Optimiser la nébulisation

Jean-Bernard Michotte

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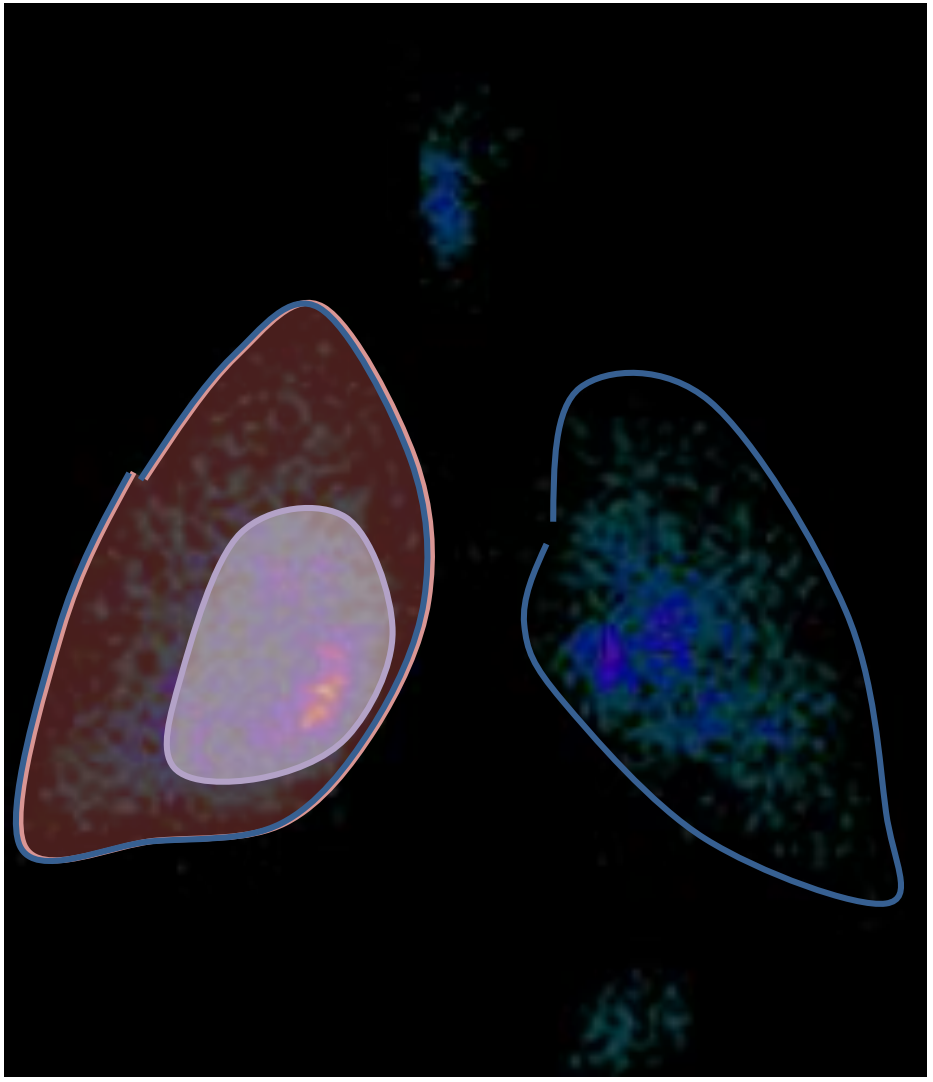
Cliniques Universitaires Saint-Luc, 1200 Bruxelles - Belgique

Introduction

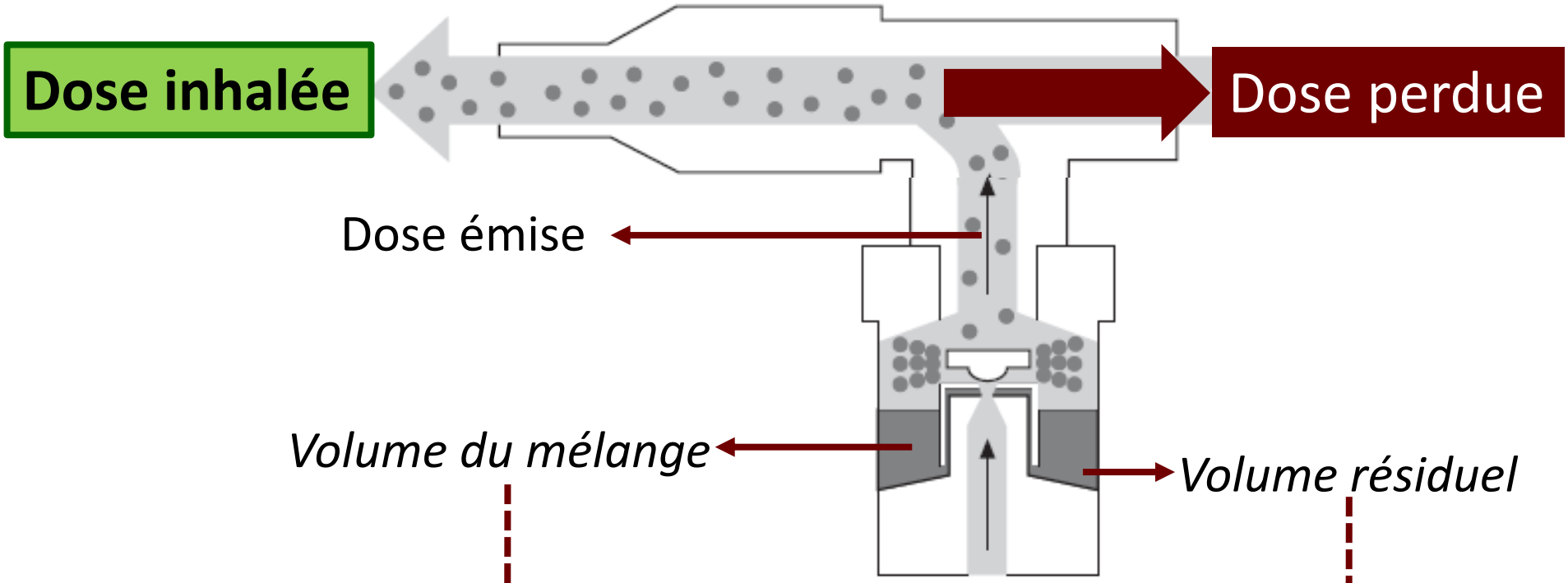
Efficacité de la nébulisation
=
Dose arrivant aux poumons



Efficacité médicamenteuse
=
Localisation de la déposition

D'après G. Reychler

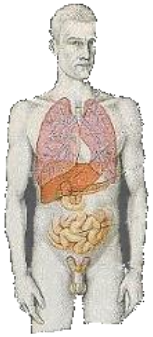
Introduction



Introduction

Dose résiduelle

Dose perdue



Dose expirée

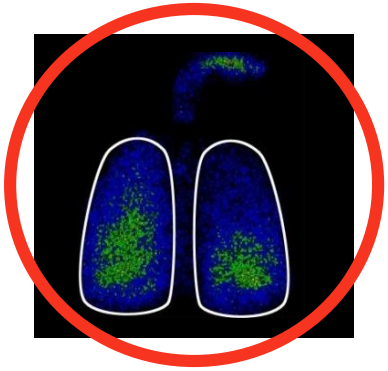
Dose patient

Dose buccale (impaction)

Dose nominale

Dose émise

Dose inhalée



Dose pulmonaire

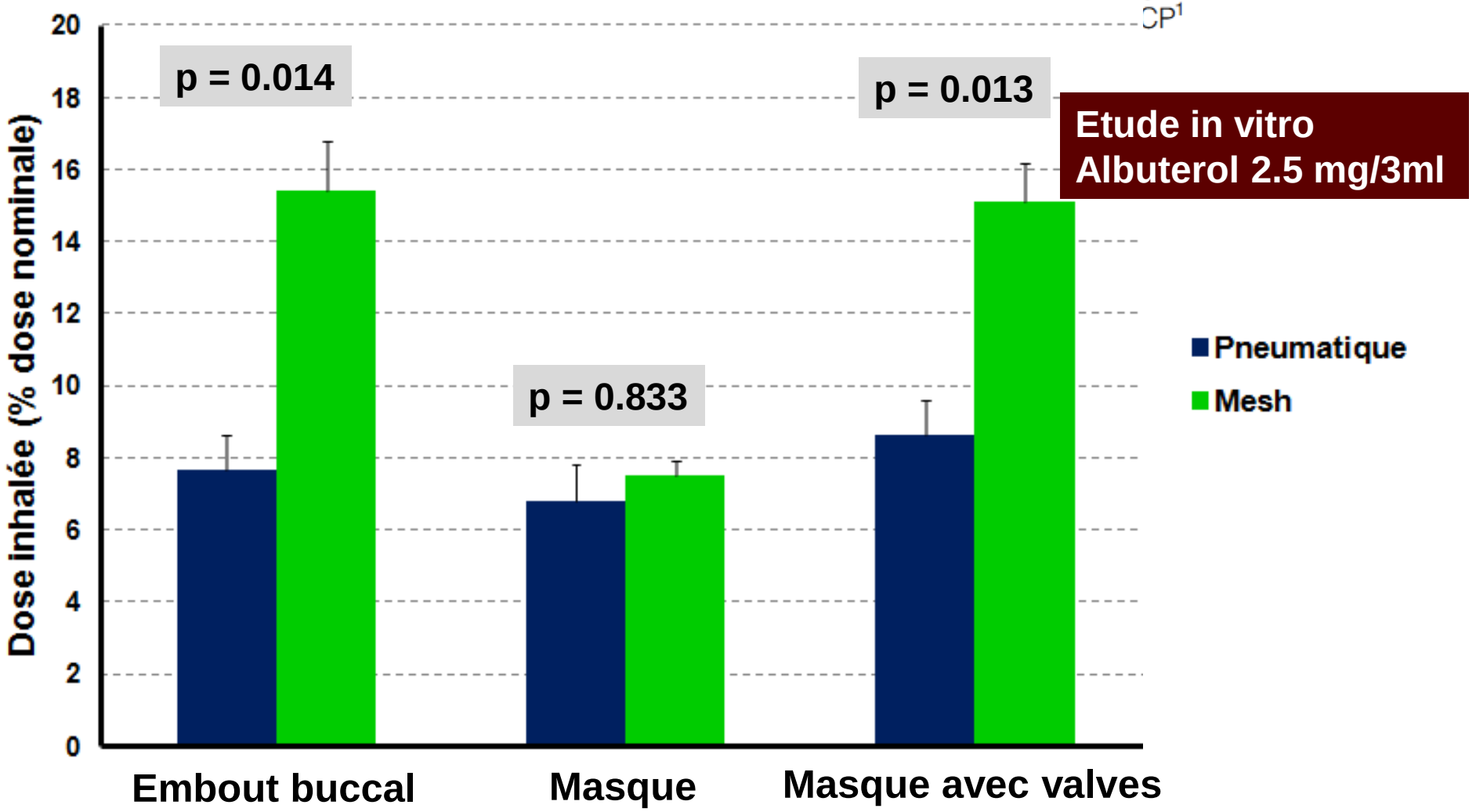
Zones cibles

Améliorer la dose inhalée

Choix du nébuliseur

Performance Comparisons of Jet and Mesh Nebulizers Using Different Interfaces in Simulated Spontaneously Breathing Adults and Children

Arzu Ari, PhD, RRT, PT, CPFT, FAARC;[1] Armele Dornelas de Andrade, PhD, PT;[2] Meryl Sheard, MS, RRT;[1]
CP[1]



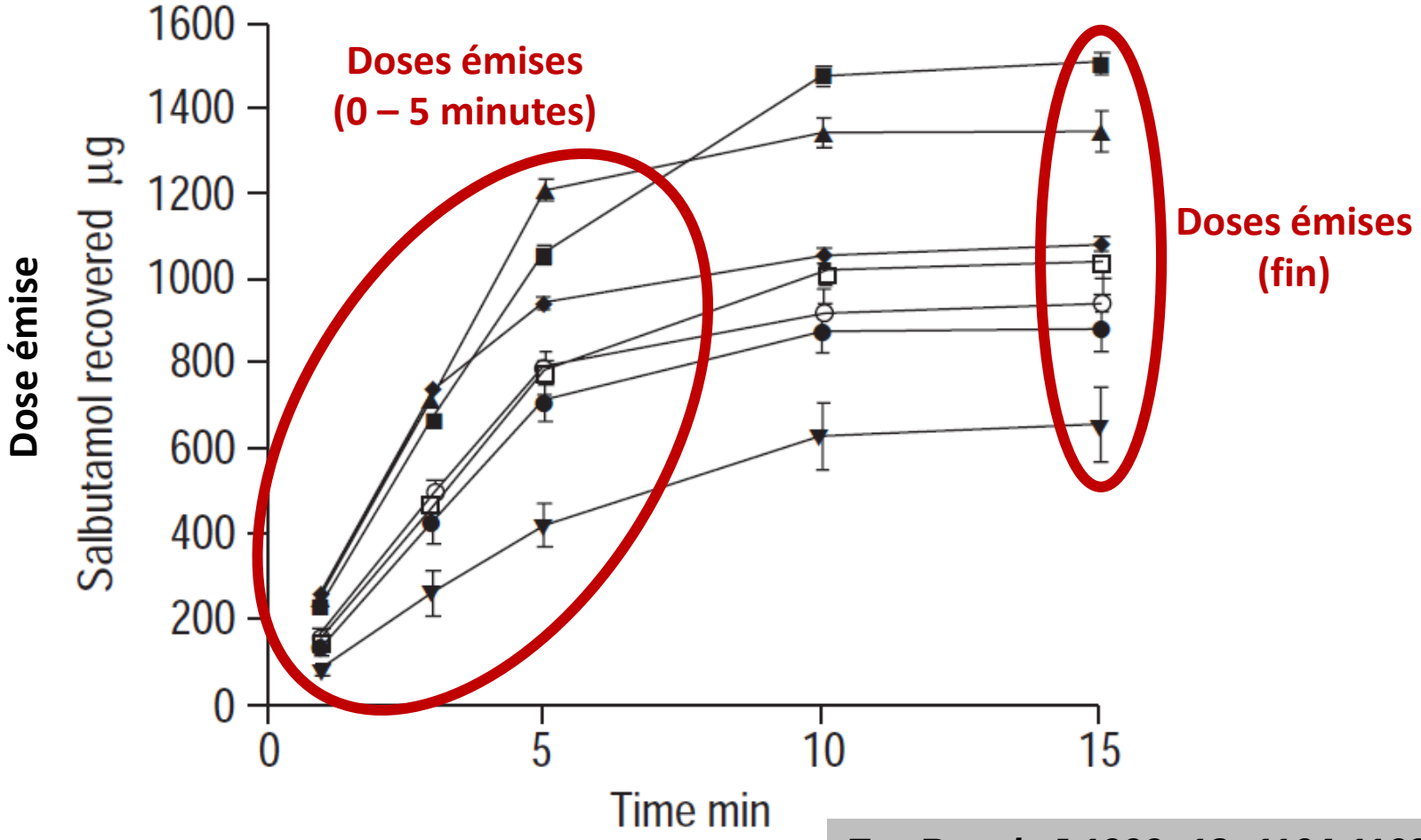
Etude in vitro
Albuterol 2.5 mg/3ml

J Aerosol Med Pulm Drug Deliv. 2014 ahead of print

An *in vitro* analysis of the output of salbutamol from different nebulizers

P.W. Barry, C. O'Callaghan

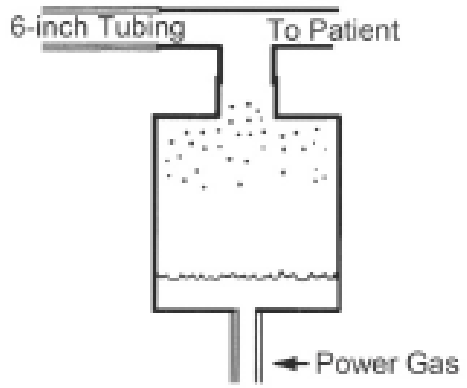
7 nébuliseurs pneumatiques
5 mg/2ml Salbutamol

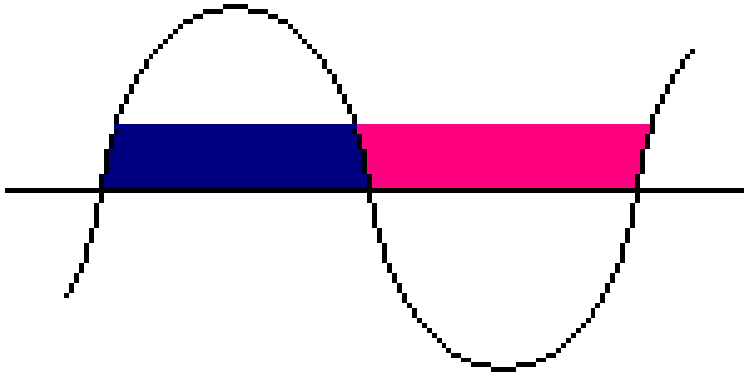


Eur Respir J 1999; 13: 1164-1169

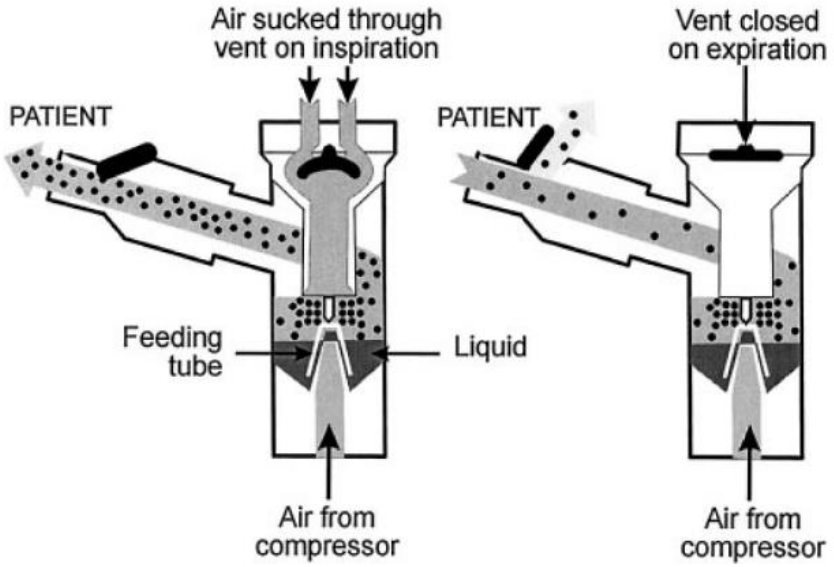
Choix du mode

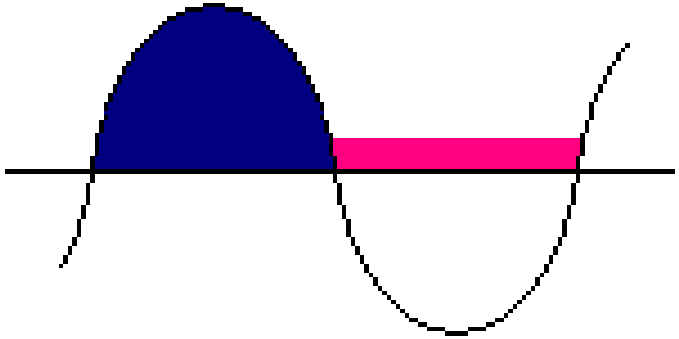
Types de nébuliseurs pneumatiques





Nébuliseur pneumatique standard

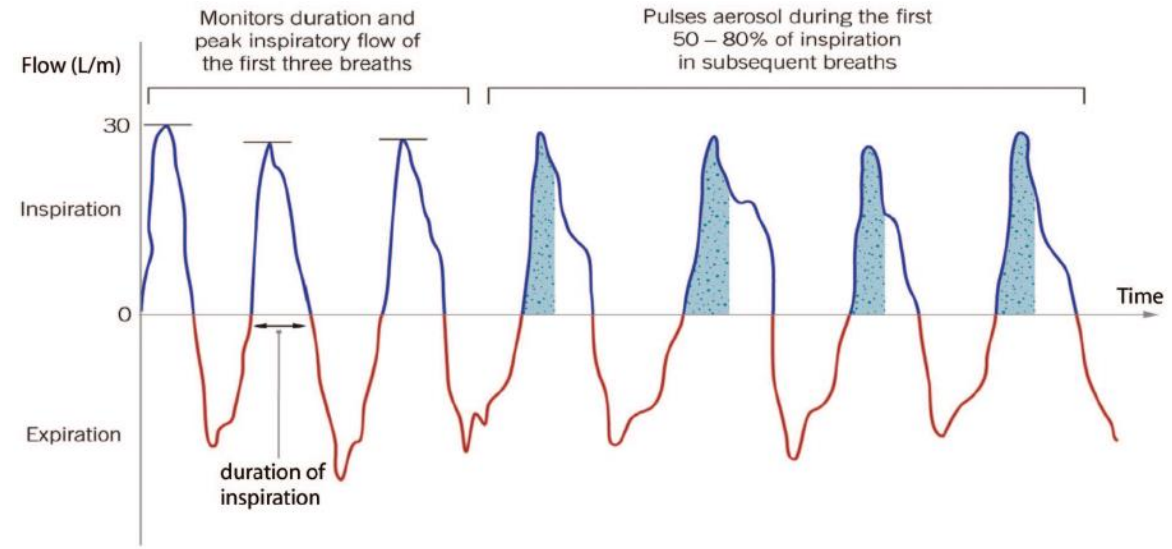


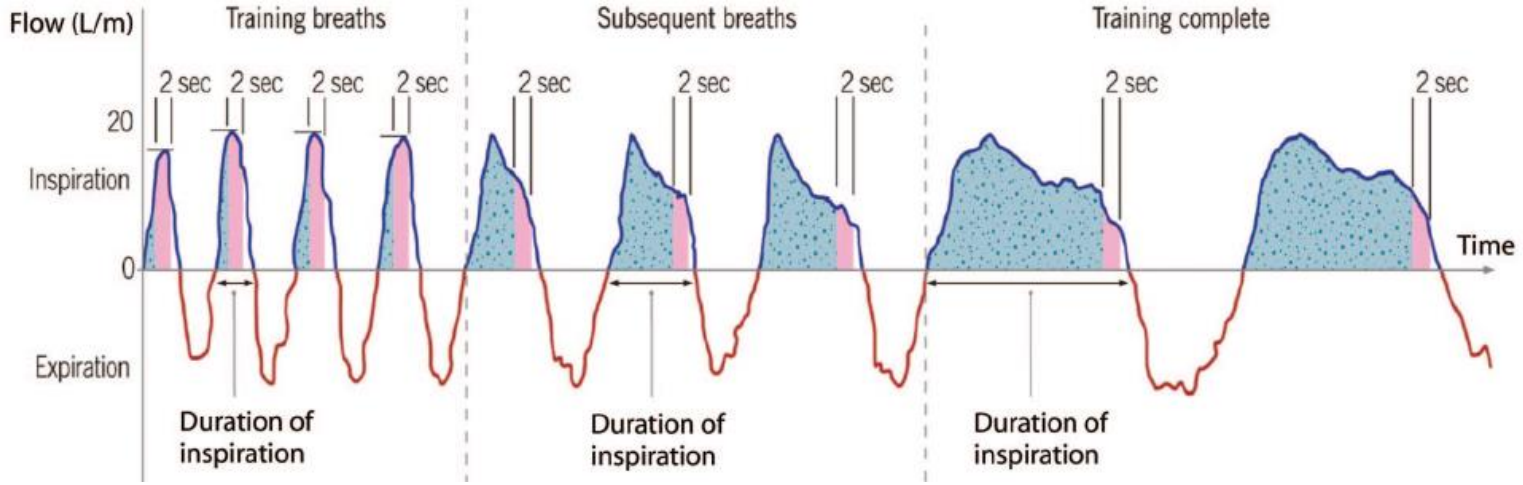


Nébuliseur pneumatique à double venturi

Chest 2004; 126:1619–1627

Nébuliseurs dosimétriques





Choix du compresseur

The Choice of Compressor Effects the Aerosol Parameters and the Delivery of Tobramycin from a Single Model Nebulizer

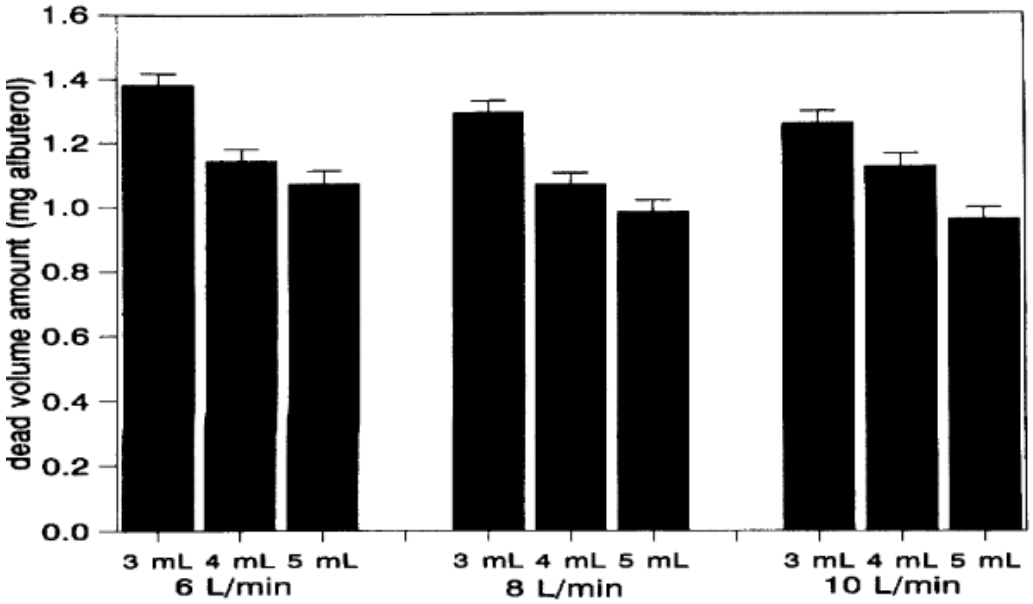
T.A. STANDAERT, Ph.D.,[1] D. VANDEVANTER, Ph.D.,[2] B.W. RAMSEY, M.D.,[1] M. VASILJEV-K, B.A.,[2] P. NARDELLA, B.S.,[2] D. GMUR, B.S.,[2] C. BREDL, B.S.,[2] A. MURPHY, Ph.D.,[2] and A.B. MONTGOMERY, M.D.[2]

Etude in vitro
Tobramycine 300mg/5ml

Nebulizer (n = 15)	*Compressor* (n = 15)	*MMD (microns) mean (S.D.)*	*Nebulization time (minutes) mean (S.D.)*	*Residual volume (mL) mean (S.D.)*
LC Plus	PulmoAide	4.93 (0.28)	14.8 (2.0)	1.7 (0.28)
LC Plus	SystAm 23 ST	5.09 (0.73)	20.8 (3.2)	1.7 (0.39)
LC Plus	SystAm 26 ST	5.42 (0.59)	20.9 (3.2)	1.6 (0.27)
LC Plus	MedicAid CR 50	4.56 (0.54)	11.2 (2.4)	2.1 (0.48)
LC Plus	MedicAid CR 60	3.57 (0.30)	7.9 (2.2)	2.3 (0.30)
LC Plus	Aiolos Hercules	3.85 (0.52)	9.1 (1.7)	2.4 (0.37)
LC Plus	Pari Master	4.70 (0.41)	12.6 (1.8)	1.8 (0.47)
LC Plus	Pari Boy	5.19 (0.46)	15.8 (3.0)	1.7 (0.32)

J Aerosol Med Pulm Drug Deliv. 2000; 13(2):147-53

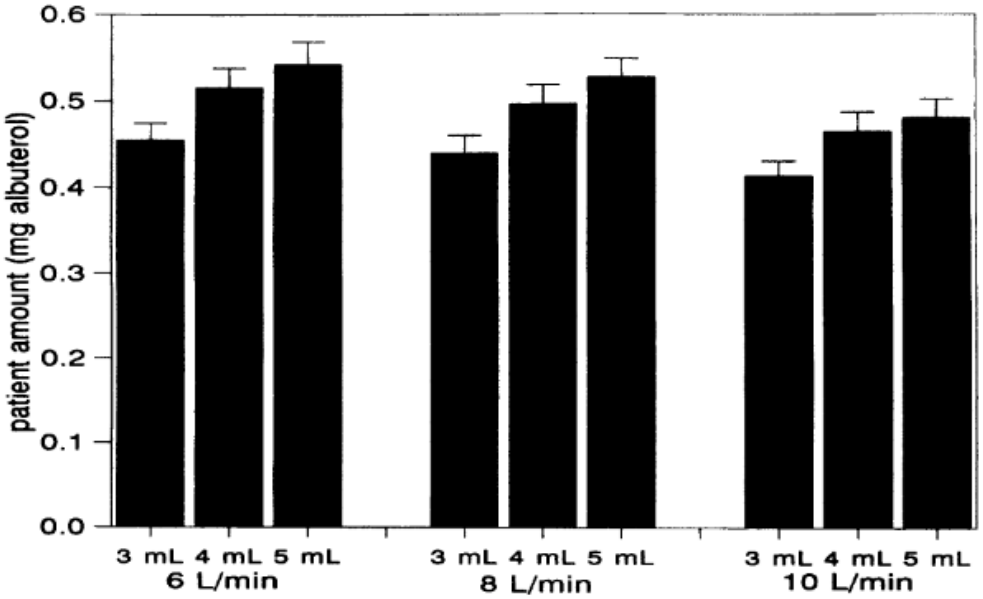
Effets du volume de dilution et du débit



D. Hess : Chest 1996; 110:498-505

Etude in vitro
17 nébuliseurs pneumatiques
2.5 mg Albuterol

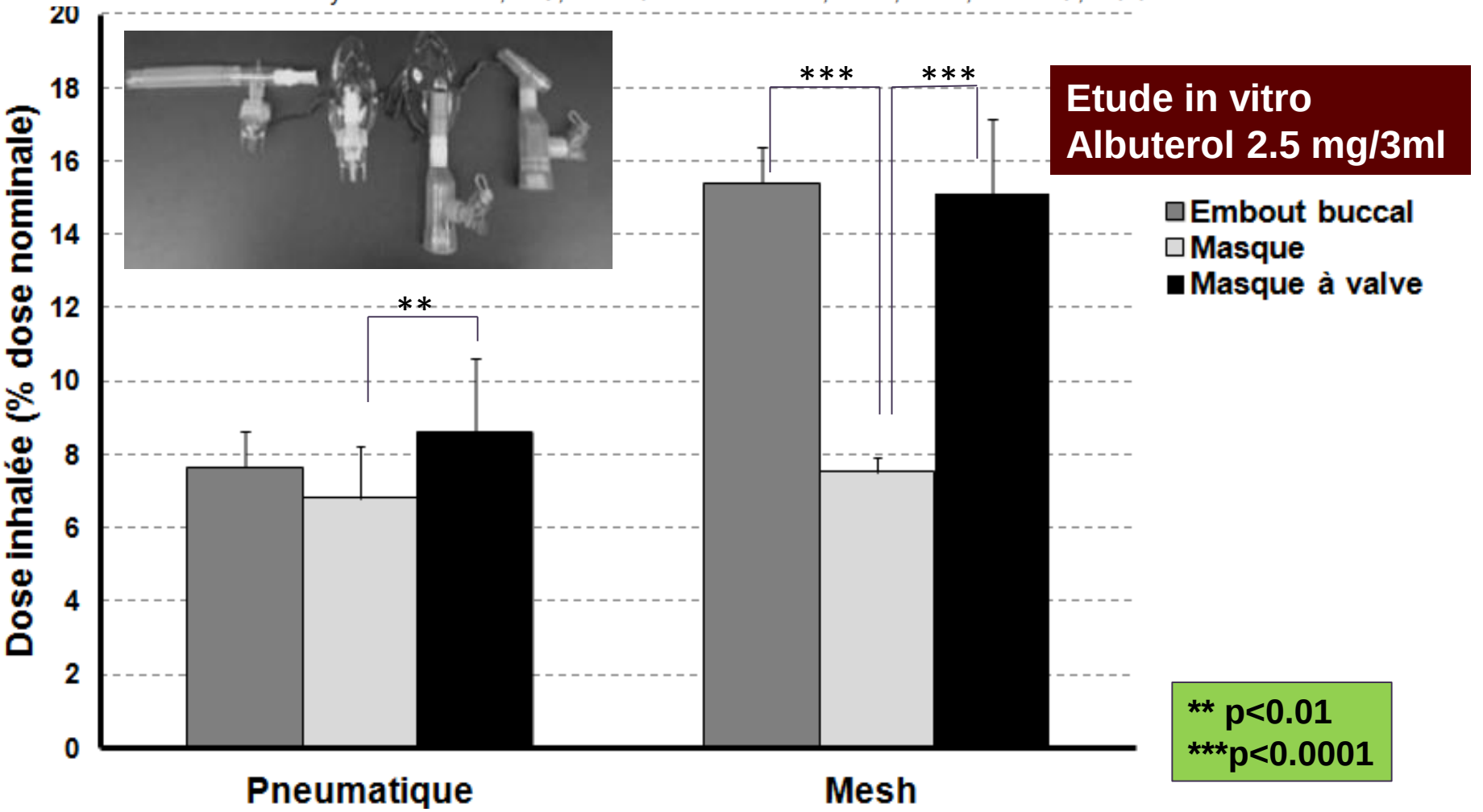
Volume effect = p < 0.001
Flow effect = p = 0.02



Choix de l'interface

Performance Comparisons of Jet and Mesh Nebulizers Using Different Interfaces in Simulated Spontaneously Breathing Adults and Children

Arzu Ari, PhD, RRT, PT, CPFT, FAARC;[1] Armele Dornelas de Andrade, PhD, PT;[2] Meryl Sheard, MS, RRT;[1] Bshayer AlHamad, MS;[1] and James B. Fink, PhD, RRT, FAARC, FCCP[1]



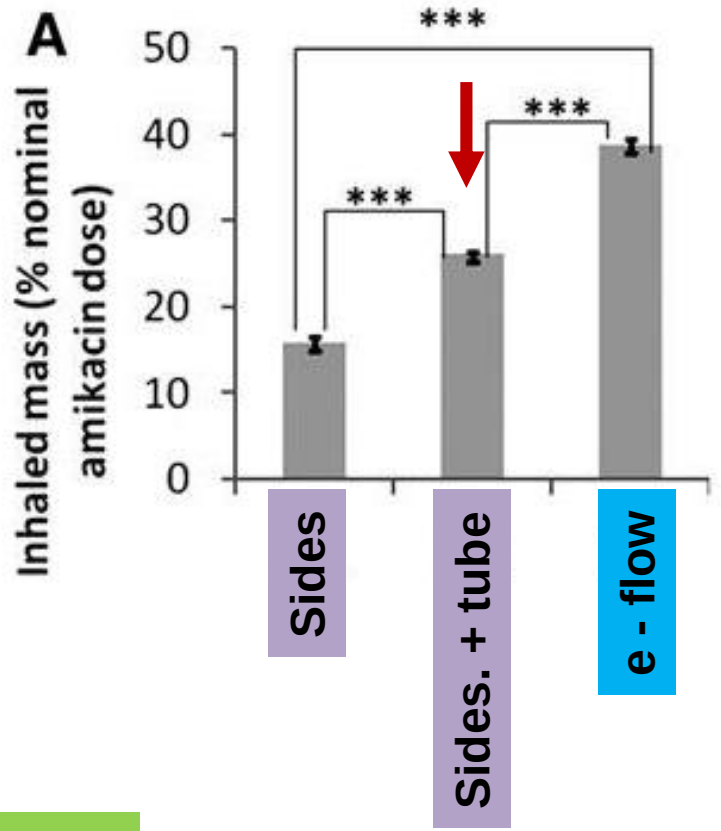
Etude in vitro
Albuterol 2.5 mg/3ml

** p<0.01
***p<0.0001

J Aerosol Med Pulm Drug Deliv. 2014 ahead of print

Effet « réservoir »

Etude in vitro
Pneumatique vs mesh
Amikacin 125mg/4ml



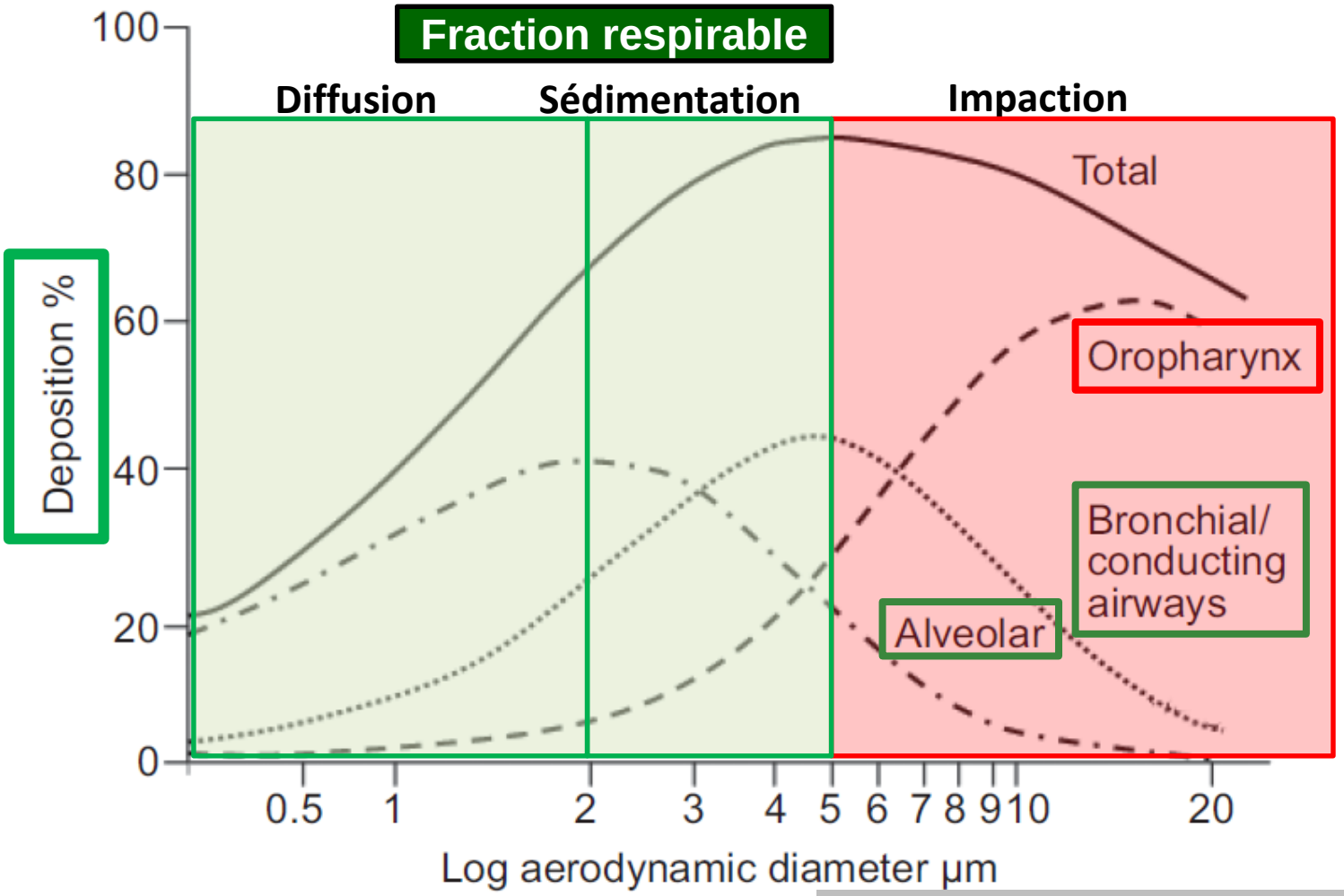
***p<0.001

J Aerosol Med Pulm Drug Deliv. 2010 Dec;23(6):389-96

Améliorer la déposition

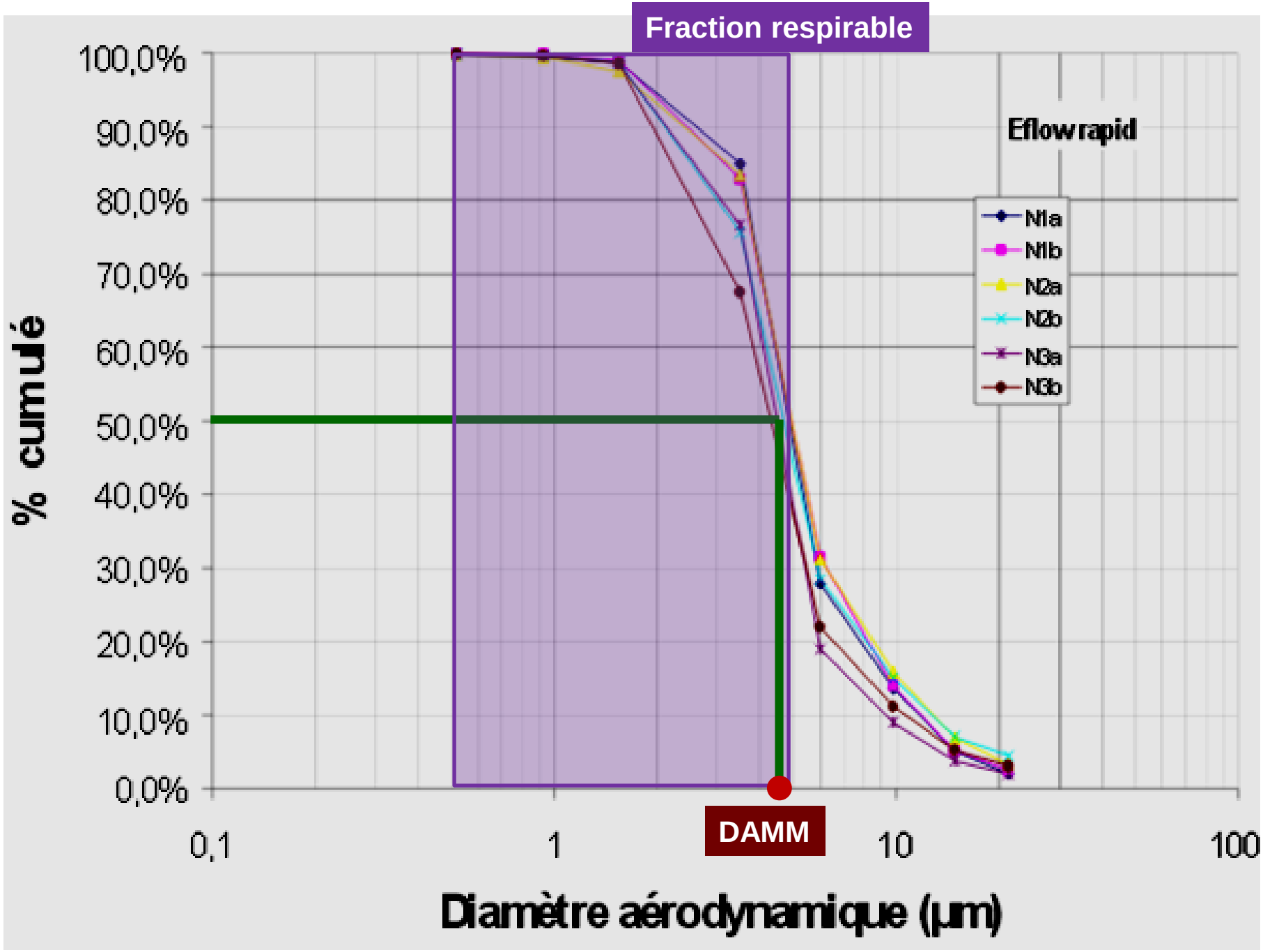
Effets thérapeutiques : DAMM

Diamètre aérodynamique médian en masse



Ann Occup Hyg 1994; 38: 15–23.

Facteurs liés au nébuliseur


Fraction respirable
Eflow rapid
N1a
N1b
N2a
N2b
N3a
N3b
100,0%
90,0%
80,0%
70,0%
60,0%
50,0%
40,0%
30,0%
20,0%
10,0%
0,0%
% cumulé
0,1
1
10
100
DAMM
Diamètre aérodynamique (µm)

ORIGINAL ARTICLE

In vitro deposition properties of nebulized formoterol fumarate: effect of nebulization time, airflow, volume of fill and nebulizer type

Samuel O. Akapo, June Gupta, Eloisa Martinez and Mark Roach

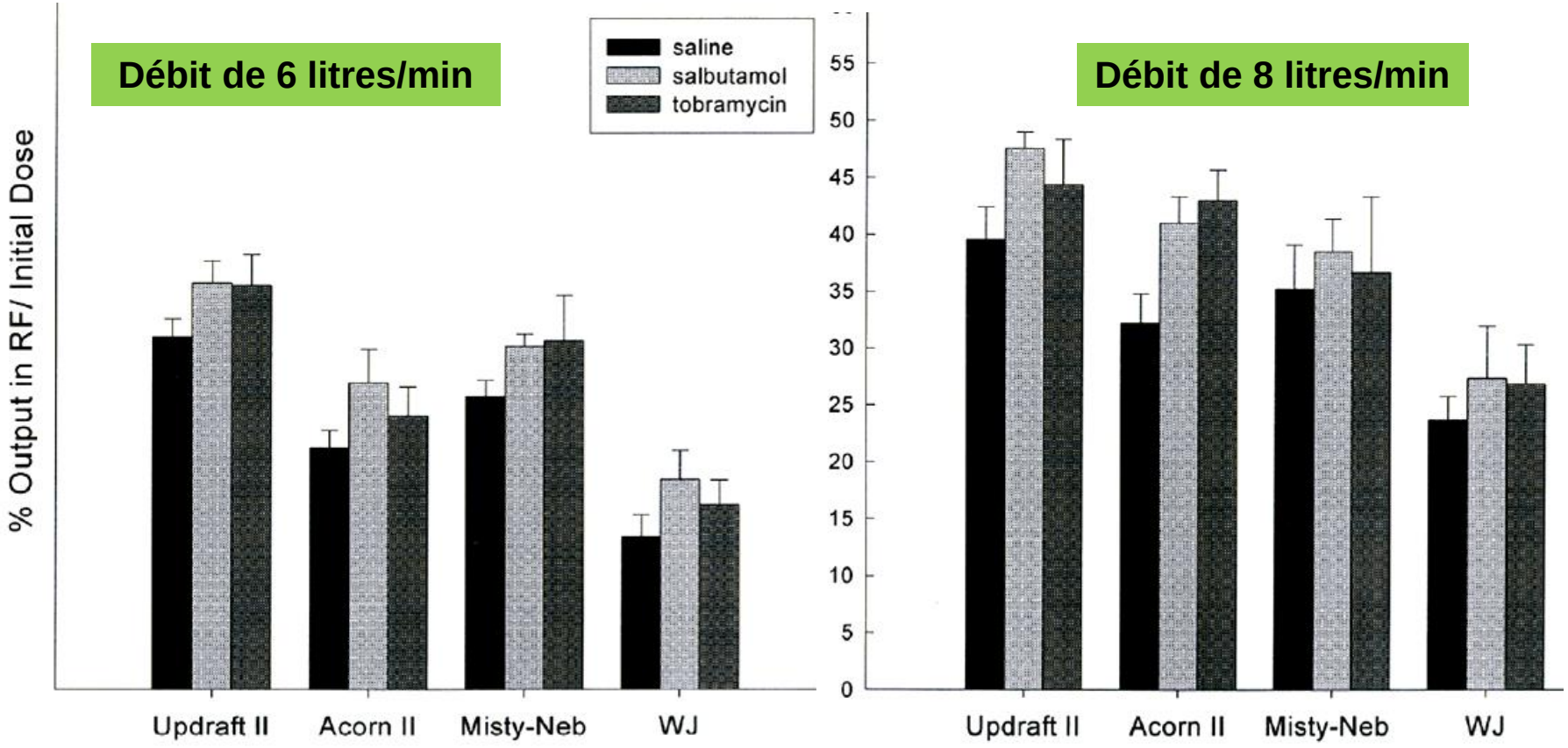
Etude in vitro
20 µg/4 ml Formoterol
0.5 mg/4 ml Ipratropium

Current Medical Research and Opinion Vol. 25, No. 4, 2009, 807–816

Parameter	Nebulization time (min)	Formoterol fumarate		Ipratropium bromide	
		MMAD	GSD	MMAD	GSD
Flow rate (L/min) formoterol–ipratropium admixture:					
5	17	6.1 ± 0.9	3.4 ± 0.4	6.1 ± 0.9	3.3 ± 0.4
10	12	5.3 ± 0.1	2.4 ± 0.1	5.3 ± 0.1	2.4 ± 0.1
15	11	4.6 ± 0.3	2.1 ± 0.3	4.6 ± 0.3	2.1 ± 0.2
20	10	4.0 ± 0.3	2.0 ± 0.1	4.0 ± 0.3	2.0 ± 0.1
28.3	10	2.7 ± 0.1	2.3 ± 0.2	2.7 ± 0.1	2.2 ± 0.1

Effect of dead volume on the efficiency and the cost to deliver medications in cystic fibrosis with four disposable nebulizers

Sharon L Ho BSc RRT. Allan L Coates MD CM



Can Respir J Vol 6 No 3 May/June 1999

Comparison of twenty three nebulizer/compressor combinations for domiciliary use

E.C. Smith*, J. Denyer**, A.H. Kendrick*

Eur Respir J., 1995, 8, 1214–1221.

	Compressor/nebulizer combination	Flow rate L·min^{-1}	2.5 ml fill volume MMAD	2.5 ml fill volume % <5.0 µm	5.0 ml fill volume MMAD	5.0 ml fill volume % <5.0 µm
1A	Aquillon/Neb MKII	7.0	2.6	82	2.6	83
1B	Aquillon/Ava Neb 1780	8.0	4.3	58	4.0	61
1C	Aqillon/Hudson	7.2	4.9	51	5.0	51
2	Pari Inhalierboy/Own	4.1	6.5	36	6.2	39
3A	Aeroneb Standard/Cirrus	3.9	6.6	35	6.7	35
3B	Aeroneb Standard/Own	3.0	10.1	16	9.1	20
3C	Aeroneb Standard/Italian	3.6	10.2	21	10.1	22
4A	Aeroneb High Power/Cirrus	4.8	7.6	28	7.7	28
4B	Aeroneb High Power/Own	3.8	7.5	30	8.4	24
4C	Aeroneb High Power/Italian	4.0	10.0	21	9.5	22
5	Porta-Neb 50/Acorn	6.2	4.7	54	4.5	56
6	Atmomlette/Own	4.2	7.6	28	6.6	36
7	Medix 2000/Cirrus	6.8	4.0	61	4.1	61
8	Medix Traveller/Cirrus	7.0	4.1	61	4.2	59
9	Medix Minor/Cirrus	6.9	3.9	62	4.1	60
10	Pulmo-Aide/Own	5.1	5.9	42	6.3	38
11	Nebu Pump/Acorn	5.6	4.7	55	5.0	50
12	AFP NO1/Microneb	6.2	4.3	59	4.3	58
13	AFP TO1/Microneb	6.4	4.3	60	4.3	60
14	Inspiron/Minineb	5.7	6.8	35	6.9	35
15A	Novair II/Microcirrus	6.7	7.0	39	5.4	48
15B	Novair II/Hudson	5.8	6.1	39	6.1	39
15C	Novair II/Cirrus	5.8	4.5	57	4.2	59

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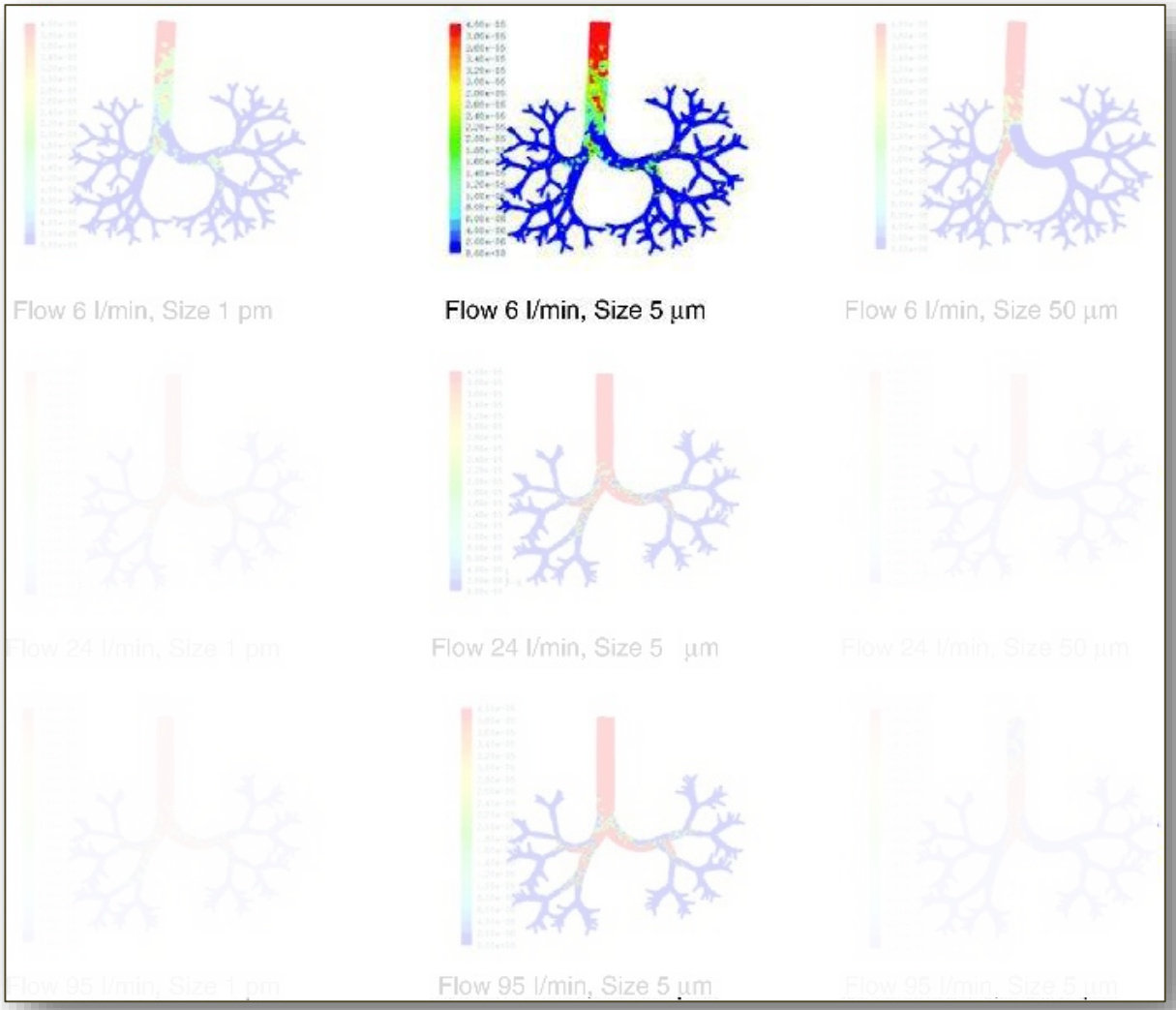
Facteurs liés au patient

Review

Deposition of Inhaled Particles in the Lungs☆

Ana Fernández Tena, Pere Casan Clarà*

Arch Bronconeumol. 2012;48(7):240–246



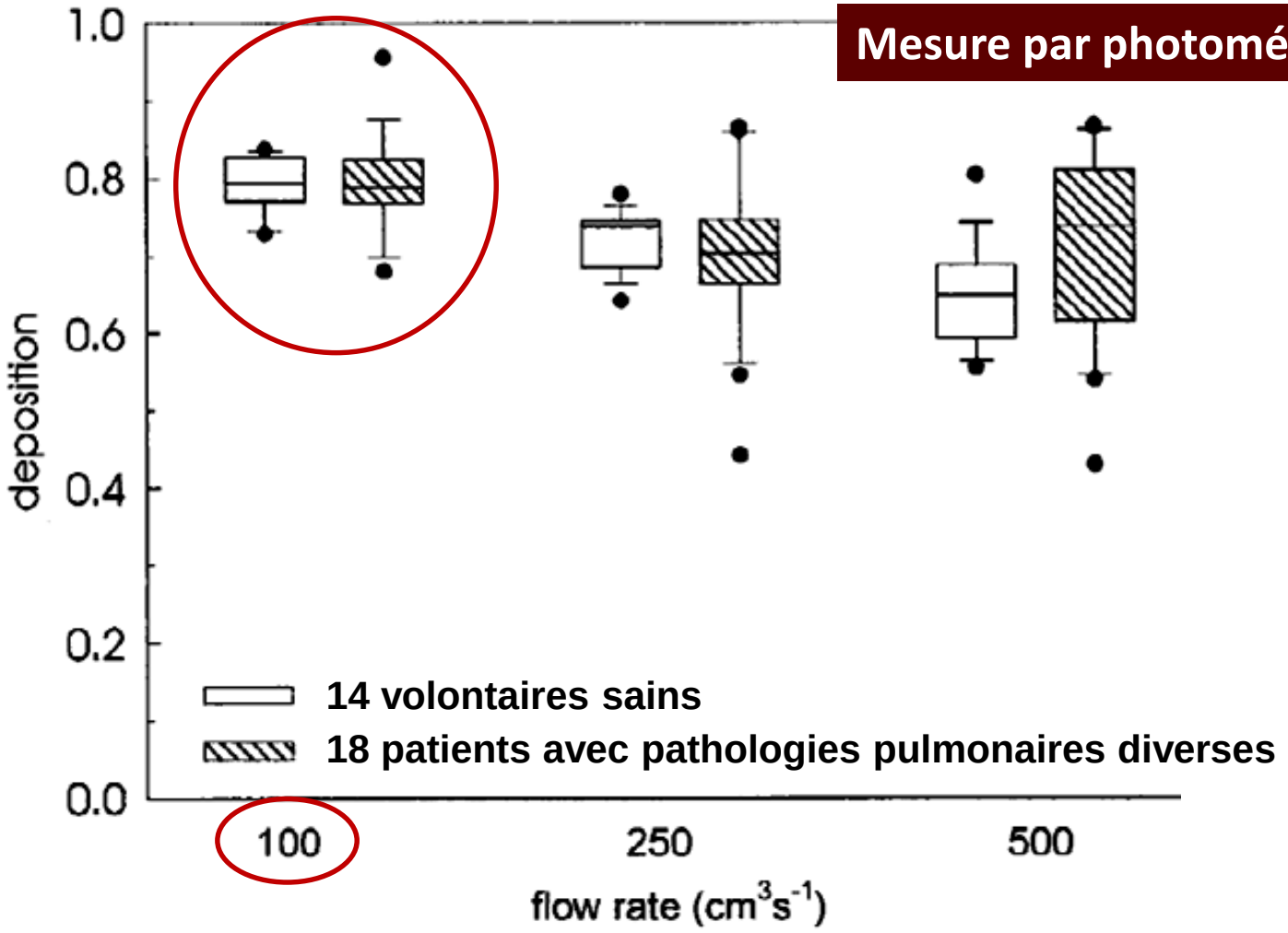
Total Deposition of Therapeutic Particles During Spontaneous and Controlled Inhalations

P. BRAND, I. FRIEMEL, T. MEYER, H. SCHULZ, J. HEYDER, K. HÄUßINGER

Clinical Research Group "Aerosols in Medicine" of the GSF-Institute for Inhalation Biology and the Clinic for Respiratory Medicine, Robert-Koch-Allee 6, D-82131 Gauting, Germany

J Pharm Sci 89 : 724–731, 2000

Mesure par photométrie



The science of nebulised drug delivery

Christopher O'Callaghan, Peter W Barry

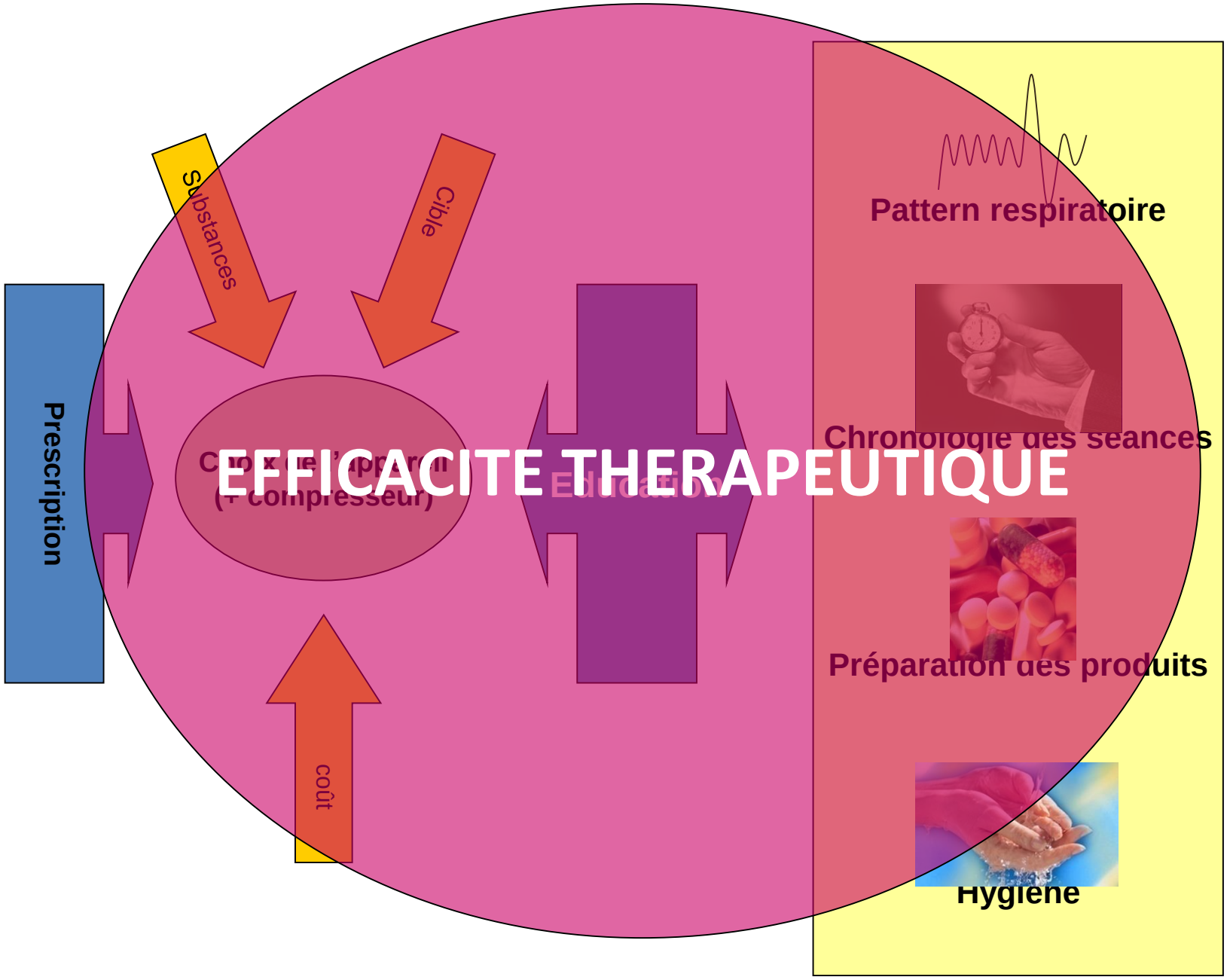
Table 2 Deposition of monodisperse aerosols in the aerodynamic size range 1–8 µm

Particle aerodynamic diameter (µm)	*% Deposition*			*% Exhaled*
	Oropharynx	*Tracheobronchial*	*Alveolar*	
1	0	0	16	84
2	0	2	40	58
3	5	7	50	38
4	20	12	42	26
5	37	16	30	17
6	52	21	17	10
7	56	25	11	8
8	60	28	5	7

Pause inspiratoire favorise la déposition

Thorax 1997;52(Suppl 2):S31–S44

Conclusion


Substances
Cible
Prescription
Choix de l'appareil
(+ compresseur)
Education
coût
EFFICACITE THERAPEUTIQUE
Pattern respiratoire
Chronologie des séances
Préparation des produits
Hygiène

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INTRANET

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Password Ok

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- LA FÉDÉRATION
- LES STRUCTURES ADHÉRENTES
- LA CMTS
- LA MATÉRIOVIGILANCE
- LES BOURSES ET SUBVENTIONS
- LES ACTUALITÉS
- L'AGENDA
- LA MÉDIATHÈQUE

RÉSULTATS

EVALUATION DU MATÉRIEL

Choisissez vos critères de sélection :

Nébulisation | Dispositif de nébulisation | Générateur ultrasonique

Rechercher par nom de dispositif

Filtrer

Supprimer les filtres

Les documents sont classés par date (du plus récent au plus ancien)

DISPOSITIF	FOURNISSEUR

Vous êtes
UN PROFESSIONNEL

EVALUATION DU MATÉRIEL

- Présentation
- Résultats
- Centres référents
- Méthodologie

FORMATIONS

RECHERCHE CLINIQUE

ANTADIR EVAL CLIN

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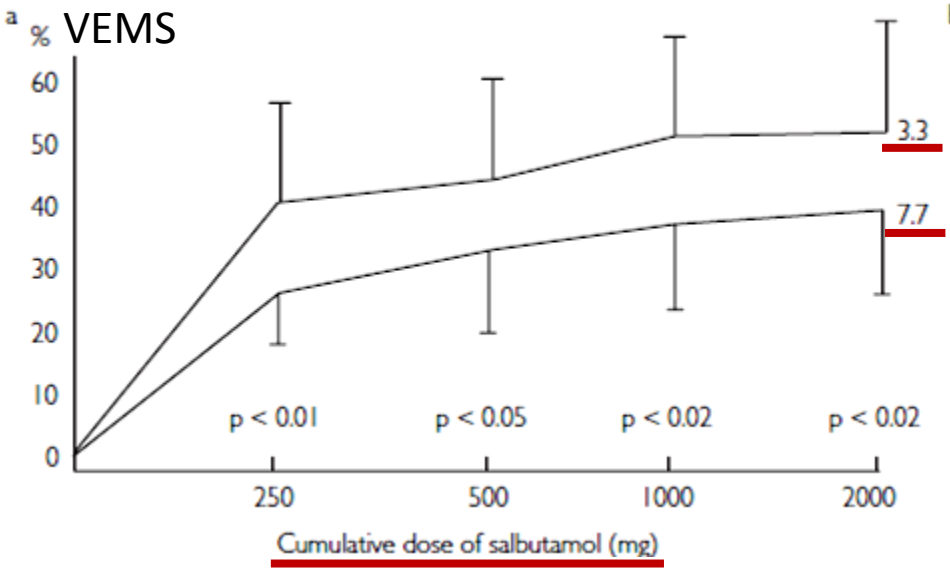
http://www.antadir.com/fr/resultats?filter=1&page=1


Merci pour votre attention !

Effets thérapeutiques : DAMM

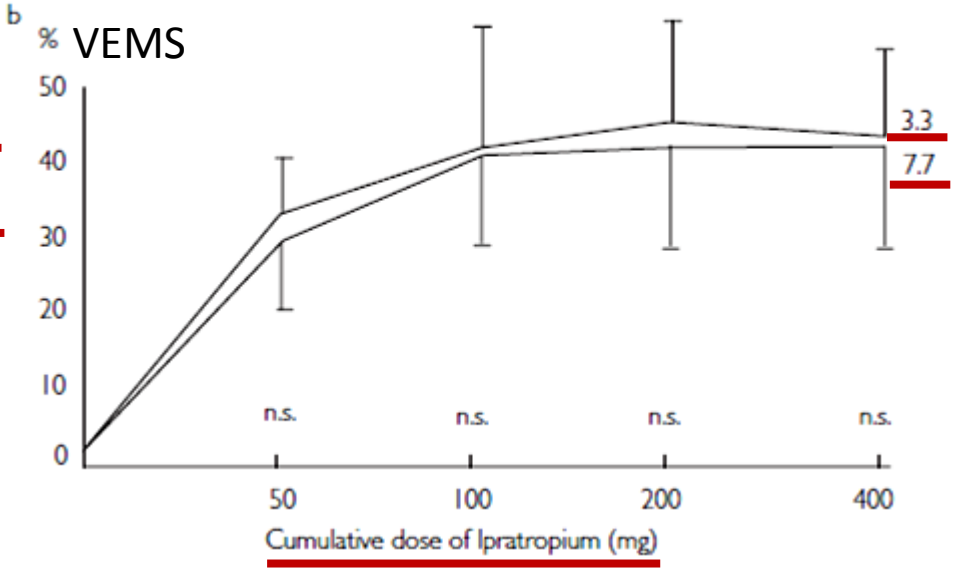
Diamètre aérodynamique médian en masse

Evolution du VEMS (Salbutamol)



Récepteurs bêta 2
(cibles distales)

Evolution du VEMS (Ipratropium)



Récepteurs muscariniques
(cibles proximales)

Br J Clin Pharmacol 2003; 56 : 588–599