●1747 OPIOID EFFECTS ON LUNG MATURATION IN FETAL RABBITS. Carolyn R. Comer, Judith S. Grunstein, Robert J. Mason, and Michael M. Grunstein (Spon. by Richard B. Johnston, Jr.) Univ. of Colo., Natl. Jewish Hospital/Natl. Asthma Center, Depts. of Pediatrics and Medicine, Denver.

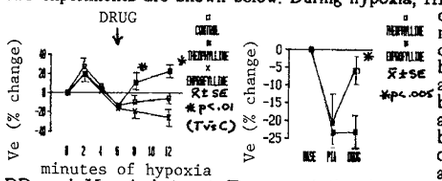
Based on the observations that the incidence of respiratory distress syndrome is less in infants of opiate-addicted mothers, and that amniotic fluid and fetal cord blood endorphins are increased during late gestation, we tested the hypothesis that endogenous opioids modulate fetal lung development. Pregnant rabbits received daily intramuscular injections, from days 18 to 28 of gestation, of either morphine sulfate (MS) (1.0 mg/kg), naloxone (NLX) (0.4 mg), or saline (C). Their fetuses, delivered prematurely on day 28 (term ∿31 days), were assessed for differences in their lung static pressure-volume (P-V) characteristics and morphology. The mean (± SE) deflation lung volume at transthoracic pressure (P_T) = 5 cm H_2O (V_5), expressed as a percentage of the lung volume at P_T = 40 (V_{40}), amounted to 70.9 (± 4.3), 52.9 (± 5.8), and 33.9 (± 7.3)% in the MS, C, and NLX fetuses, respectively. Thus, relative to the C group, the MS fetuses had P-V curves displaced significantly ($p < .05$) upward and to the left, indicating increased alveolar stability; whereas the curves of the NLX fetuses were displaced significantly ($p < .05$) downward and to the right, demonstrating decreased alveolar stability. Moreover, relative to the C lungs, the MS lungs also appeared more mature histologically, having thinner alveolar septa and a greater airspace-to-tissue ratio. In contrast, the NLX lungs were less developed. These data provide evidence that opiate agonists accelerate intrauterine lung development, whereas opiate antagonists delay lung maturation. These findings suggest that lung development may be significantly modulated by endogenous opioids.

1748 EARLY DISCHARGE FOR NEONATES REQUIRING CONTINUING RESPIRATORY CARE. L. Corcoran, A.R. Spitzer, W.W. Fox. Dept. of Peds., Univ. of Pa. Sch. of Med., and The Children's Hosp. of Phila., Phila., PA.

Neonates requiring prolonged ventilator support and tracheostomy care are often confined to intensive care units for extended periods of time. With appropriate education for parents and caretakers, these patients can be managed at home while still requiring respiratory support. During the past 2½ years, we have discharged 9 infants on respiratory support. Mean birthweight was 1610 grams (range 750-4480 gms), mean age at time of discharge was 7.1 months (range 2-11 mos.). All patients had tracheostomies. At discharge, respiratory support consisted of mechanical ventilation in 2, CPAP in 3, and T-piece in 4. Inspired O_2 concentration was 21% in all infants at time of discharge. Five infants required initial home nursing care, with a mean of 20.8 hours/day (range 8-24 hrs). Presently, these patients have been home for a mean of 15.7 months (range 1-29 mos). All nine patients have had elective readmissions, four have required staged tracheoplasty. Only two infants (both mechanically ventilated) have had emergency admissions for pneumonia. Three infants had intercurrent viral respiratory infections that required an increase in oxygen or ventilation at home for brief periods. At this time, four of nine patients have been successfully decannulated. Evaluation of this patient groups's needs has led us to an organized program for monitoring and follow-up of patients clinical progress. A six week schematic flow sheet is used to delegate responsibilities to the members of a multidisciplinary team working with patient and family. We believe this approach is appropriate for this patient population and represents an incurred care cost reduction for families and third party payers of 30-80%.

†1749 AMINOPHYLLINE BUT NOT ENPROFYLLINE REVERSES NEONATAL VENTILATORY DEPRESSION CAUSED BY HYPOXIA AND L-N6-PHENYLISOPROPYLADENOSINE (PIA) R. Darnall, D. Bruce, L. Belardinelli (Spon. by J. Kattwinkel) Department of Pediatrics and Internal Medicine, University of Virginia School of Medicine, Charlottesville, Va.

We have previously shown that aminophylline (A) decreases the amount of hypoxic ventilatory depression in the piglet and have postulated that this effect was due to inhibition of the actions of adenosine (ADO). This study tests the hypothesis that Enprofylline (E), an alkylxanthine with no ADO inhibitory activity, would not reverse ventilatory depression caused by either hypoxia or the systemic administration of PIA, an adenosine analogue. Saline (S), A, or E was given to three groups of 7 hypoxic piglets <3 days old and the effects on minute ventilation (Ve), heart rate (HR), and blood pressure (BP) were compared. To assess the effect of A and E on ADO induced ventilatory depression, we administered PIA to 6 normoxic piglets until Ve was significantly reduced, and then gave A or E. The effects on Ve for the two experiments are shown below. During hypoxia, HR increased and BP decreased, but by 6 minutes BP was not different from baseline. The administration of both A and E caused an increase in HR but had little effect on BP. PIA caused a decrease in HR, BP, and Ve. A but not E reversed the decrease in HR, Bp, and Ve caused by either hypoxia or PIA. These findings suggest that ADO is involved in the hypoxic depression of Ve.



1750 SWEAT POTASSIUM (K^+) VALUES IN CHILDREN WITH CYSTIC FIBROSIS (CF). Scott H. Davis, Frances J. Mather, Marian Hebert, and Robert C. Beckerman (Spon. by John E. Lewy). Tulane University School of Medicine, Department of Pediatrics, New Orleans.

We retrospectively studied the results of sweat K^+ values gathered on initial presentation from patients with CF to determine whether sweat K^+ values varied with age. Two hundred seventy four sweat collections were obtained by the Gibson-Cooke method from 204 patients with CF over a ten year period and were analyzed for sodium (Na^+), Chloride (Cl^-), and K^+ by the same technician. We excluded tests performed on patients already diagnosed and under treatment for CF, leaving a total of 112 patients. In the case of duplicate sweat tests on the same person, the test with the largest amount of sweat was used for analysis. The mean sweat Na^+, Cl^-, and K^+ for patients <1 year and >1 year are compared in the table.

	Sweat Electrolytes ($\bar{x}$ ± S.E.)		
	Na^+	K^+	Cl^-
<1 year (n=73)	79.5 ± 1.8	21.1 ± 0.8	94.7 ± 1.6
>1 year (n=39)	93.7 ± 2.8	13.8 ± 0.8	97.3 ± 2.6
p values	<0.0001	<0.0001	NS

The findings of lower sweat Na^+ and higher sweat K^+ in infants compared to older children may reflect hyperaldosteronism secondary to inadequate salt replacement prior to diagnosis. Loss of large quantities of K^+ in the sweat in infants with CF may predispose them to hypokalemia and metabolic alkalosis.

1751 GAS TRAPPING IN THORACIC SCOLIOSIS, D. Dennis, N. Scarpa, R.W. Wilmott, (Spons by S.D. Douglas) Children's Hosp. of Phila., U. of P. Sch. of Med., Dept. of Pediatrics, Philadelphia, PA 19104

We report PFT from 25 patients evaluated for scoliosis who were asymptomatic, and without any pulmonary complications. Mean age was 14.6 years, and mean primary angle was 51.2 degrees (n=21). Thirteen had idiopathic adolescent scoliosis; and 12 had another primary diagnosis. Using arm span to predict height, the mean percent predicted lung volumes were total lung capacity (TLC) 81.5%; forced vital capacity (FVC) 74.0%; functional residual capacity 93.3%; and residual volume (RV) 130.9%. Mean RV/TLC was 34.0%, however 14 of 25 patients (56%) had increased values (ranging from 31.91% to 67.5%). Mean percent predicted flows for the group as a whole were forced expiratory volume in 1 second (FEV1) 67.5%; peak flow 67.3%; and forced expiratory flow between 25% and 75% VC 58.7%. The mean FEV1/FVC was 82.2%. The subgroup with an increased RV/TLC were compared to the others and there was no significant difference in age, arm span, major angle, location of angle or the degree of kyphosis. There also were no significant differences in TLC, FVC or flow rates. The difference between height predicted from arm span and actual height, and the degree of the major angle were used as indices of deformity. There was no correlation between deformity and the percent predicted flows. There was, though, a significant correlation between the primary angle and the residual volume. Thus, in patients with scoliosis, mechanical deformity of the chest is sometimes associated with gas trapping which may exacerbate respiratory muscle inefficiency.

†1752 POTENTIAL ERRORS IN FLOW-VOLUME CURVES IN ASTHMA. K. Desmond, D. Demizio, P. Allen, P.H.Beaudry, A.L. Coates. McGill University-Montreal Children's hospital Research Institute and Children's Hospital of Eastern Ontario, Montreal and Ottawa, CANADA.

Despite evidence that flow-volume curves (FVC) obtained in a body plethysmograph (FVCb) may differ from those obtained by the integration of flow at the mouth (FVCm), it is still common practice to compare FVCm before and after bronchodilator therapy (pre and post BD) in asthmatics. In order to evaluate both the magnitude and source of errors in the flow rate at 50% of vital capacity ($\dot{V}max50$) that result from using FVCm instead of FVCb, we measured FEV1, static elastic recoil (Pst) and maximum expiratory pressures at FRC (PeFRC). FVCb and FVCm were measured simultaneously with an esophageal balloon in place. Measurements were obtained pre and post BD in 10 asthmatic children aged 8 to 18 years. The mean error in $\dot{V}max50m$ ($(\dot{V}max50b-\dot{V}max50m)/\dot{V}max50b X100$) pre BD was 25% with a range of 6 to 60%. Post BD it was 13% with a range of -2 to 22%. Pre BD error correlated with both FEV1 (%pred) ($r=-0.82$) and the driving pressure (Pdr=Pes+Pst) at 50% VC ($r=0.74; p<0.05$ for both). The PeFRC correlated with Pdr at 50% VC ($r=0.74$) but not the error in $\dot{V}max50$. The errors post BD are related to the % increase in FEV1 with BD ($r=0.65; p<0.05$). Similar results pertained to $\dot{V}max25$. In conclusion, the use of FVCm instead of FVCb in asthma results in errors that are related to both degree of airflow limitation and the force of the expiration. They also differ pre BD compared to post BD. We therefore suggest that FVCm not be used to assess the response to bronchodilators in patients with asthma.