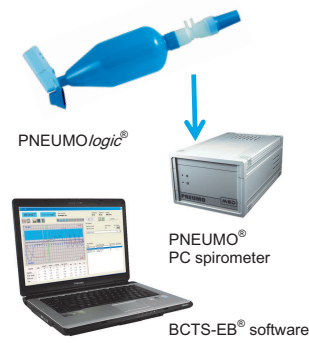


Optimization of inhalation treatment – evaluation of influence of PNEUMO^{logic}® and Optimiser[®] spacers on aerosol particle distribution from pMDI-EB.

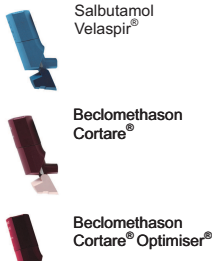
Podolec Z, Siekaniec J Dept. of Aerosology and Aerosol Bioengineering, Research and Development Centre MEDiNET, Cracow, Poland; e-mail: zpodolec@medinet.com.pl, www.medinet.com.pl

Optimization of inhalation treatment - using PNEUMO^{logic}® inhalation chamber connected with PNEUMO[®] PC spirometer enables optimization of inhalation treatment as a result of individual adjustment of method of inhalation.

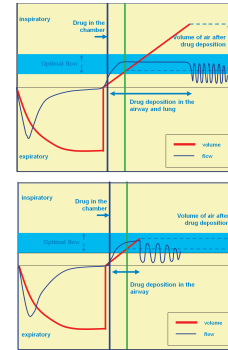
The kit for aerosol administration:



Inhalation drug:



Inhalation method, which use PNEUMO^{logic}® inhalation chamber in order to obtain maximal drug aerosol deposition at targeted site, enables:



Beclomethason

- reduction of aerosol deposition in oral cavity
- obtaining maximum aerosol deposition in peripheral [and central] part of airways

↑ the overall drug effect

Salbutamol / Beclomethason

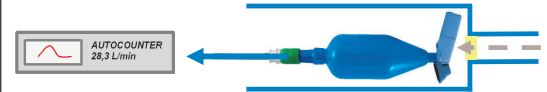
- reduction of aerosol deposition in oral cavity
- obtaining maximum deposition in central part of airways

↓ the overall drug effect

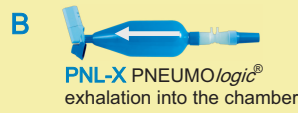
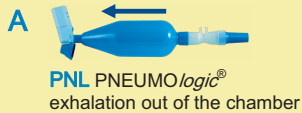
Introduction: PNEUMO^{logic}® [PNL] [vol. 800 ml] is the first inhalation chamber integrated with the PC spirometer used for the controlled drug delivery from pMDI-EB. Optimiser[®] [OPT] [vol. 50 ml] is the aerosol chamber used for drug administration from pMDI-EB. The aim of the study was to evaluate the influence of inhalation chamber and method of performing inhalation on the quality of aerosol.

Method: Aerosol particle distribution and mass of aerosol was measured using particle counter with constant flow of 28,3 L/min. Inhalation chamber was placed in 7 L chamber with a constant air humidity 20% and constant air temperature 25°C.

Diagram of measuring set:

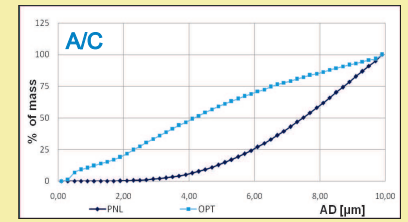
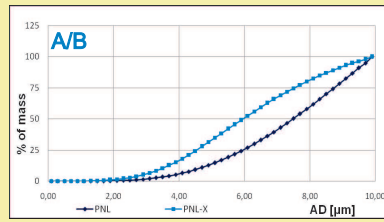


Results: Our study demonstrated statistically significant influence of chamber's size and the air exhaled into the chamber on quality and mass of aerosol.



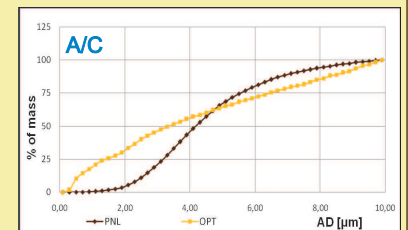
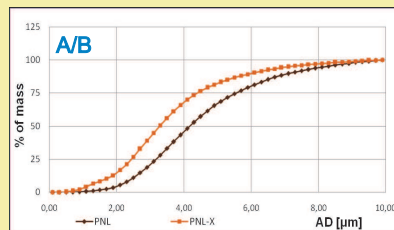
Salbutamol 100	PNL	PNL-X	OPT
	A	B	C
FR 1µm [%]	0,04	0,15	12,79
FR 3,5µm [%]	3,47	10,18	43,13
FR 5µm [%]	14,98	34,46	62,79
MMAD [µm]	7,49	5,96	4,17
σg	1,22	1,38	1,86
MA [µg]	0,2574	0,1834	0,0129

Statistically significant difference (p<0,5)
FR 1µm: A/B; A/C; B/C;
FR 3,5µm: A/B; A/C; B/C;
FR 5µm: A/B; A/C; B/C;
MA: A/B; A/C; B/C;



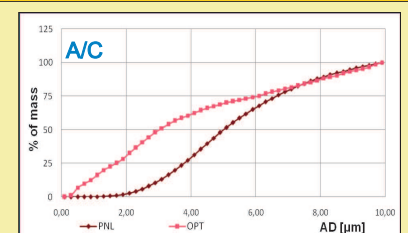
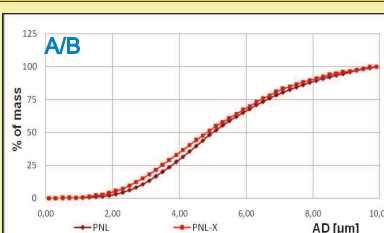
Beclomethason 100	PNL	PNL-X	OPT
	A	B	C
FR 1µm [%]	0,62	4,42	22,48
FR 3,5µm [%]	34,20	57,59	53,55
FR 5µm [%]	69,70	80,10	63,86
MMAD [µm]	4,18	3,28	3,35
σg	1,52	1,58	2,32
MA [µg]	0,0331	0,0194	0,0062

Statistically significant difference (p<0,5)
FR 1µm: A/B; A/C; B/C;
FR 3,5µm: A/B; A/C; B/C;
FR 5µm: A/B; A/C; B/C;



Beclomethason 250	PNL	PNL-X	OPT
	A	B	C
FR 1µm [%]	0,27	0,77	18,22
FR 3,5µm [%]	20,49	27,83	64,43
FR 5µm [%]	52,69	57,75	77,18
MMAD [µm]	5,01	4,83	3,03
σg	1,49	1,49	2,47
MA [µg]	0,0456	0,0328	0,0057

Statistically significant difference (p<0,5)
FR 1µm: A/B; A/C; B/C;
FR 3,5µm: A/B; A/C; B/C;
FR 5µm: A/B; A/C; B/C;



Conclusion: Application of the PNEUMO^{logic}® chamber integrated with the PC spirometer opens up new possibilities for optimization of inhalation treatment.