Health & Personal Social Services (HPSS) in Northern Ireland. By their very nature, infections have a multifaceted causation related to many areas including poor hygiene, human behaviour, environment, pre-disposing illness, antimicrobial resistance and other healthcare interventions. This has been recognised in Northern Ireland by the launch of “Protecting Patients and Staff - A Strategy for the Prevention and Control of Healthcare Associated Infections in Northern Ireland 2005-2010.”

The development of Changing the Culture - an action plan for the prevention and control of Healthcare Associated Infections in NI 2006-2009, identifies the key message - “infection prevention and control is everyone’s responsibility.”

In addition, Cleanliness Matters – a Regional Strategy for improving the Standards of Environmental Cleanliness in HPSS Trusts 2005-2008, promotes the importance of attaining and consistently maintaining high standards of environmental cleanliness, which includes all equipment/medical devices.

The World Health Organization (WHO) global patient safety challenge invites all countries to adopt the challenge of focusing attention on improving hand hygiene standards and practices in health care by engaging fully with patients and service users, as well as healthcare providers to ensure actions are taken for improvement. DHSSPS is participating in this Safety Challenge by leading a regional hand hygiene/clean care campaign in Northern Ireland in 2006/2007 and commenced this campaign from 1st June 2006.

The Challenge (<http://www.who.int/patientsafety/challenge/en/>) is part of WHO initiatives on reducing the burden associated with HCAs and it is very similar to work already proposed under our approach to prevention and control of HCAs. WHO have developed hand hygiene guidelines which propose simple measures to reduce such infections through attention to hand hygiene. DHSSPS will expect Trusts to use the WHO Guidelines on Hand Hygiene in Health Care *Clean Hands are Safer Hands*

(see [http://www.who.int/patientsafety/events/05/HH\\_en.pdf](http://www.who.int/patientsafety/events/05/HH_en.pdf)) to guide implementation of hand hygiene initiatives across all work areas and to engage staff, patients and the public in these initiatives.

Infection control has been key to the development of these CREST guidelines, particularly in the area of maintaining the highest possible standards in relation to respiratory equipment and we recommend that all HPSS staff should adhere to the good infection control principles within these guidelines.

## **SPIROMETRY**

An individual bacterial/viral (B/V) filter with supporting evidence of 99.99% or greater, protection must be used at all times when recording spirometry, in every clinical setting, regardless of the type of spirometer used as per manufacturers recommendations.

The filter must be discarded after use except if it is needed for a repeat reversibility test within that particular session on the same patient; it must then be discarded. There is no necessity to use a cardboard mouthpiece when using the B/V filter.

Due to the various types of portable spirometer and in the absence of any available evidence, the equipment should be cleaned in accordance with the manufacturers recommendations. Advice should also be sought from your infection control team.

It is recommended that the practice of daily washing of corrugated tubing for spirometry should stop and that disposable tubing be used. Tubing must be protected by a B/V filter. This tubing should be changed depending on the frequency of use and in collaboration with local infection control teams. Should the tubing be cracked/damaged or visibly soiled, it must be replaced immediately.

**Individuals with known or suspected TB should not perform spirometry.**

## **PEAK FLOW METERS**

### **Hospital Inpatient Setting**

All hospital inpatients requiring serial peak flow recordings should receive a peak flow meter for their individual use i.e. single patient use. This can then be taken home for ongoing monitoring if required. The patient should be reminded to bring this peak flow meter to future outpatient, A&E, or primary care visits.

Multiple patient use of the peak flow meter within the ward setting should stop because of the potential risk of transmission of infection between patients.

### **Outpatient, A&E and Primary Care Settings**

Peak flow meters with a one-way valve can be used as stated for multiple patients in the outpatient, A&E and primary care setting when a ‘one-off’ recording is required. An individual B/V filter must be used and may be the same filter used for spirometry on this visit. The filter should then be discarded.

Whilst some manufacturers recommend weekly cleaning of the multiple use peak flow meters, it is preferable that the peak flow be discarded after 1 weeks use due to the difficulties associated with cleaning and reassembling the peak flow meter.

Peak flow meters, which do not have a one-way valve in situ, must only be for single patient use as stated by the manufacturer.

## **PLACEBO INHALER DEVICES**

Placebo inhaler devices must be single patient use. A new placebo inhaler must be used if starting a patient for the first time on a device or changing the type of device to be used. It is acceptable to recheck the patient's technique on their present inhaler if no alteration is being made. The health professional should keep a designated labelled selection of devices for demonstration purposes.

When checking the patient's inspiratory flow, an in-check dial may be used in conjunction with a B/V filter. There is currently no clinical evidence to support the use of one-way cupboard mouthpieces and therefore they cannot be recommended within these guidelines.

The subsequent care of an in-check dial must adhere to the Trust infection control advice outlined for the use of peak flow meters in the outpatient setting.

When a spacer device is used in the outpatient, A&E, or primary care setting and the patient can use it effectively, it should then be given to the patient to continue their treatment at home; as it cannot be adequately decontaminated for reuse and would otherwise have to be discarded. (N.B. This is a single patient device as per the manufacturers recommendations.)

All relevant pharmaceutical companies have been asked to provide a greater supply of placebo inhaler devices to health professionals involved in the teaching and checking of inhaler technique.

## COMPRESSORS

When compressors are required for multiple patient use the external surfaces of the compressor should be cleaned as per local infection control guidance. The external and internal filters that protect the machine from contamination, such as dust particles, should be changed as per the manufacturers instructions and local infection control guidelines between each use. B/V filters are available for use with the compressor if recommended by local infection control guidelines.

A single patient use nebuliser chamber must be used for each individual patient. If a patient is known to have a ‘serious’ infection the internal filter will need to be changed and advice sought from the local infection control team. If a compressor does not have an external filter it would require the internal filter being changed between patients and since this would not be practical it was agreed to discontinue using such compressors.

## NEBULISER CHAMBERS AND MASKS

Nebulisers are for single patient use and should not be used for multiple patients.

Typically, the manufacturers designate a life span of 30 days for a nebuliser chamber based solely on particle size analysis. They suggest that immediately following each treatment the nebuliser is emptied of any residual drug that may be left in the chamber, disassembled and rinsed in ‘hand-hot’ tap water. It should then be reassembled, run as empty on air until **completely dry** and stored in a clean dry place between uses. All nebulisers should be labelled and dated with the patient’s name and hospital number if admitted; the expiry

date/disposal date should also be included. If the nebuliser chamber becomes cracked or damaged it should be discarded and replaced immediately. There are individual durable masks available for use in the patient's home setting that have a longer life-span. This is in keeping with the British Thoracic Society (BTS) nebuliser guidelines.

## **OXYGEN MASKS**

Oxygen masks are for single use. The manufacturers state that they should not be reprocessed or reconfigured in any way. They do not recommend washing/rinsing between use. If a single episode of use consists of more than one treatment, the product should be checked to ensure that it is functionally fit prior to each treatment. It should be disposed of if soiled, damaged, no longer functioning correctly or when the patient's treatment is completed. Masks should be labelled if the patient is in hospital and kept in a clean dry place when not in use.

## **NASAL CANNULAE**

These are single use and care is as stated for oxygen masks.

## **HUMIDIFICATION**

When humidification is required in the secondary care setting, pre-packed sterile water should be used and the circuit changed in accordance with the manufacturers recommendations.

## **PULSE OXIMETRY**

The patient and health professional should adhere to general infection control principles of good hand washing prior to obtaining oxygen saturation readings.

## **NON-INVASIVE VENTILATION (NIV) AND CONTINUOUS POSITIVE AIRWAYS PRESSURE (CPAP) VENTILATION EQUIPMENT**

Since there are a variety of equipment and interfaces available, each manufacturers recommendation should be adhered to as specified. A B/V filter must be attached to the NIV and changed after every patient if in hospital, in accordance with local infection control guidance. The exterior of the machine should be cleaned as per local agreement. It is recommended that the complete interface for NIV or CPAP, which includes the face mask/nasal mask, head gear, metal frame, tubing and plastic connectors be single-patient use. It is not cost effective to decontaminate each individual component. There are autoclavable masks, which are still acceptable, providing there is adherence to the manufacturers recommendations.

These NIV recommendations follow the BTS guidelines (2002) and include recommendations for infection control.

## CARBON MONOXIDE (CO) MONITORS

During CO monitoring a mouth piece containing a one-way valve should be used to protect the patient in the interim period and until the CO monitor manufacturer can produce a compatible B/V filter suitable for the CO monitor. Thereafter adhere to the guidance below.

When recording a CO reading the mouth piece should contain an individual B/V filter with supporting evidence of 99.99% or greater protection.

The mouth piece must be discarded after use except if it is needed for a repeated test within that particular session on the same patient. It should then be disposed of.

Due to the various different types of CO monitors and in the absence of any available evidence, the equipment should be cleaned in accordance with the manufacturers recommendations. Advice should also be sought from local infection control teams.

**Individuals with known or suspected TB should not perform CO monitoring.**

**As further clinical evidence is gathered these recommendations must be updated for all of the above issues.**

**The benefits to be derived from implementing these guidelines include compliance with manufacturers recommendations, reduced risks of infection and improved outcomes for patients.**

## REFERENCES

DHSSPSNI (2005) Protecting Patients and Staff - A Strategy for the Prevention and Control of Healthcare Associated Infections in Northern Ireland 2005-2010 (June 2005).

<http://www.dhsspsni.gov.uk/publications/2005/prevention-of-HCAIs.pdf>

DHSSPSNI (2006) Changing the Culture - an action plan for the prevention and control of Healthcare Associated Infections in NI 2006-2009 (March 2006).

[http://www.dhsspsni.gov.uk/hcai\\_action\\_plan.pdf](http://www.dhsspsni.gov.uk/hcai_action_plan.pdf)

Cleanliness Matters – a Regional Strategy for improving the Standards of Environmental Cleanliness in HPSS Trusts 2005-2008 (Sept 2005)

[http://www.dhsspsni.gov.uk/facilities\\_management\\_cleanliness\\_matters\\_strategy\\_sept05.pdf](http://www.dhsspsni.gov.uk/facilities_management_cleanliness_matters_strategy_sept05.pdf)

The World Health Organization (WHO) <http://www.who.int/en/>

Bell, J (2002) Peak flow Meter Manufacturers Comment-Single Patient Use? Primary Care Respiratory Journal 11 (3); 91-92

The British Thoracic Society Standards of Care Committee. The 1997 BTS Guidelines on the management of COPD are available from BMJ Thorax Subscription Department reference Thorax 1997. 52: (suppl V).

British Thoracic Society (1997) Summary of nebuliser guidelines for ward and community staff. Thorax 52 (suppl 2)

Kendrick, AH., John, DP., Leeming, JP. (2003) Infection control of lung function equipment: A practical Approach. Respiratory Medicine 97, 1163-1179

Medical Devices Agency 2001. Devices in Practice (ISBN 1841823597)

Medical Devices Agency 2000. Single-use medical devices: Implications and Consequences of Reuse. (MDA DB 2000(04)).

Non-invasive ventilation in acute respiratory failure are available from BMJ Thorax Subscription Department reference Thorax 2002; 57:192–211

British Thoracic Society/ Scottish Intercollegiate Guideline Network (2003) British Guideline on the Management of Asthma. Thorax 58: Suppl (1) <http://www.enterpriseportal2.co.uk/filestore/bts/asthmaupdatenov05.pdf>

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