# Hygiène et (matériel) de kinésithérapie

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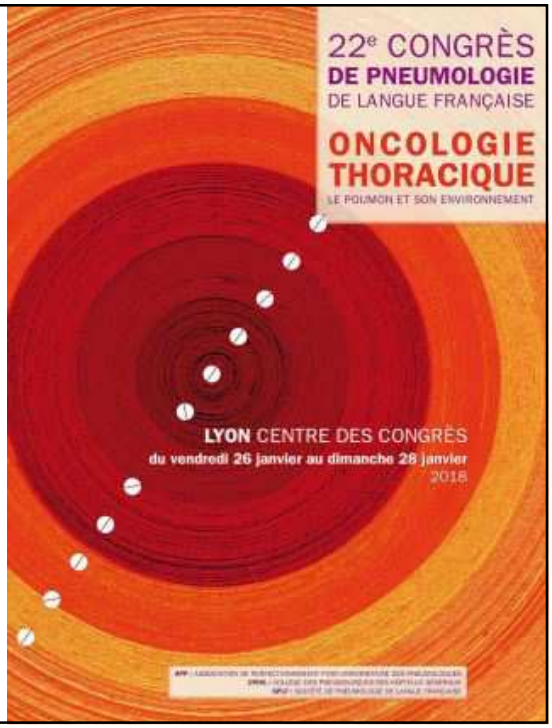


22e CONGRÈS DE PNEUMOLOGIE DE LANGUE FRANÇAISE
ONCOLOGIE THORACIQUE - LE POUMON ET SON ENVIRONNEMENT

LYON
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## Déclaration de liens d'intérêts

J'ai actuellement, ou j'ai eu au cours des trois dernières années, une affiliation ou des intérêts financiers ou intérêts de tout ordre avec les sociétés commerciales suivantes en lien avec la santé.

- **Liens d'intérêt :**
  - DTF
  - Aptar
  - Aerogen

- **Liens d'intérêt en relation avec la présentation :**

# Introduction

- Sujet vaste… mais peu de données
- Plusieurs conditions
  - Type de soin
  - Type de patients
- Dissémination et contamination

# 3 modes de transmissions

Transmission directe
*Person-to-person*

Transmission indirecte
*Object-to-person*

Gouttelettes
*Aerosol*

# 3 modes de transmissions

Transmission directe
*Person-to-person*

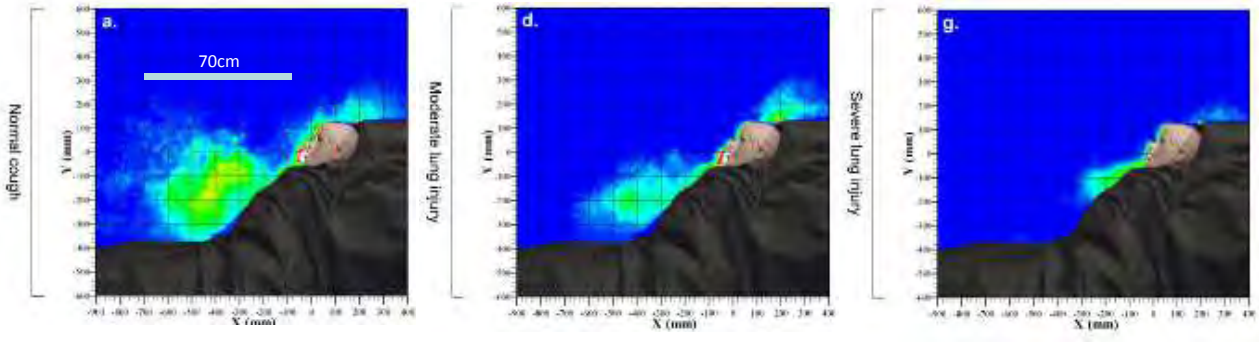
Transmission indirecte
*Object-to-person*

Gouttelettes
*Aerosol*

# Dissémination

**Exhaled Air Dispersion during Coughing with and without Wearing a Surgical or N95 Mask**

David S. Hui[1,2]*, Benny K. Chow[2,3], Leo Chu[4], Susanna S. Ng[1], Nelson Lee[1,2], Tony Gin[4], Matthew T. V. Chan[4]




PLoS One. 2012;7(12:e50845)

# Dissémination

Table II. *Recovery of* Ps. aeruginosa *from petri-dishes and from the hands of cystic fibrosis patients after coughing*

| Site of isolation after coughing | Total number of samples (patients) | Number of samples positive for *Ps. aeruginosa* |
|---|---|---|
| Exposed Petri-dishes | 17 | 11 (65%) |
| Patients' hands | 16 | 3 (19%) |

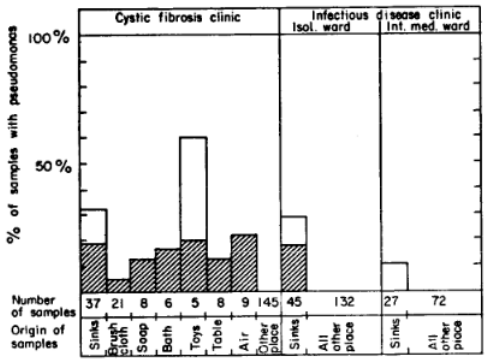


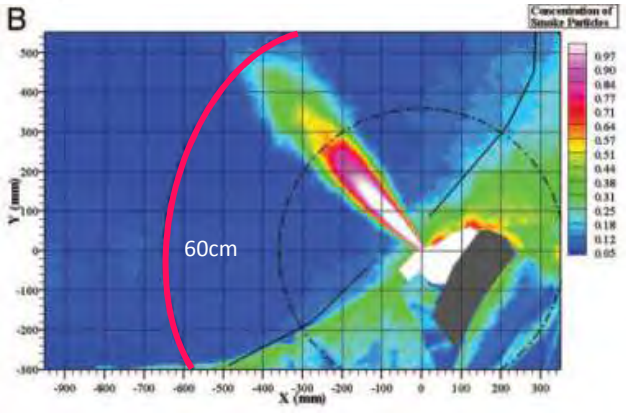

Figure 1. Prevalence of *Ps. aeruginosa* in environmental samples. (A few cystic fibrosis patients are treated for *Ps. aeruginosa* infection on the isolation ward of the infectious disease clinic.) ■, *Ps. aeruginosa* strains of the same epidemiological type as isolated from the cystic fibrosis patients, □, other epidemiological types not found in the cystic fibrosis patients.

Zimakoff, J Hosp Infect 1983;4,31-40

# Dissémination

## Exhaled Air Dispersion Distances During Noninvasive Ventilation via Different Respironics Face Masks

*David S. Hui, MD, FCCP; Benny K. Chow, MPH; Susanna S. Ng, MBChB; Leo C. Y. Chu, MBChB; Stephen D. Hall, PhD; Tony Gin, MD; Joseph J. Y. Sung, MD; and Matthew T. V. Chan, MD*


CHEST 2009; 136:998–100

# Dissémination

REVIEW

## Review of mobile communication devices as potential reservoirs of nosocomial pathogens

R.R.W. Brady [a,*], J. Verran [b], N.N. Damani [c], A.P. Gibb [d]

**Table 1** Recent studies of contamination of mobile communication devices (MCDs)

| Study | Year | Country | Setting | Sample | Findings |
|---|---|---|---|---|---|
| Beer *et al.*[32] | 2006 | Canada | HCWs, children's hospital | 100 pagers | 12% pathogenic bacteria |
| Borer *et al.*[14] | 2005 | Israel | HCWs, tertiary care hospital | 124 mobile phones | 12% *Acinetobacter* spp. (2% MDR) |
| Braddy *et al.*[27] | 2005 | USA | HCWs, teaching hospital | 82 PDAs | 7.5% MSSA (0% MRSA) |
| Brady *et al.*[7] | 2006 | UK | HCWs, district general ward | 105 mobile phones | 7.6% MSSA (1.9% MRSA) |
| Brady *et al.*[25] | 2007 | UK | HCWs, operating theatre environment | 46 mobile phones, 27 pagers, 5 PDAs | 3.8% MSSA, 3% *Pseudomonas* spp. |
| Goldblatt *et al.*[26] | 2007 | USA/Israel | HCWs, non-clinical controls | 400 mobile phones | 26% pathogenic bacteria |
| Hassoun *et al.*[42] | 2004 | USA | Metropolitan teaching hospital | 75 PDAs | 11% MSSA (8% MRSA), 1% VRE |
| Jayalakshmi *et al.*[11] | 2008 | India | Hospital and research institute | 144 mobile phones | 2.7% MRSA; 4.8% *Acinetobacter* spp. |
| Jeske *et al.*[28] | 2007 | Austria | Anaesthetists' hands after using MCDs | 40 hands following 1 min call on mobile phone | 10% pathogenic bacteria |
| Karabay *et al.*[29] | 2007 | Turkey | HCWs, teaching hospital | 122 mobile phones | 9.0% pathogenic bacteria, 8.1% MSSA |
| Khivsara *et al.*[26] | 2006 | India | Doctors, teaching hospital | 30 mobile phones | 40% MSSA (6.7% MRSA) |
| Namias *et al.*[30] | 2000 | USA | Urban teaching hospital | 36 pagers | 23.3% MSSA, 6.6% *Acinetobacter* spp. |
| Ramesh *et al.*[3] | 2008 | Barbados | HCWs, general hospital | 101 mobile phones | 15% Gram-negative pathogens |
| Singh *et al.*[34] | 2002 | USA | Medical centre | 100 pagers | 21% MSSA (14% MRSA) |
| Tambekar *et al.*[35] | 2008 | India | Doctors, teaching hospital | 75 mobile phones | 20% MSSA |

HCWs, healthcare workers; MDR, multidrug resistant; PDA, personal digital assistant; MSSA/MSRA meticillin-sensitive/resistant *Staphylococcus aureus*; VRE, vancomycin-resistant enterococci.

- 9 à 25 des smartphones sont contaminés

J Hosp Infect 2009;71: 295-300

# Dissémination

## Bacterial contamination of stethoscopes on the intensive care unit

A. M. Whittington,[1] G. Whitlow,[1] D. Hewson,[2] C. Thomas[3] and S. J. Bi

- 67% stethoscopes
- 95% bedside stethoscopes



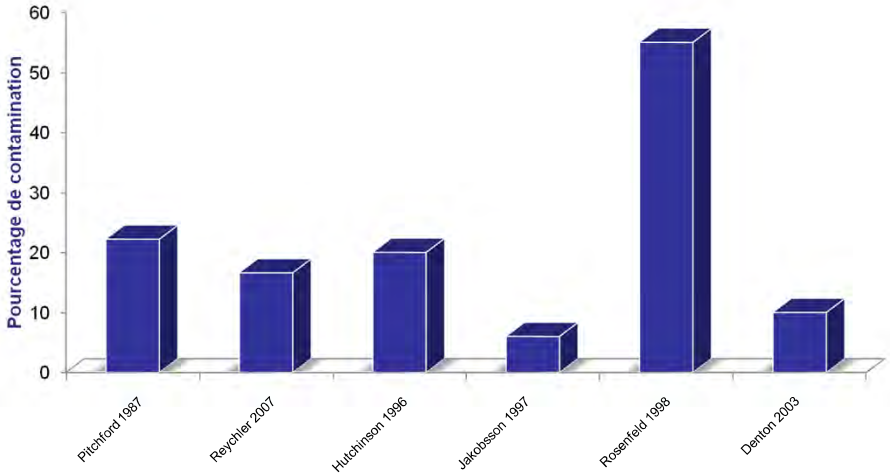
**Table 2** Culture results from stethoscopes pre- and postcleaning. Antibiotic sensitivities in brackets.

| | Diaphragm precleaning | Diaphragm postcleaning | Ear pieces precleaning | Ear pieces postcleaning |
|---|---|---|---|---|
| ICU bedside stethoscopes ($n = 24$) | | | | |
| No growth | 8 | 18 | 6 | 8 |
| Skin flora only | 14 | 13 | 13 | 15 |
| Pathogenic bacteria | 2 | 6 | 5 | 1 |
| Organisms cultured and significant antibiotic sensitivities | BS 8 – *A. iwoffi* (fully sensitive)<br>BS 24 – *A. baumanii* (panresistant – S to colistin only) | | BS 3 – MRSA (R methicillin, penicillin)<br>BS 8 – *A. radioresistans* (R ceftazidime)<br>BS 11 – *A. iwoffi* (fully sensitive)<br>BS 13 – *A. iwoffi* (fully sensitive)<br>BS 14 – *A. iwoffi* (fully sensitive) | BS 3 – MRSA (R methicillin, penicillin) |
| Personal stethoscopes ($n = 22$) | | | | |
| No growth | 1 | 5 | 0 | 2 |
| Skin flora only | 18 | 14 | 17 | 18 |
| Pathogenic bacteria | 3 | 2 | 5 | 2 |
| Organisms cultured and significant antibiotic sensitivities | PS 7 – MRSA (R – all Beta-lactams gentamicin, S – teicoplanin, vancomycin)<br>PS 7 – *Enterobacter cloacae* (R – Cephalosporin)<br>PS 12 – *A. baumanii* (S – carbopenems, colistin<br>PS 22 – *S. aureus* (S – methicillin, R. penicillin, fusic acid)<br>PS 22 – *Stenotrophomonas maltophilia* (S – piperacillin and tazobactam only) | PS 7 – MRSA (R – all Beta-lactams gentamicin, S – teicoplanin, vancomycin)<br>PS 22 – *Stenotrophomonas maltophilia* (S – piperacillin and tazobactam only) | PS 2 – *S. aureus* (S methicillin R penicillin, fusidic acid)<br>PS 11 – *Pseudomonas luteola* (S – piperacillin and tazobactam)<br>PS 12 – *A. baumanii* (S – carbapenems, colistin)<br>PS 20 – *A. iwoffi* (S – carbapenems, colistin)<br>PS 21– *A. iwoffi* (S – carbapenems, colistin) | PS 11 *Pseudomonas luteola* (S – piperacillin and tazobactam)<br>PS 12 – *A. baumanii* (S – carbapenems, colistin) |

Anaesthesia, 2009, 64, pages 620–624

# Dissémination

## *Spécificités de la mucoviscidose*




# Précautions standards

*Mesures d'hygiène de base pour tous les patients et tout type de soin*

# Prérequis

# Lavage des mains

- Avant ET après !
- Pauvre adhérence
- Mauvaise technique

# Ségrégation

- Nouvelle contamination à Ps a pour 8/10 CF lors de camp de 4 semaines (Tummler 1991)
- 13/76 CF non infectés avant le camp dont 46% sont devenus infectés (Wolz 1989)
- 100% de contamination croisée à Ps a chez 22 CF après un camp de une semaine (Ojeniyi 2000)

© Med Sci Monit, 2008; 14(4): CR196-198
**PMID:** 18376347

WWW.MEDSCIMONIT.COM
Clinical Research

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**Published:** 2008.04.01

## Incidence and characteristics of hospital-acquired pneumonia in a pulmonary rehabilitation setting

**Cristoforo Incorvaia**[1,A,D,E,F], **Gian Galeazzo Riario-Sforza**[1,B,C], **Chiara Pravettoni**[1,B,C], **Raffaella Megali**[1,G], **Mona-Rita Yacoub**[2,3], **Franco Frati**[3,D]

[1] Pulmonary Rehabilitation Unit, ICP Hospital, Milan, Italy
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[3] Department of Medical and Surgical Specialty and Public Health, Perugia, Italy

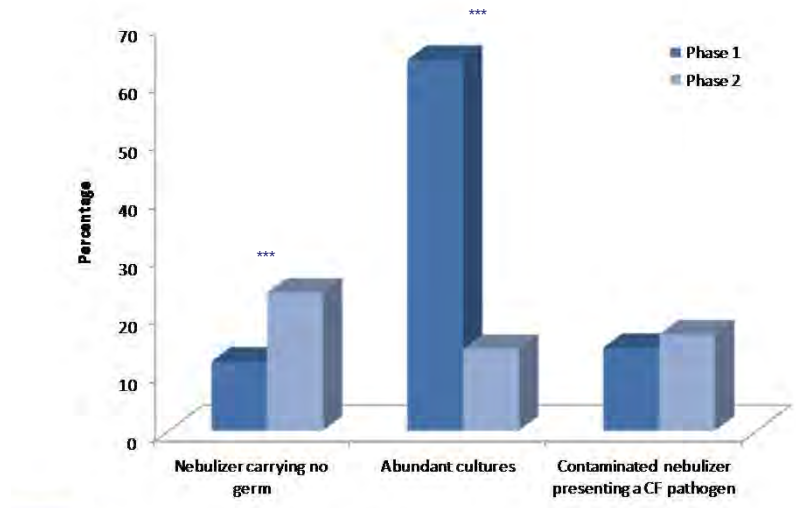
**Source of support:** Departmental sources

**Authors' Contribution:**
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

*Aim: Our study sought to establish the incidence of HAP and disease exacerbations in patients with severe and disabling COPD in the pulmonary rehabilitation setting.*

*Results: 9/143 (6.3%; 6 men, 3 women; mean age, 72.8±3.2 years) developed HAP ...* Twenty-four (16.8%) of 143 patients developed a COPD exacerbation.

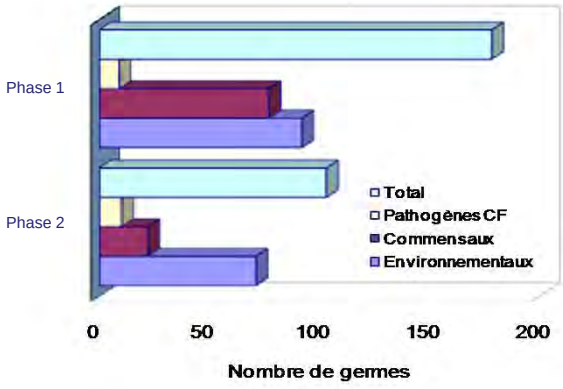
# Contamination et désinfection du matériel




N = 50 CF

Reychler G. et al, J Hosp Infect. 2009 Aug;72(4):351-7

# Contamination et désinfection du matériel




N = 50 CF

**Limitation du risque de contamination du matériel suite au respect de recommandations**
**(Jakobsson 1997, Craven 1984)**

Reychler G. et al, J Hosp Infect. 2009 Aug;72(4):351-7

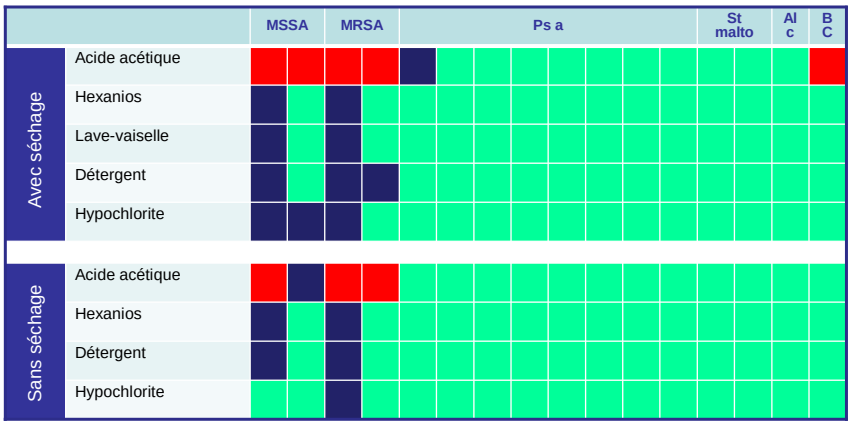
# Recommandations

CDC : appareils semi-critiques

| | Belgique | France | CFF | CDC | BTS |
|---|---|---|---|---|---|
| **Nettoyage** Fréquence | A chaque fois | A chaque fois | A chaque fois | ? | Une fois par jour ou à chaque usage si AB |
| *Méthode* | *Savon* | *Savon* | *Savon* | | *Eau savonneuse* |
| **Désinfection** Fréquence | Une fois par jour | Une fois par jour | Une fois par jour | A chaque usage | Après 30 séances si AB |
| *Méthode* | *Javel ou thermique* | *Javel, thermique, isopropylique* | *Javel, thermique, isopropylique* | *Stérilisation* | *Thermique* |
| **Rinçage** *Méthode* | *Eau robinet* | *Eau robinet ou stérile* | *Eau stérile ou filtrée* | *Eau stérile ou alcool* | ? |
| **Séchage** *Méthode* | *Papier usage unique* | *Papier usage unique* | *Air libre* | *Air comprimé* | *Air comprimé* |

# Méthodes et efficacité

**Contamination artificielle de 320 nébuliseurs par des germes de patients**

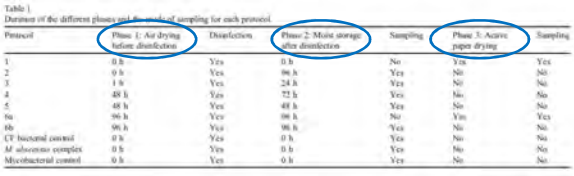



Désinfection  Disparition  Echec

Reychler G et al, JCF 2005;4:183-187

# Méthodes et efficacité

## *Stérilisateurs*



- There was no recovery of any CF bacteria after disinfection.
- There were no differences in the efficacy of the different steam disinfectors in killing CF bacteria and M. abscessus complex.
- Skin bacteria were recovered in both protocols including active paper drying.

**Annex. Proposition for recommendations for effective steam disinfection**

After every use:

1. Wash the assembled nebulizer with water, with or without dish-washing detergent.
2. Steam disinfect the assembled nebulizer using tap water.
3. Open the steam disinfector after disinfection only for a short time if it is desired to let some steam out; otherwise, leave the lid closed until the nebulizer is reused (a maximum of 24 h).
4. Wash hands and dry them with a clean paper towel (a) (e.g. the inner side of a leaf of kitchen roll) and place another clean paper towel (b) next to the steam disinfector.
5. Open steam disinfector and assemble the parts if dismantled.
6. If the parts are too wet, shake off the water, or tap it off on the clean paper towel (b).
7. Place the nebulizer only in the steam disinfector or on a clean paper towel (b)

Hohenwarter K. et al, JCF 2016;15:78-84

# Facteurs de risque… sur base des nébuliseurs

- Risque faible (O'Malley 2007) (faible concordance) mais répétitif (Borsje 2000)
- Taux d'infection/colonisation (Vassal 2000)
- Usage d'antibiotiques inhalés
- Durée d'utilisation (Pitchford 1987, Hutchinson 1996)
- Partage du nébuliseur (Tablan 1985)
- Solutions médicamenteuses (Estivariz 2006)
- Non renouvellement du matériel (Wexler 1991)

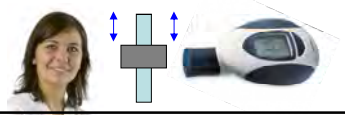
## An audit into the efficacy of single use bacterial/ viral filters for the prevention of equipment contamination during lung function assessment

M. Unstead[a,*], M.D. Stearn[b], D. Cramer[a], M.V. Chadwick[b], R. Wilson[c]

Table 1 Micro-organisms isolated from proximal, distal and filter sample sites.

| Isolate | Sample site | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Infectious group ($n$ = 86) | | | Non-infectious group ($n$ = 69) | | | All subjects ($n$ = 155) | | |
| | Proximal | Distal | Filter | Proximal | Distal | Filter | Proximal | Distal | Filter |
| Any growth | 17 (19.8%) | 2 (2.3%) | 72 (83.7%) | 16 (23.2%) | 0 | 53 (76.8%) | 33 (21.3%) | 2 (1.3%) | 125 (80.6%) |
| No growth | 69 (80.2%) | 84 (97.7%) | 14 (16.3%) | 53 (76.8%) | 69 | 16 (23.2%) | 122 (78.7%) | 153 (98.7%) | 30 (19.4%) |
| AHS | 9 (10.5%) | 0 | 12 (24.4%) | 13 (18.8%) | 0 | 5 (7.2%) | 22 (14.2%) | 0 | 17 (11.0%) |
| *Aeromonas salmonicida* | 0 | 0 | 1 (1.2%) | 0 | 0 | 0 | 0 | 0 | 1 (0.6%) |
| *Bacillus* sp. | 0 | 0 | 35 (40.7%) | 0 | 0 | 27 (39.1%) | 0 | 0 | 62 (40%) |
| CNS | 6 (7.0%) | 2 (2.3%) | 17 (19.8%) | 9 (13.0) | 0 | 26 (39.9%) | 15 (9.7%) | 2 (1.3%) | 40 (25.8%) |
| Diptheroids | 4 (4.7%) | 0 | 3 (3.5%) | 2 (2.9%) | 0 | 0 | 6 (3.9%) | 0 | 3 (1.9%) |
| *Micrococcus* sp. | 0 | 0 | 1 (1.2%) | 0 | 0 | 0 | 0 | 0 | 1 (0.6%) |
| *Neisseria* sp. | 1 (1.2%) | 0 | 0 | 2 (2.9%) | 0 | 0 | 3 (1.9%) | 0 | 0 |
| NHS | 4 (4.7%) | 0 | 5 (5.8%) | 6 (8.7%) | 0 | 5 (7.2%) | 10 (6.5%) | 0 | 10 (6.5%) |
| *Ochrobactrum anthropi* | 0 | 0 | 0 | 0 | 0 | 1 (1.4%) | 0 | 0 | 1 (0.6%) |
| *Pseudomonas aeruginosa* | 1 (1.2%) | 0 | 3 (3.5%) | 0 | 0 | 0 | 1 (0.6%) | 0 | 3 (1.9%) |
| *Pseudomonas stutzeri* | 0 | 0 | 1 (1.2%) | 0 | 0 | 0 | 0 | 0 | 1 (0.6%) |
| *Ralstonia picketii* | 0 | 0 | 1 (1.2%) | 0 | 0 | 1 (1.4%) | 0 | 0 | 2 (1.3%) |
| *Sphing. paucimobilis* | 0 | 0 | 0 | 0 | 0 | 1 (1.4%) | 0 | 0 | 1 (0.6%) |
| *Staphylococcus aureus* | 1 (1.2%) | 0 | 4 (4.7%) | 0 | 0 | 0 | 1 (0.6%) | 0 | 4 (2.6%) |

Note: AHS: α-haemolytic streptococci, CNS: coagulase-negative staphylococci, NHS: non-haemolytic streptococci. Methicillin-resistant *Staphylococcus aureus*, *Burkholderia cepacia* and Mycobacteria were not isolated from any test.



Unstead M, Respir Med. 2006 May;100(5):946-50

# En pratique…
# Take home message

- Critère de choix de la méthode
  - Efficacité
    - Désinfection démontrée
    - Non-délétère pour le matériel
  - Coût
  - La moins contraignante possible
    - Facilité d'emploi!!!
    - Durée
    - Transportable
  - Adaptée au patient
- Points non- ou peu discutables
  - 4 phases :
    - Lavage (biofilm)
    - Rinçage
    - Désinfection → Quelle méthode?
    - Séchage