1858 EFFECT OF LIPID INFUSION RATE ON OXYGENATION IN PREMATURE INFANTS. G.E. Stahl, M.L. Spear, J.M. Egler, S. Berkow, A. Gutman, M. Hamosh, P. Hamosh, R.A. Polin and G.R. Pereira. Depts. of Pediatrics, Children's Hosp. of Phila., PA & Georgetown Univ. Med. Center, Washington, DC

We have previously documented decreased oxygenation during infusion of 1 g/kg Intralipid (IL) over 4 h (0.25 g/kg/h) in premature infants with respiratory illnesses (Pediatr. 66:26,1980). To examine the effect of slow infusion rates and lipid dosage on oxygenation, 16 AGA premature infants with RDS (BW mean ± SEM - 1.26 kg ± 0.04; EGA 29.9 wks ± 0.34; Postnatal age 4.0 days ± 0.26 - p = NS vs. previous study group) maintained on total parenteral nutrition were given 1, 2 and 3 IL g/kg/day over 15 h (IL g/kg/h = 0.067, 0.133, 0.20) on day 1, 2 and 3 respectively. Arterial blood gases (for calculation of alveolar-arterial oxygen gradients-$AaDO_2$) and blood for free fatty acid (FFA) and triglyceride (TG) analysis were drawn before and at the end of IL infusion.

IL g/kg/h	Δ $AaDO_2$*	Δ FFA**	Δ TG
0.067	-68.8 ± 21.0	.38 ± .13	69.4 ± 14.8
0.133	-15.3 ± 13.8	.75 ± .17	139.9 ± 36.4
0.200	- 8.9 ± 6.5	.91 ± .16	194.5 ± 56.4
0.250	+18.9 ± 8.7	1.24 ± .25	188.8 ± 45.6

* $p<.05$ comparing 0.067 vs. 0.133; 0.133 vs. 0.20 or 0.25 FFA = mEq/l
** $p<.05$ comp. 0.067 vs. 0.133 or 0.20; 0.133 or 0.20 vs. 0.25 TG = mg/dl

There was a significant effect of IL infusion rate on Δ $AaDO_2$ ($p<.001$ by ANOVA). A significant correlation was noted between Δ $AaDO_2$ and end-infusion FFA concentration ($r=.36$, $p<.01$). No correlation between $AaDO_2$ and TG concentration was seen. These data demonstrate that slower infusion rates decrease the adverse effect of lipids on oxygenation in premature infants recovering from RDS. (NIH Grants HD-15631 & RR-00240)

●1859 IMMUNOREACTIVE (I-R) SEROTONIN IN THE DEVELOPING HUMAN LUNG. Mildred T. Stahlman, Mary E. Gray, and A.G. Kasselberg. Vanderbilt University School of Medicine, Departments of Pathology & Pediatrics, Nashville, TN 37232.

26 human fetal (8-23 weeks) and 19 live born (24-41 weeks) lungs were examined for the presence of serotonin by immunocytochemistry using horseradish peroxidase bridging technique. Solitary intraepthelial neuroendocrine cells (NEs) and cell clusters (NEBs) were found in developing distal conducting airways as early as 10 weeks gestation and 6/8 first trimester fetal lungs were positive. By 14 weeks gestation many stained NEs and NEBs were present in future bronchi, bronchioles and alveolar ducts. As alveolarization occurred (18-22 weeks) the presence of stained cells at the terminal portion of alveolar ducts in close proximity to invading capillaries was striking and 16/18 second trimester fetal lungs contained many I-R stained cells and cell clusters. After terminal airway differentiation progressed toward term the total number of stained cells appeared to decrease dramatically. 14/19 newborn infants showed few stained cells. Although stained cells were difficult to find in the presence of acute neonatal lung disease, such as HMD, as conducting airway epithelial regeneration occurred with recapitulation of capillary invasion, positively stained NE and NEBs reappeared. This pattern of cells positively stained for I-R serotonin is in contrast to that of both I-R bombesin and I-R calcitonin in the fetal lung. The location of I-R serotonin stained cells at areas of capillary invasion is also more prominent than that of I-R bombesin or I-R calcitonin. It is suggested that serotonin might play a role in the vascularization of terminal airways. Supported by NIH grant HL 14214.

1860 TIMING RESPONSE TO GRADED EXPIRATORY RESISTIVE LOADING IN PRETERM INFANTS. Ann R. Stark, Ivan D. Frantz, Barbara A. Cohlan, and Philip C. Kosch. Harvard Medical School, Brigham and Women's Hospital, Department of Pediatrics, Boston.

Maturational effects on inspiratory timing reflexes have been studied, however little is known about the control of expiratory duration in newborn infants. We studied 5 healthy preterm infants, 28-32 wks gestation, birthweight 1.3±0.2 kg (mean±SD), on day 2-4 of life. Using a one-way valve with resistive manifold (J.Appl.Physiol. 40:177,1976), we presented 3 graded resistive loads during 9-25 single expirations. Airflow and mask pressure were recorded while the infant breathed through a face mask and pneumotachograph and flow was integrated to give volume. Expiratory time (Te) was measured from the flow tracing. Control values were determined from the breath preceding the loaded breath. During resistive loads, expired volume was reduced from 10.7±0.6 ml (mean±SD) by an average of 10.4% (R1, NS), 20.4% (R2, $p<0.005$), and 32.2% (R3, $p<0.005$) and Te was significantly prolonged from 0.47±0.05 sec by 10.0%, 21.9%, and 29.4% for R1, R2, and R3 ($p<0.05$ or less). For comparable reductions in expired volume, Te was less prolonged than in full term infants previously studied. Our study of expiratory timing modulation agrees with previous studies on inspiratory timing which show that lung inflation reflex activity is decreased in preterm infants. The inability of preterm infants to maintain end-expiratory volume consistently above relaxation volume may depend on the relative weakness of this expiratory timing modulation. (Supported by HL 21405 and HL 28617.)

1861 POSTNATAL MATURATION OF THE RESPIRATORY RHYTHM GENERATOR (RRG) IN NEONATAL SWINE. A.M.Steele, P.M.Gootman, H.L.Cohen, L.P.Eberle, A.P.Rudell (Spon. P.J.Lipsitz). Div.Neonatology, Schneider Children's Hosp, SUNY Stony Brook, New Hyde Park and Dept.Physiology, Downstate Med.Ctr., Bklyn, N.Y.

Efferent phrenic nerve (PHR) activity (monitor of RRG) was recorded in piglets <1 day-39 days old, anesthetized with Althesin, immobilized with C-10 and artificially ventilated. Recordings were made on magnetic tape of left and/or right PHR activity (bandpass 10 or 30 Hz to 10,000 Hz), integrated (INT) PHR activity (time constant 0.1 sec), intratracheal pressure (ITP), blood pressure and EKG. Computer analyses (PDP 11/45) included correlation and averaging techniques as well as power spectral analysis. During inspiration (I), peaks of power at higher frequencies (ca.150 Hz) were observed in older piglets when compared to younger animals (<1 wk)(ca.100 Hz). Maturational differences in responses of the RRG to hyperoxia, hypoxia and hypercapnia were observed. PHR activity always increased during hypercapnia. Hyperoxia elicited biphasic changes in PHR discharge: initially decreased peak power, followed by an increase. During hypoxia, peak power increased in magnitude during I in piglets >3 wk of age. During maintained hypoxia, in piglets <1 wk old, peak power was not significantly greater than during control. During Maintained Lung Inflation (LI) Tests: expiratory time (T_E) lengthened at all ages without apparent change in I bursts of PHR activity. During No LI Tests: T_E decreased; PHR activity tended to decrease in piglets <1 wk old, with increased PHR activity in piglets >2 wk of age. The results, to date, indicate that changes in INT PHR activity and power spectral analysis can be used to demonstrate postnatal maturation of RRG. (Supported by NIH Grant #HL-20864).

1862 LACK OF OBJECTIVITY IN DISTINGUISHING INFANTS IN NEED OF HOME MONITORING OR PREDICTING SUBSEQUENT APNEA. A.M.Steele, B.D.Lenihan, E.S.Eisenberg, P.J.Lipsitz, Schneider Children's Hosp, LIJ-HMC, SUNY Stony Brook, New Hyde Park

Seventy patients referred following an apparent "apneic episode" were evaluated by detailed history (H), physical examination (PE) and objective studies (OS) which were indicated by the H&PE. These included CBC, serum chemistry & electrolytes, chest X-ray, ABG, pneumogram (P), ECG, EEG, esophagram and esophageal pH monitoring. Home monitoring (HM) was prescribed in 43 infants who were considered by an attending physician to be at high risk for sudden unexplained death. All infants were monitored for apnea (>20 sec) & bradycardia for a minimum of 2 months. Twenty-seven infants were not monitored (Group I). A diagnosis other than apnea was made in 13, mostly gastroesophageal reflux (GER) and/or seizures. Twenty-three infants on HM had no subsequent events requiring intervention (Group II); twenty infants on HM had subsequent A requiring intervention (Group III). All patients were followed at least past their first birthday with no deaths. In all patients the severity of the presenting episode failed to predict recurrent A. Of 20 infants requiring mouth-to-mouth (MTM) or cardiopulmonary resuscitation by H, 13 were monitored. Only 2/13 had subsequent A (1 requiring gentle shake, the other MTM). P obtained in 60 infants was abnormal in 7 (Group I-0/21; Group II-3/19; Group III-4/20), but not predictive of future A. GER was found in 16/49, 9 of whom were monitored. Eight of these infants had another A. The results of all other studies were non-contributory. We conclude that the decision for HM was largely subjective and that neither H or OS were predictive of outcome.

†1863 A 22 YEAR STUDY OF CHILDHOOD RESISTANT TUBERCULOSIS WITH EMPHASIS ON THE SUSCEPTIBILITY PATTERN OF MATCHED PATIENT AND SOURCE CASE STRAINS. Phillip Steiner, Milicent Mitchell, and Madu Rao (Spon. by Laurence Finberg). State University of New York, Downstate Medical Center.

The purpose of this study was to compare the susceptibility patterns of patient and source case strains of M. tuberculosis to ascertain if the susceptibility pattern of the source case strain could be used as a guide in the initial selection of the patients' antituberculous drug regimen. In 119 culture positive patients, source cases were identified who had positive cultures. All strains had susceptibility tests for isoniazid, streptomycin, para-aminosalycilic acid, ethionamide and when available ethambutol and rifampin. In 111 instances (93.3%) the patient strain and the source case strain had identical drug susceptibility patterns. Drug resistant strains were found in 28 of the 119 cases. In only 8 instances (6.7%) the susceptibility pattern of the patient strain and the source case strain were dissimilar. In the total group, there was only one instance (0.8%) in which the susceptibility pattern for isoniazid did not match. These findings emphasize the importance of obtaining the susceptibility pattern of the source case and using it as a guide in the initial selection of a therapeutic regimen. This is especially important for patients from groups or areas with a high primary drug resistance rate.