

Supplementary Information for:

Hypertonic Saline Jet Nebulization Breathing Treatments Produce a Predictable Quantity of Aerosolized Sodium Chloride for Inhalation

By: Martin J. Flores^a; MaTais Caldwell^a; Kalysa D. Passmore^a; Megan Denney, RRT^a;
James M. Carr^b, Kerri Carr, FNP-BC^{a,c}, Jeremy M. Carr, Ph.D., M.Ed.^{*a,b}

Institutional Information

- a) Central Alabama Community College, 1675 Cherokee Road, Alexander City, AL, 35010, United States of America, Phone: +1 256-215-4342
- b) KeBa, LLC, Research Division, 4342 Dudleyville Road, Dadeville, AL 36853, United States of America
- c) Neurology Consultants of Montgomery, P.C., 1722 Pine Street, Suite 700, Montgomery, AL 36106, United States of America, Phone: +1 334-834-1300

**Please address all correspondence to:*

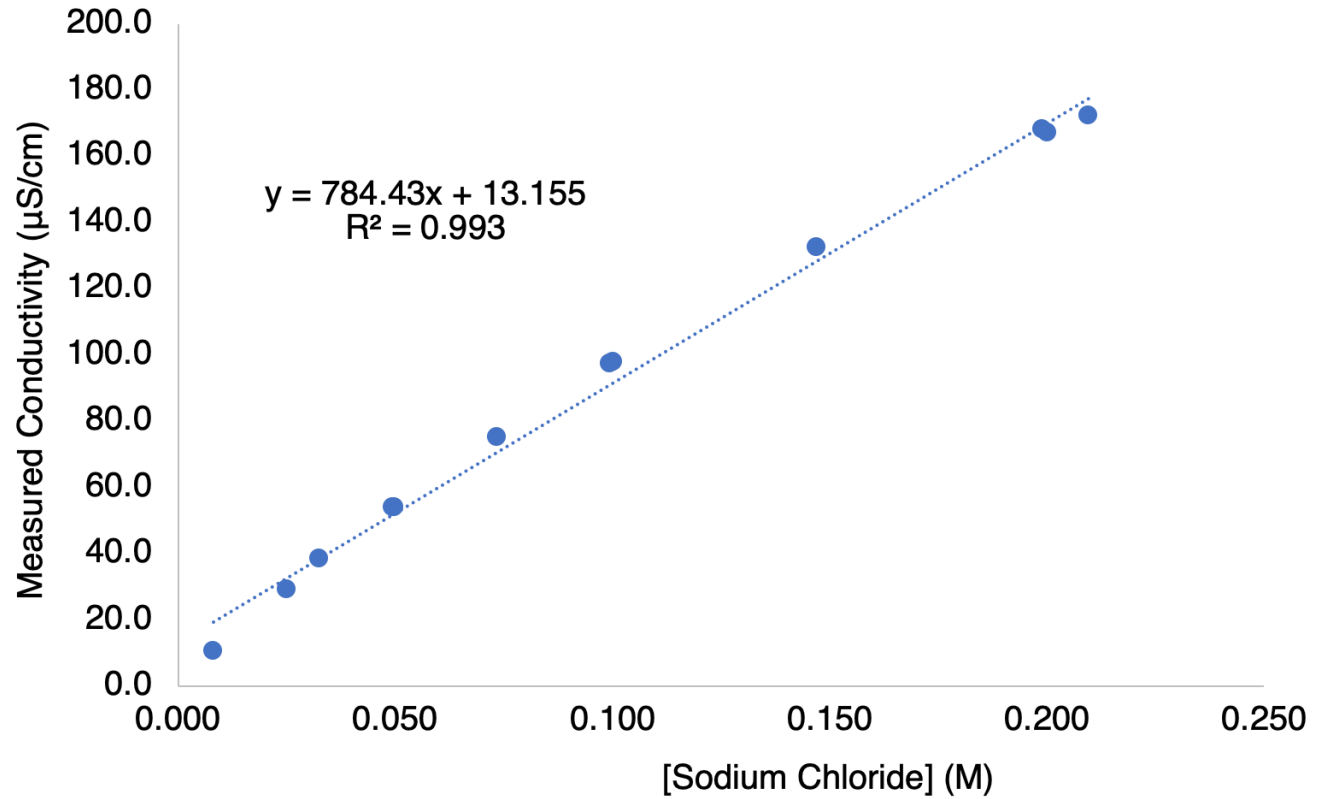
Dr. Jeremy M. Carr, Chemistry Department Chair, Central Alabama Community College, 1675 Cherokee Road, Alexander City, AL, 35010, USA
Email: jcarr@cacc.edu, Phone: +1 256-215-4342.

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Calibration Data, Standard Curve, and Relevant Statistics

Saline Concentration (M)	Measured Conductivity ($\mu\text{S cm}^{-1}$)
0.210	172.3
0.200	167.0
0.199	167.8
0.147	132.3
0.100	97.9
0.100	97.4
0.074	74.9
0.050	54.1
0.050	53.9
0.033	38.3
0.025	29.1
0.008	10.3



Slope	784.4 $\mu\text{S cm}^{-1} \text{ M}^{-1}$
Intercept	13.2 $\mu\text{S cm}^{-1}$
Correlation	0.996
Coefficient of Determination	0.993

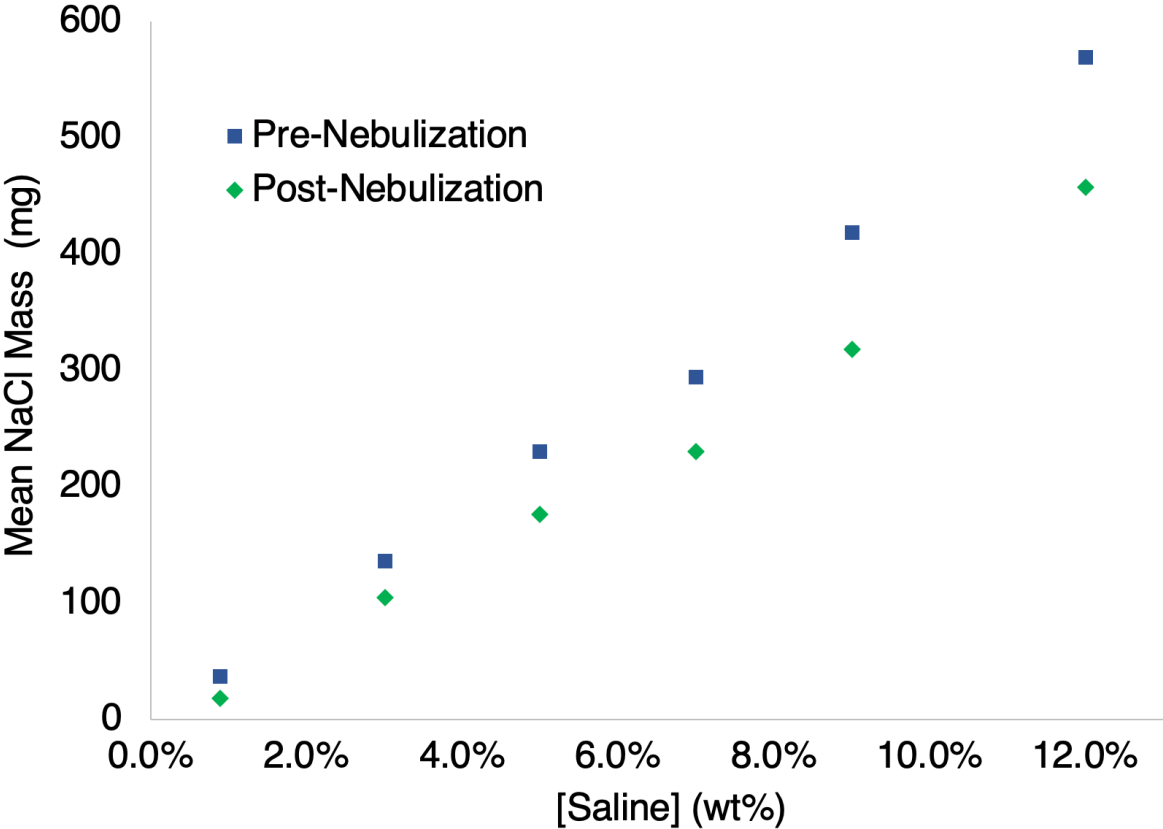
Pre- and Post-Nebulization Data for 0.9%, 3.0%, and 5.0% NaCl Solutions

Solution	PRE-NEBULIZATION DATA						POST-NEBULIZATION DATA						Difference (mg)	
	Initial Conductivity (uS/cm)	Analyte Volume (mL)	Analyte Volume (L)	Correlated Molarity (M)	NaCl in Analyte (mol)	NaCl Mass in Sample	Final Conductivity (uS/cm)	Analyte Volume (mL)	Analyte Volume (L)	Correlated Molarity (M)	NaCl in Analyte (mol)	Mass (mg)		
0.9%	137.5	4.00	0.004	0.1585	0.00063	37	25.7	25.00	0.025	0.0160	0.00040	23	-14	
	138.4	4.00	0.004	0.1597	0.00064	37	23.0	25.00	0.025	0.0126	0.00031	18	-19	
	137.3	4.00	0.004	0.1583	0.00063	37	22.9	25.00	0.025	0.0124	0.00031	18	-19	
							20.9	25.00	0.025	0.0099	0.00025	14	-23	
							21.7	25.00	0.025	0.0109	0.00027	16	-21	
							21.8	25.00	0.025	0.0110	0.00028	16	-21	
							25.0	25.00	0.025	0.0151	0.00038	22	-15	
							23.8	25.00	0.025	0.0136	0.00034	20	-17	
						Average = 37.1						Average = 19	Average = 3	-19
						St Dev = 0.2						St Dev = 3	St Dev = 3	3
3.0%	88.5	25.00	0.025	0.0961	0.00240	140	66.6	25.00	0.025	0.0681	0.00170	100	-37	
	86.7	25.00	0.025	0.0938	0.00234	137	66.5	25.00	0.025	0.0680	0.00170	99	-37	
	85.7	25.00	0.025	0.0925	0.00231	135	68.7	25.00	0.025	0.0708	0.00177	103	-33	
	85.3	25.00	0.025	0.0920	0.00230	134	67.8	25.00	0.025	0.0697	0.00174	102	-34	
	85.0	25.00	0.025	0.0916	0.00229	134	67.8	25.00	0.025	0.0697	0.00174	102	-34	
							65.9	25.00	0.025	0.0672	0.00168	98	-38	
							72.4	25.00	0.025	0.0755	0.00189	110	-26	
							69.7	25.00	0.025	0.0721	0.00180	105	-31	
							72.3	25.00	0.025	0.0754	0.00188	110	-26	
							73.3	25.00	0.025	0.0767	0.00192	112	-24	
						75.3	25.00	0.025	0.0792	0.00198	116	-20		
					Average = 136						Average = 105	Average = 6	-31	
					St Dev = 3						St Dev = 6	St Dev = 6	6	
5.0%	135.8	25.00	0.025	0.1563	0.00391	228	106.7	25.00	0.025	0.1193	0.00298	174	-56	
	136.2	25.00	0.025	0.1569	0.00392	229	106.5	25.00	0.025	0.1190	0.00297	174	-56	
	142.9	25.00	0.025	0.1654	0.00414	242	108.2	25.00	0.025	0.1212	0.00303	177	-53	
	131.4	25.00	0.025	0.1507	0.00377	220	108.5	25.00	0.025	0.1215	0.00304	178	-52	
	132.2	25.00	0.025	0.1518	0.00379	222	108.3	25.00	0.025	0.1213	0.00303	177	-53	
	133.0	25.00	0.025	0.1528	0.00382	223								
	130.1	25.00	0.025	0.1491	0.00373	218								
						Average = 230						Average = 176	Average = 2	-54
					St Dev = 9						St Dev = 2	St Dev = 2	2	

Pre- and Post-Nebulization Data for 7.0%, 9.0%, and 12.0% NaCl Solutions

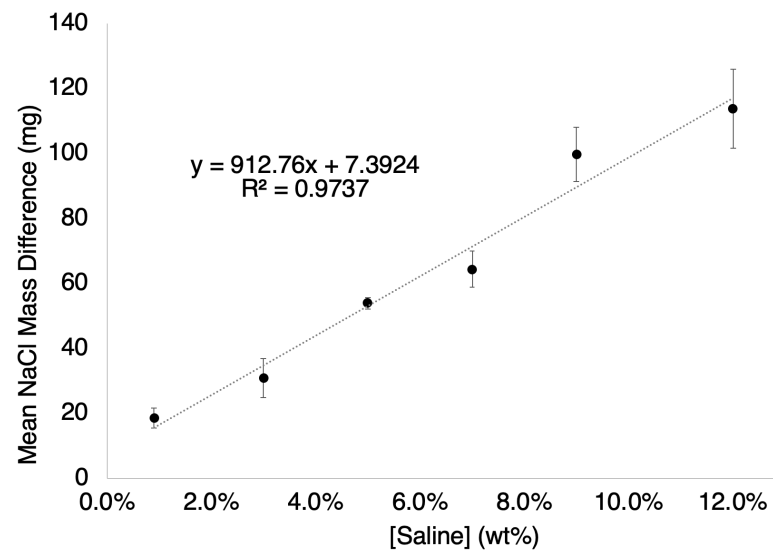
Solution	PRE-NEBULIZATION DATA						POST-NEBULIZATION DATA						Difference (mg)
	Initial Conductivity (uS/cm)	Analyte Volume (mL)	Analyte Volume (L)	Correlated Molarity (M)	NaCl in Analyte (mol)	NaCl Mass in Sample	Final Conductivity (uS/cm)	Analyte Volume (mL)	Analyte Volume (L)	Correlated Molarity (M)	NaCl in Analyte (mol)	Mass (mg)	
7.0%	172.2	25.00	0.025	0.2028	0.00507	296	135.9	25.00	0.025	0.1565	0.00391	229	-66
	169.8	25.00	0.025	0.1997	0.00499	292	140.0	25.00	0.025	0.1617	0.00404	236	-58
	170.7	25.00	0.025	0.2008	0.00502	293	133.0	25.00	0.025	0.1528	0.00382	223	-71
	175.6	25.00	0.025	0.2071	0.00518	303	138.0	25.00	0.025	0.1592	0.00398	233	-62
	168.2	25.00	0.025	0.1977	0.00494	289							
						Average = 295 St Dev = 5						Average = 230 St Dev = 6	
9.0%	66.7	100.00	0.100	0.0683	0.00683	399	55.5	100.00	0.100	0.0540	0.00540	315	-103
	69.4	100.00	0.100	0.0717	0.00717	419	55.8	100.00	0.100	0.0544	0.00544	318	-101
	68.6	100.00	0.100	0.0707	0.00707	413	57.5	100.00	0.100	0.0565	0.00565	330	-88
	69.7	100.00	0.100	0.0721	0.00721	421	54.9	100.00	0.100	0.0532	0.00532	311	-107
	69.5	100.00	0.100	0.0718	0.00718	420							
						Average = 418 St Dev = 4						Average = 319 St Dev = 8	
12.0%	88.1	100.00	0.100	0.0955	0.00955	558	75.2	100.00	0.100	0.0791	0.00791	462	-107
	89.1	100.00	0.100	0.0968	0.00968	566	76.5	100.00	0.100	0.0808	0.00808	472	-97
	88.9	100.00	0.100	0.0966	0.00966	564	71.4	100.00	0.100	0.0743	0.00743	434	-135
	90.2	100.00	0.100	0.0982	0.00982	574	73.0	100.00	0.100	0.0763	0.00763	446	-123
	90.2	100.00	0.100	0.0982	0.00982	574	74.3	100.00	0.100	0.0779	0.00779	456	-113
	89.8	100.00	0.100	0.0977	0.00977	571	74.9	100.00	0.100	0.0787	0.00787	460	-109
	90.1	100.00	0.100	0.0981	0.00981	573	74.4	100.00	0.100	0.0781	0.00781	456	-113
	89.7	100.00	0.100	0.0976	0.00976	570	76.4	100.00	0.100	0.0806	0.00806	471	-98
							74.2	100.00	0.100	0.0778	0.00778	455	-114
							73.8	100.00	0.100	0.0773	0.00773	452	-117
							75.2	100.00	0.100	0.0791	0.00791	462	-107
					Average = 569 St Dev = 6						Average = 457 St Dev = 11		Average = -114 St Dev = 12

Scatter Plot Comparing Mean Pre- and Post-Nebulization Data as a Function of NaCl Solution Concentration



Experimental Data Scatter Plot Comparing Mean Pre- and Post-Nebulization Differences as a Function of NaCl Solution Concentration

[Saline] (wt%)	Pre-Nebulization Mean NaCl Mass (mg)				Post-Nebulization Mean NaCl Mass (g)				Absolute Mean NaCl Mass Difference (mg)					
	Pre-Nebulization Mean NaCl Mass (mg)	Standard Deviation (mg)	Upper Range (mg)	Lower Range (mg)	Post-Nebulization Mean NaCl Mass (g)	Standard Deviation (mg)	Upper Range (mg)	Lower Range (mg)	Absolute Mean NaCl Mass Difference (mg)	Standard Deviation (mg)	Upper Range (mg)	Lower Range (mg)	Upper Range - Absolute Mean	Absolute Mean - Lower Range
0.9%	37	0	37	37	19	3	23	14	19	3	23	14	4	5
3.0%	136	3	140	134	105	6	116	98	31	6	38	20	7	10
5.0%	230	9	242	218	176	2	178	174	54	2	56	52	2	2
7.0%	295	5	303	289	230	6	236	223	64	6	71	58	7	6
9.0%	418	4	421	413	319	8	330	311	100	8	107	88	8	12
12.0%	569	6	574	558	457	11	472	434	114	12	135	97	21	17
Ave =	4	mg			Ave =	6	mg		Ave =	6	mg			



Note: error bars correspond to propagated standard deviation in the data

Comparison Between Absolute Mean Pre- and Post-Nebulization Mass Difference and Predicted Mass Difference

[Saline] (wt%)	Absolute Mean NaCl Mass Difference (mg)	Predicted NaCl Mass Difference (mg)	Mass Difference (mg)	Relative Difference
0.9%	19	16	3	16%
3.0%	31	35	4	13%
5.0%	54	53	1	2%
7.0%	64	71	7	11%
9.0%	100	90	10	10%
12.0%	114	117	3	3%

Average = 9%