

# In Vitro Performance of Litholyme Prefilled CO<sub>2</sub> Absorbent Canistera With the Aisys®

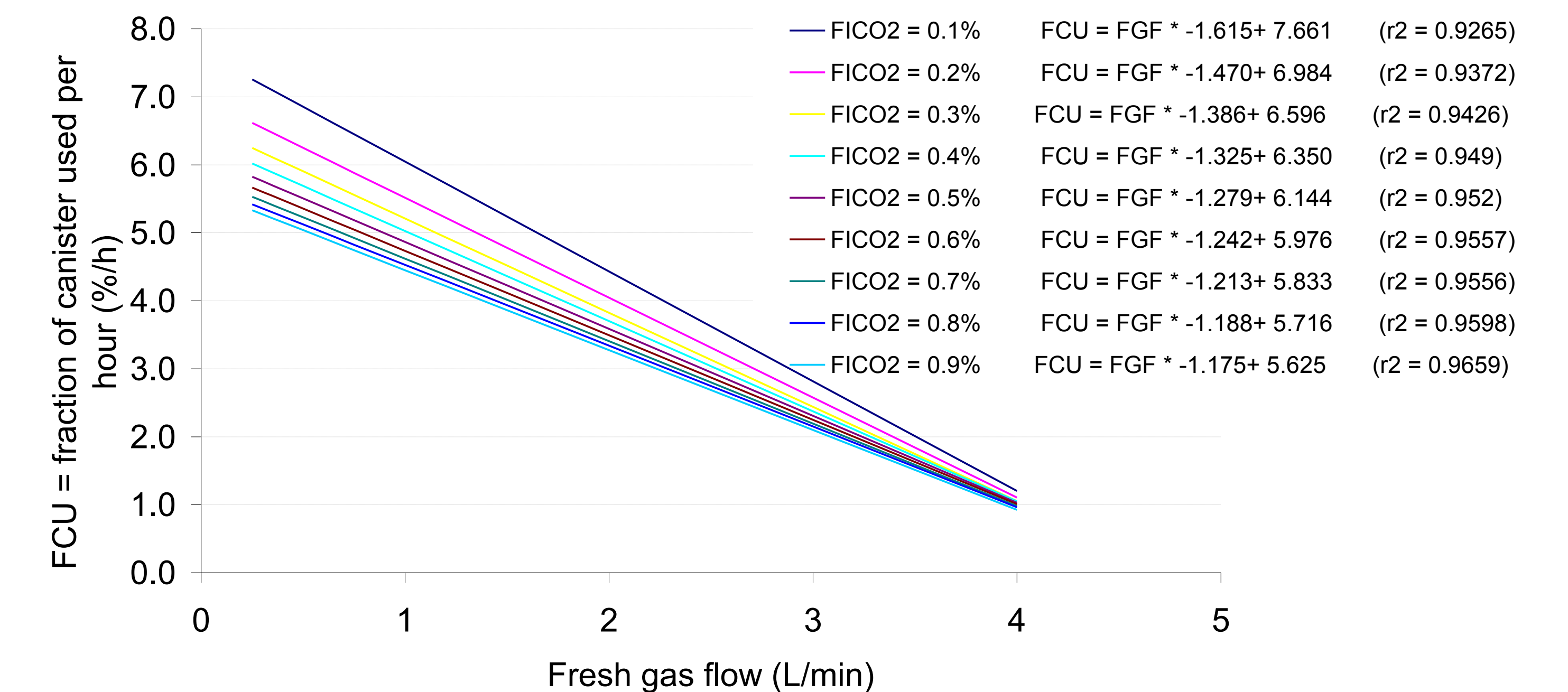
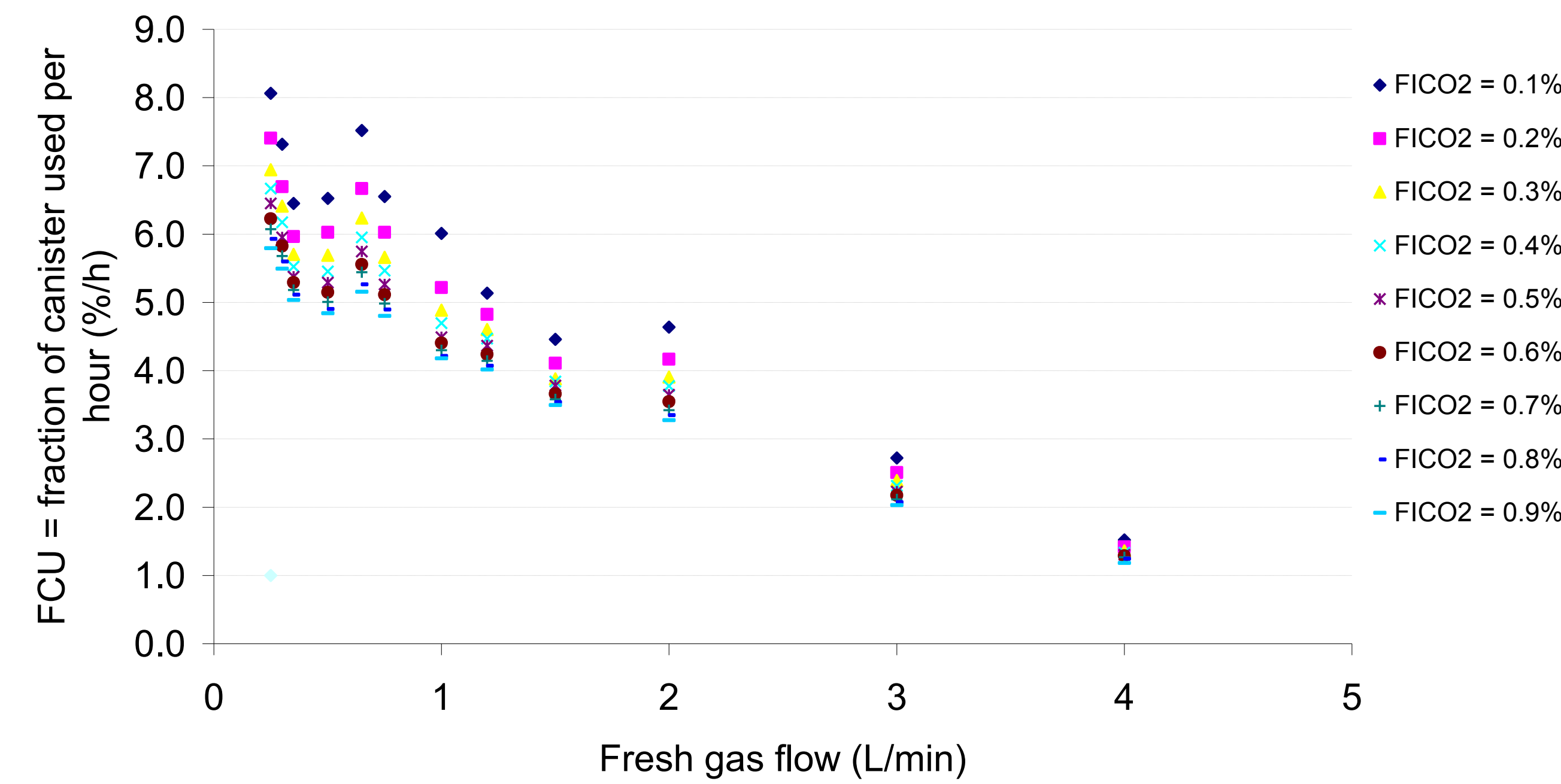
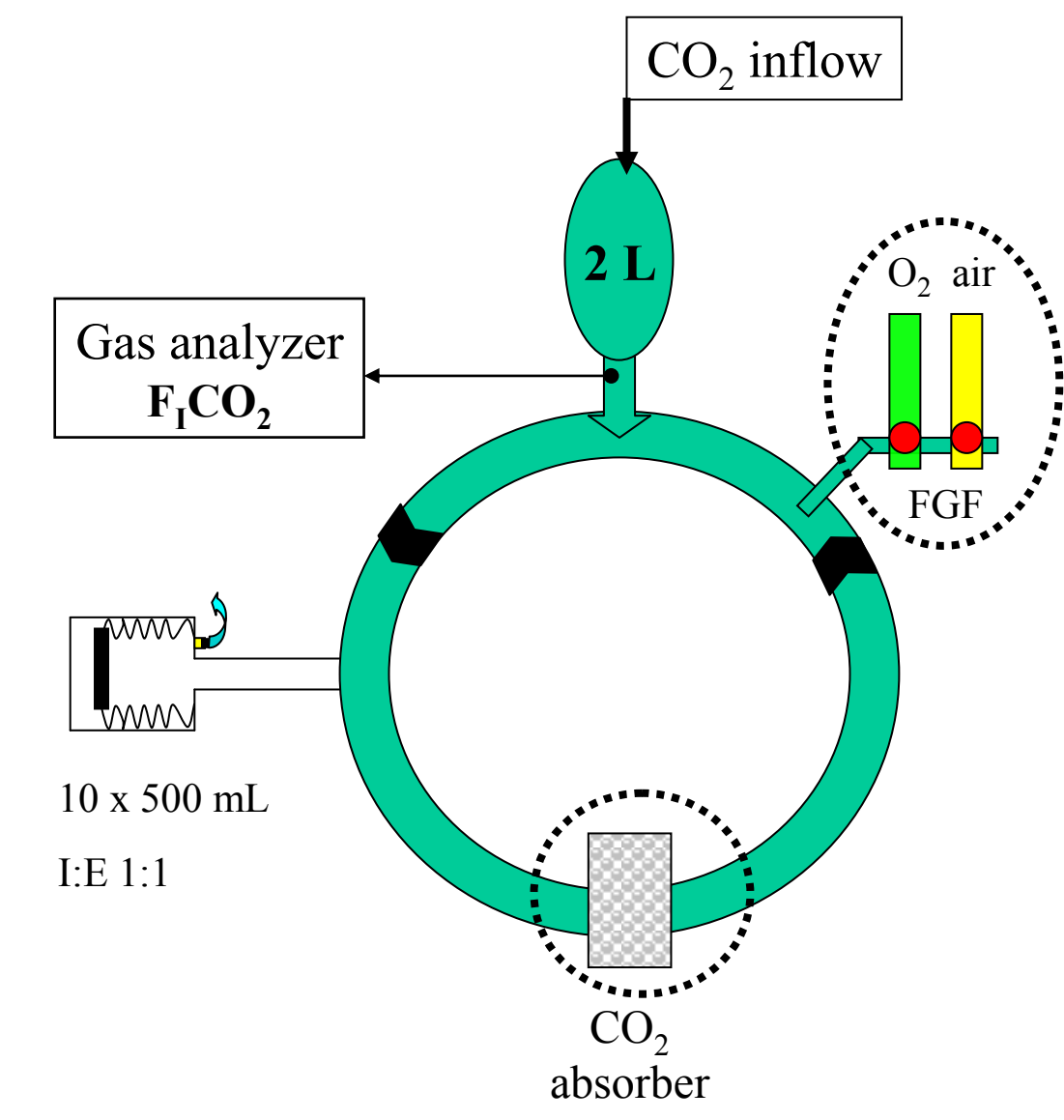
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## Introduction

- Fresh gas flows (FGF) in circle system ↓
  - inhaled agent usage ↓
  - CO<sub>2</sub> absorbent usage ↑
- CO<sub>2</sub> absorption capacity of prefilled CO<sub>2</sub> canisters
  - bound to differ between products (weight, composition, ...)
  - good comparative data scarce, lacking external validation
  - often not tested in clinical relevant setting
  - knowledge would be useful to guide product selection
- test commercially available canisters in vitro under standardized conditions
- Litholyme canister performance has not been tested yet



## Materials and Methods

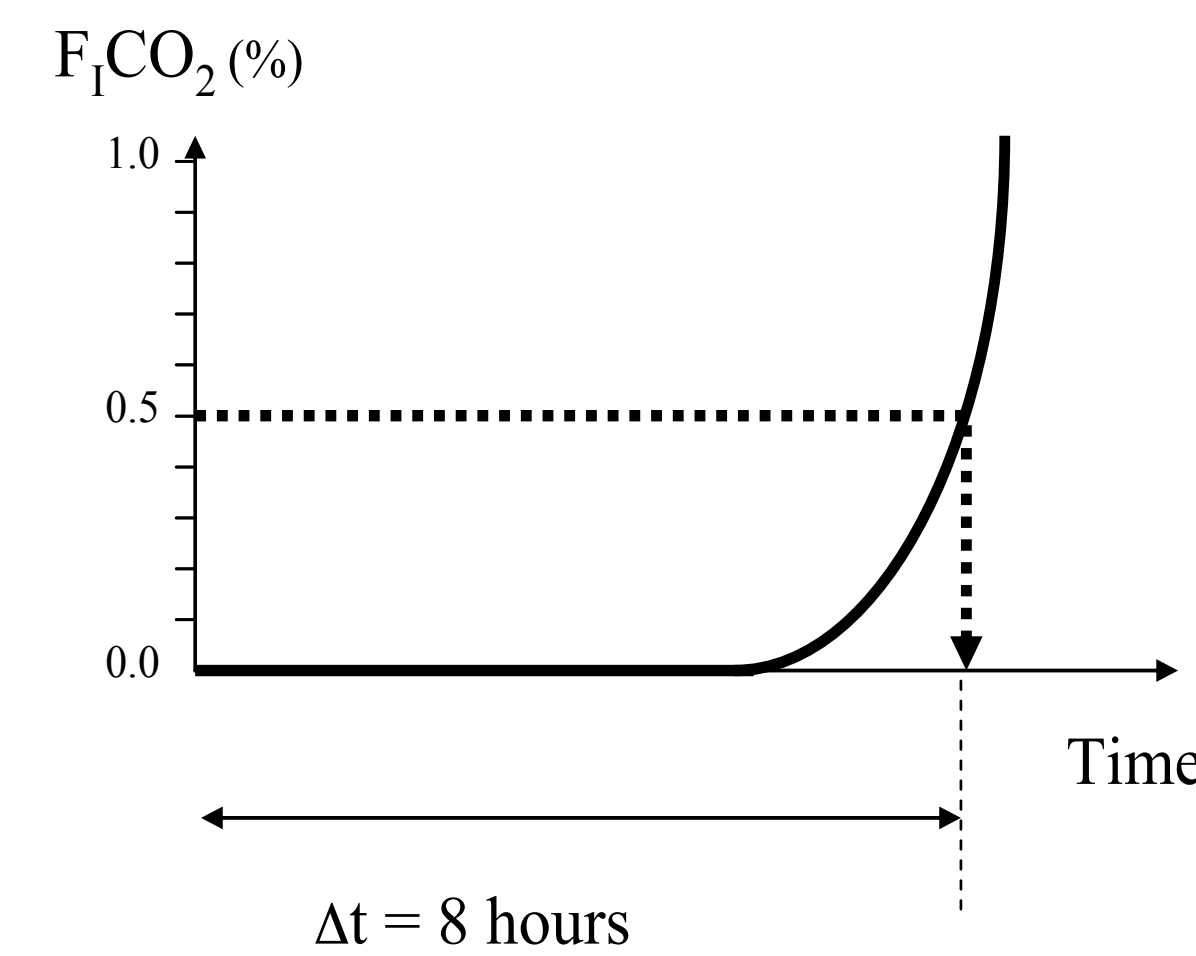
- Canisters: Litholyme® prepac for Aisys®
- CO<sub>2</sub> load: 164 ± 4 mL/min into the tip of 2L bag; Aisys® (GE), CMV, minute ventilation 5L/min (TV 500 mL, RR 10,)

- Q1: Δt to F<sub>1</sub>CO<sub>2</sub> = 0.1 to 0.9 % with different O<sub>2</sub>/air FGF? FGF ranged from 0.25 to 5.0 L/min (one canister per FGF run) new canister for each FGF
- Q2: interlot variability? Δt to F<sub>1</sub>CO<sub>2</sub> = 0.1 to 0.9 % with 6 canisters of 2 different lots with 0.35 L/min FGF

Fraction of a canister used per hour (FCU or fractional canister usage) for a particular FGF  
 FCU (in %) = 100/(time [in hours])  
 example: Δt to an F<sub>1</sub>CO<sub>2</sub> of 0.1% = 8 h  
 100% of the canister was used in 8 hours  
 12.5% of the canister was used per hour thus FCU = 12.5%

CO<sub>2</sub> absorption capacity across FGF spectrum  
 plot FGF versus FCU  
 linear regression (one for each F<sub>1</sub>CO<sub>2</sub> thresholds)  
 slope of the regression lines defines performance of particular canister

Example of calculating FCU  
 e.g. 1 l/min FGF



Δt = 8 hours  
 1 canister/8 hours  
 = 0.125 canister/h  
 = 12.5 % of 1 canister/h  
 “FCU” = fractional canister usage

Canister usage for different F<sub>1</sub>CO<sub>2</sub> thresholds  
 (% of canister used per hour for prevailing study conditions)

Lot number	Parameter	Fresh granule content g	CO <sub>2</sub> flow mL/min	F <sub>1</sub> CO <sub>2</sub> %	Time (min) to reach F <sub>1</sub> CO <sub>2</sub> (%) threshold										Fractional canister usage (%) with each F <sub>1</sub> CO <sub>2</sub> threshold									
					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
LA00714EZ	Average	1000	162	4.82	641	730	791	833	867	903	932	958	980	1001	9.5	8.3	7.6	7.2	6.9	6.7	6.5	6.3	6.1	6.0
	Standard deviation	12	3	0.17	81	63	56	52	52	49	45	47	46	44	1.3	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3
	Coefficient of variaton (%)	1			13	9	7	6	6	5	5	5	5	4	14	9	7	6	6	6	5	5	5	5
LA35313EZ	Average	1003	161	4.61	866	935	983	1023	1053	1079	1104	1126	1141	1161	7.0	6.5	6.1	5.9	5.7	5.6	5.4	5.3	5.3	5.2
	Standard deviation	27	3	0.05	75	79	78	72	71	67	63	62	63	58	0.6	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3
	Coefficient of variaton (%)	3			9	8	8	7	7	6	6	5	5	5	9	9	8	7	7	6	6	6	6	5
Different?	t-test	0.81	0.46	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Two lots combined	Average	1002	161	4.71	754	833	887	928	960	991	1018	1042	1060	1081	8	7	7	7	6	6	6	6	6	6
	Standard deviation	20	3	0.16	140	127	119	116	114	108	104	102	99	97	2	1	1	1	1	1	1	1	1	1
	Coefficient of variaton (%)	2	2	3.43	19	15	13	12	12	11	10	10	9	9	20	15	13	12	12	11	10	10	9	9

## Interlot variability

## Conclusion

When used in prepac with the Aisys, Litholyme absorber usage decreases linear with FGF. Different Litholyme canister lots may differ in their clinical efficiency.

