

## Longitudinal Evaluation of Pulmonary Function in Premature Infants

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### Background:

Infants born premature have decreased pulmonary function compared to full-term infants. Longitudinal infant studies are needed to determine whether impaired pulmonary function following premature birth demonstrates catch-up growth. This study measured airway and parenchymal function in infants born premature at approximately 6 months and 1 year of age to assess growth and the effects of gestational age (GA) and sex.

### Methods:

37 infants born premature participated in two study visits (V1 and V2) at Riley Hospital in Indianapolis, IN. While sleeping, forced expiratory maneuvers were performed to measure airway function. DL<sub>CO</sub>, diffusion capacity of the lung, and V<sub>A</sub>, alveolar volume, were measured under conditions of room air. Z scores were calculated to compare infants born premature and full-term, adjusting for size, race, and sex.

### Demographics:

The subjects consisted of 21 females and 16 males. There were 7 subjects born at 24 – 28 weeks, 6 at 29 – 31 weeks, and 24 at 32 – 36 weeks.

### Pulmonary Testing Results:

Variable	Z Score					
	V1	V2	V2-V1	Male	Female	GA
DL <sub>CO</sub>	-0.17 (-0.59, 0.26)	*-0.75 (-1.18, -0.31)	*-0.58 (-1.03, -0.12)	*-0.86 (-1.42, -0.30)	-0.05 (-0.53, 0.43)	*0.13 (0.001, 0.28)
V <sub>A</sub>	0.06 (-0.24, 0.45)	-0.24 (-0.70, 0.23)	-0.30 (-0.72, 0.14)	-0.14 (-0.71, 0.43)	-0.04 (-0.53, 0.45)	0.09 (-0.05, 0.23)
FVC	*-0.38 (-0.60, -0.17)	** -1.05 (-1.36, -0.74)	** -0.67 (-0.98, -0.36)	** -0.71 (-1.04, -0.38)	** -0.72 (-1.01, -0.44)	0.07 (-0.01, 0.15)
FEF <sub>50</sub>	** -0.88 (-1.15, -0.62)	** -1.36 (-1.63, -1.08)	* -0.47 (-0.80, -0.14)	** -1.12 (-1.44, -0.79)	** -1.12 (-1.40, -0.84)	** 0.15 (0.07, 0.23)
FEF <sub>75</sub>	** -0.57 (-0.88, -0.26)	** -1.16 (-1.48, -0.83)	* -0.59 (-0.93, -0.24)	** -0.76 (-1.16, -0.35)	** -0.97 (-1.32, -0.62)	** 0.21 (0.11, 0.31)

\* = p < 0.05    \*\* = p < 0.001

DL<sub>CO</sub> was decreased in male subjects compared to female subjects and male full-term infants. V<sub>A</sub> was not significantly different between subjects and full-term infants. Compared to full-term infants, subjects had decreased forced vital capacity (FVC) and forced expiratory flow at 50% and 75% vital capacity (FEF<sub>50</sub> and FEF<sub>75</sub>). DL<sub>CO</sub>, FVC, FEF<sub>50</sub>, and FEF<sub>75</sub> exhibited a significant decrease in pulmonary function from V1 to V2 among subjects. Gestational age showed a positive relationship for DL<sub>CO</sub>, FEF<sub>50</sub>, and FEF<sub>75</sub>.

**Conclusion and Potential Impact:**

The subjects did not exhibit catch-up growth, or an increase in z score from V1 to V2, in parenchymal and airway function for  $DL_{CO}$ , FVC,  $FEF_{50}$ , and  $FEF_{75}$ . Gestational age and sex were factors affecting pulmonary function. As premature infants are born with lower pulmonary function than full-term infants, it is important to understand how lungs continue to develop after release from the NICU.