1402 THE RELATIONSHIP OF ANTENATAL STEROIDS AND PROLONGED RUPTURE OF MEMBRANES (PROM) TO DEVELOPMENT OF HYALINE MEMBRANE DISEASE (HMD). Nancy Reed, Sheryl Silfen, Ronald Bolognese, Ronald Wapner, Frank Bowen, Jr. and Chari Otis (Spon. by Alfred Bongiovanni) Univ. of Pa., Sch. of Med., Dept. of OB-GYN and Pediatrics and Jefferson Med. Coll., Dept. of OB-GYN, Pennsylvania Hospital, Phila. There are conflicting data about the effect of PROM on the development of HMD. We performed a retrospective analysis of 95 neonates with PROM. 41% received antenatal glucocorticoids and 59% were managed expectantly. Labor was induced for signs of chorioamnionitis. The charts were analyzed for presence of HMD, birth weight (BW), Apgar score, length of PROM, sex, gestational age (GA) and route of delivery. The data were analyzed by step wise multiple regression and chi square with all factors weighed against HMD for each group (I: PROM with steroid; II: PROM alone).

	n	GA	BW	Apgar	HR PROM	%C-Sect	Males
PROM c̄ STEROIDS	39	31.7	1565	7.9	112	18%	58%
PROM ALONE	56	32.5	1717	8.0	58	16%	66%

BW was the only factor correlating with HMD. BW and GA were the only correlating variables. There was no difference in the incidence of HMD in the presence or absence of steroids in this PROM population.

● 1405 THE "STRUCTURE" OF ALVEOLAR PCO_2 AND PO_2 DURING PERIODIC BREATHING IN PRETERM INFANTS. Henrique Rigatto, Manuel Pereira, Francisco Reis, Leanne Horvath and Donald Cates. Dept. of Pediatrics, Univ. of Manitoba, Canada.
To determine the "structure" of alveolar PCO_2 (P_ACO_2) and PO_2 (P_AO_2) changes during periodic breathing we studied 13 preterm infants during sleep (B.W. 1430±94 g; G.A. 31±1 wk, PNA 28±3 days). A total of 94 breathing/apneic cycles were analyzed. During apnea (2 to 14 sec) ΔP_ACO_2 increased from 2.8±0.1 to 6±1 and P_AO_2 from 8±1 to 24±2 mmHg. The regression equation of P_AO_2 on P_ACO_2 of the breath preceding apnea was $P_AO_2 = -1.48\ P_ACO_2 + 166$. Combinations of P_ACO_2 and P_AO_2 were clustered at different levels along this line for different babies. Short and long apneas occurred anywhere along the regression line for individual babies. During periods of regular breathing (130 breaths in 13 babies) the regression was $P_AO_2 = -2.34\ P_ACO_2 + 194$. Individual infants became apneic by moving their P_ACO_2 and P_AO_2 coordinates along the regression line towards lower P_ACO_2 and higher P_AO_2 values. "Structure" analysis showed that apnea occurred at the lowest P_ACO_2 and highest P_AO_2 levels if allowance was made for circulation time. We suggest: 1) the increase in P_ACO_2 and the decrease in P_AO_2 during apnea are linear, not logarithmic; 2) for individual infants, apnea occurs at well defined clusters of P_ACO_2 and P_AO_2 levels along the regression line; and 3) short and long apneas occur randomly along the regression line for individual babies. The data are consistent with the idea that each baby chooses an optimum range of CO_2 and O_2 in which apnea occurs.

1403 PARTITION OF ENERGY METABOLISM IN THE VERY LOW BIRTH WEIGHT INFANT. Brian L. Reichman, Philippe Chessex, Guy Putet, Gaston J.E. Verellen, John M. Smith, Tibor Heim, Paul R. Swyer. Dept. Paeds. & Med. Eng., Univ. of Toronto, Res. Inst., Hosp. for Sick Children, Toronto.
Energy requirements are partitioned between needs for maintenance (including resting metabolism, thermoregulation and muscular activity), and needs for synthesis of, and storage in, new tissue. The partition of energy utilization was evaluated by 34 metabolic and nutritional balance studies in 19 growing very low birthweight(VLBW) infants(birth wt: 1140+30g; study wt: 1390+50g; age: 24+2d). Continuous open circuit indirect calorimetry was performed for periods of 6+0.25 hrs. in a thermoneutral environment. Results are expressed as mean ± SE Kcal/kg.d and as a percentage of energy intake.

Energy intake	: 150+3 (100%)
Stool and urine losses	: 23+2 (15%)
Absorbed(metabolizable) energy	: 127+3 (85%)
Resting metabolism	: 55+1 (36%)
Energy cost of activity	: 4+1 (3%)
Thermic effect of food	: 7+1 (5%)
Energy stored in new tissue	: 62+3 (41%)

These results provide a reference standard for the breakdown of energy utilization in VLBW infants under thermoneutral conditions. Increased activity due to e.g. handling, blood sampling, and a thermal environment outside the neutral range will increase maintenance energy requirements, thus decreasing the amount of energy available for growth if energy intake remains constant.

1406 FOLLOWUP OF NEONATAL BRAINSTEM EVOKED RESPONSE AUDIOMETRY (BERA) FAILURES. John Roberts, Hallowell Davis, Gilbert Phon, Eileen Sturdevant, Timothy Reichert, Robert Loomis, and Richard Marshall, Wash. Univ. Med. Sch., St. Louis Children's Hosp., Dept. Ped., Dept. Otolaryngology, and the Central Institute for the Deaf, St. Louis, MO.
A prospective study was designed to determine the reliability of BERA in predicting permanent audiologic impairment in high risk neonates in the NICU. 70 infants with mean gestational age (GA) of 33wks (range=28-42wks) were originally tested at 1-45days of age using a Nicolet CA 1800 unit. Auditory tests were classified as pass or fail depending upon the presence or absence of wave V in the brainstem response in the latency range expected for postconceptual age (PCA: GA plus postnatal age) and intensity of stimulus, i.e., 40dbHL wideband clicks (4000clicks, 33/sec). 28 infants passed the initial test and 42 failed (table). Both PCA and intraventricular hemorrhage (IVH) correlated with failure (*p<.01). 15 failures were retested before discharge (table). 8 of the 35 failures discharged were retested at 4-10mos of age (table). Of the 27 untested discharged failures 6 have died and 21 are yet to be tested. There was no significant relationship to either PCA or IVH in either of these followup studies (p>.05).

	INITIAL BERA(70)		EARLY FOLLOWUP(15)		LATE FOLLOWUP(8)	
	Pass(28)	Fail(42)	Pass(7)	Fail(8)	Pass(6)	Fail(2)
PCA	37±3	33±4*	38±6	37±3	63±12	71±9
IVH	7%	43%*	86%	75%	50%	50%

This suggests that initial BERA failure was related to PCA and/or IVH and that infants who initially fail may subsequently pass as they become more mature or as the IVH resolves. (NIH #NS03856).

1404 FACTORS INFLUENCING INCIDENCE OF RETROLENTAL FIBROPLASIA. P.A. Riedel, M.D. Bert, R.I. Clyman, S.H. Sniderman, R.S. Roth and R.A. Ballard. Mt. Zion Hosp. Med. Ctr., Dept. Pediatrics, San Francisco, California.
Retrolental fibroplasia (RLF) remains a significant problem in premature low-birth-weight infants. Since 1976, all infants in our intensive care nursery <1500 gm have had routine eye examinations from the time they were stable enough to be examined until at least 1 month following discharge. Since 1978, all infants <1500 gm who required supplemental oxygen or ventilation had frequent transcutaneous oxygen monitoring along with intermittent PaO2 measurements. The incidence of RLF in infants <1500 gm was 7% from 1976-1978 and 10% from 1978-present but mean birthweight in the later group was significantly lower (1087 gm vs 1166 gm p<.001). Since 1978, 16/160 infants <1500 gm developed RLF: 7 had bilateral Stage I, 5 progressed to bilateral Stage II, 3 had bilateral Stage II-III and 1 had bilateral Stage V with complete blindness. Infants with RLF did not differ significantly in sex distribution, incidence of hyaline membrane disease, patent ductus arteriosus or treatment with betamethasone from infants without RLF. The incidence of chronic lung disease, which was divided equally between bronchopulmonary dysplasia and chronic pulmonary insufficiency of the premature, was significantly higher in infants with RLF (87% vs 26%, p <.001) and birthweight was significantly lower (1017 gm vs 1096 gm, p<.001). Transcutaneous oxygen monitoring has not prevented RLF in low-birth-weight infants requiring long term oxygen supplementation.

1407 THEOPHYLLINE (THEO) THERAPY FOR MIXED AND OBSTRUCTIVE APNEA. John L. Roberts, Oommen P. Mathew and Bradley T. Thach, Washington Univ. Med. Sch., St. Louis Children's Hosp., Dept. of Pediatrics, St. Louis, MO.
We performed diagnostic monitoring (heart rate, abdominal excursion, nasal and oral airflow) on infants referred because of apnea and bradycardia (HR<100) spells. By classifying apnea (absent airflow >20sec or <20sec with bradycardia) as central (CA: no respiratory effort), obstructive (OA: effort but no airflow), and mixed (MA: >2sec central plus obstructive), we identified 5 preterm infants (GA:26-32wks; postnatal age: 6-34days) with predominantly OA and MA. We used bedside monitoring for bradycardia to determine frequency of apnea pre and post THEO since 99% of all apneic spells were associated with bradycardia and 99% of bradycardias were preceded by apnea by our diagnostic monitoring. All infants received THEO (6mg/kg then 2mg/kgTID; serum levels: 6-13 µg%). All infants had a decrease in the frequency of bradycardia spells in the 48hr period post vs. pre THEO (p<.05).

Infant	Diagnostic Monitoring				Bedside Monitoring(spells/hr)		
	#spells	%CA	%OA	%MA	PreRx	PostRx	%Decrease
1	24	0	38	62	1.00	.04	96
2	4	0	25	75	.23	.06	84
3	18	0	11	89	.67	.10	85
4	4	0	0	100	.21	.00	100
5	41	32	0	68	2.71	.08	98

Repeat diagnostic monitoring in 4 infants (9 recorded spells) showed a similar distribution of the apnea types (78% MA, 22% OA) while on THEO. We conclude that THEO, in decreasing the frequency of bradycardia, decreased OA and MA in these infants.