European Respiratory Society
Annual Congress 2012

Abstract Number: 2037

Publication Number: P3207

Abstract Group: 9.1. Respiratory Function Technologists/Scientists

Keyword 1: Lung function testing **Keyword 2:** Spirometry **Keyword 3:** Physiology

Title: Validation of spirometer calibration syringes

Dr. Flemming 3364 Madsen flem-mad@dadlnet.dk MD [1]. [1] Lung Function Laboratory, Allergy and Lung Clinic Helsingør, Helsingør, Capital Region, Denmark, 3000 .

Body: The calibration syringe is probably the most important instrument in pulmonary function laboratories, yet no validation results have been published. Methods: We weighed a 3 L calibration syringe before and after emptying it of water and determined the corresponding volume of gas by using a modified rolling seal spirometer. Results: The volume of a spirometer calibration syringe could be verified with an accuracy of ± 15 mL. All syringes larger than one litre had volumes within the label claimed volume ± 0.5 %.

Syringe Manufacturer	Volume claimed ml	Volume Verified	Volume deviation ml(pct.)	Volume SD ml	Syringe duty cycle
Hans Rudolph	2,989	2,988	1 (0.03)	0.8	1990-1991 & 1998-1999. Epidemiology
Hans Rudolph	5,500	5,530	30 (0.05)	1,7	Never
Hans Rudolph	2,500	2,496	4 (0.2)	4.6	Never
Hans Rudolph	3,000	2,987	13 (0.4)	2.9	Never
Ferraris	3,000	2,988	12 (0.4)	2.9	2002-2005 Clinical trial
Ferraris	3,000	3,002	07 (0.2)	0.9	2002-2005 Clinical trial
Ferraris	3,000	2,990	10 (0.3)	0.7	2002-2005 Clinical trial
Biotrine	3,000	2,994	06 (0.2)	2	1975-1990
Biotrine	3,000	3,002	02 (0.1)	4	2002-2005 Clinical trial
Cardinal	3,000	2,988	12 (0.4)	3	2008-2010
Jaeger	1,000	0,976	24 (2.4)	1	Never
Jaeger	1,000*3	2,952	48 (1.6)	5	Never
Vitalograph	1,000	0,984	16 (1.6)	11	1998-2011 Routine
Vitalograph	1,000*3	2,979	21 (0.7)	15	1998-2011 Routine

All results are based on 10 measurements. One litre syringes were tested at 1 litre and the sum of three strokes. None of the syringes had been serviced by the manufacturer or by a certified company

Conclusion: Spirometer calibration syringes have a stable stroke volumes. The maximal interval between syringe validations should perhaps be extended beyond the 1-year period required by current standards. Use of two syringes would allow one syringe exceeding the maximal permissible error to be detected earlier.