1864 NEUROMOTOR BEHAVIORAL EXAMINATION OF INFANTS AT RISK FOR SIDS. F.M.Stern, D.I.Gorga, A.N.Krauss, Depts. of Rehab. Medicine, Pediatrics, N.Y. Hosp.-Cornell Med. Center, New York City.

Previous reports have found histologic abnormalities in the muscles of SIDS victims. We were therefore interested if infants at risk for SIDS demonstrated neuromotor abnormalities. Our study group consisted of 24 consecutive infants enrolled in a home monitoring program. These infants were examined using a Neuromotor Behavioral Inventory, a comprehensive 5-part examination measuring muscle tone, patterns of movement, reflexes, environment, and oral motor behavior. Infants on monitors included "near miss SIDS", siblings of SIDS victims, and premature babies with persistent apnea. Low neuromotor tone was found in 14/24 infants who received the Neuromotor Behavioral Inventory. Subsequent siblings of SIDS victims had the highest incidence of normal exams (5/6,83%), while 70% of the near miss group had low muscle tone on the first exam. One near miss infant was later diagnosed as having cerebral palsy. The low muscle tone is consistent with earlier reported histologic findings in SIDS victims, and may also be a reflection of a fundamental neurological problem in this group of infants, of which apnea may be another manifestation. The Neuromotor Behavioral Inventory may prove to be a useful adjunct to apnea screening in identifying a group of infants at high risk for clinically significant apnea and SIDS.

1865 THE EFFECTS OF THE OCCURRENCE OF MILD BRONCHIOLITIS ON LUNG FUNCTION Gerald L. Strope, Diane L. Fairclough, Ronald W. Helms, Floyd W. Denny, Albert M. Collier Department of Pediatrics and The Frank Porter Graham Child Development Center. The University of North Carolina at Chapel Hill, Chapel Hill, NC.

Bronchiolitis requiring hospitalization during infancy is reported to result in decrements of lung function suggestive of small airways dysfunction. The purpose of this study was to evaluate the effects of a history of mild bronchiolitis not requiring hospitalization in a group of children enrolled in day care and followed longitudinally from early infancy. Fifty-six black children (30 girls, 26 boys) had all illnesses documented clinically and etiologically, then were trained to perform spirometry at 2 1/2 years of age. Regression analyses were performed on MEFV parameters over the height range 90-130 cm using these measurements as dependent and height as independent variables. The $FEF_{25-75\%}$ and $Vmax_{50\%}$ in children who ever had bronchiolitis (n=27) were significantly reduced and about 300 ml/sec below the flows for children who had never had bronchiolitis but the slopes of the regressions were not different for the 2 groups; there were no differences in mean values or slopes for the regressions of FVC or FEV_1 nor between girls and boys. These data demonstrate that black children who have had mild bronchiolitis have decrements in flow rates at low lung volumes as early as 3 years of age and that this change persists during early childhood. Since the flow rate decreases were constant over the height range studied, they may represent a fixed effect of acute injury or constitutional differences.

1866 ALVEOLAR-ARTERIAL CO_2 DIFFERENCE ($AaDCO_2$) AS AN INDICATOR TO WEAN FROM MECHANICAL VENTILATION. Shyan Sun, Alberto Chavez, Tzong Wei, Vang Kamtorn (Spons. F. Behrle) UMD-N.J. Med. Sch., Div. Neonatology, Newark, N.J.

$AaDCO_2$ is an indication of pulmonary ventilatory function. To determine a critical level of $AaDCO_2$ at which patients can be successfully weaned from respirator, we retrospectively reviewed 50 successfully extubated newborn infants who had had daily End Tidal CO_2 monitoring from the first day to the last day of mechanical ventilation.

$AaDCO_2$ ($PaCO_2$-$P_{ET}O_2$)	<5	6-10	>10
No. off respirator	46	4	0
% off respirator	92%	8%	0%

Ninety-two percent of infants were successfully weaned from respirator when $AaDCO_2$ was less than 5 torr. At $AaDCO_2$ of 6 to 10, 92% were not ready and at $AaDCO_2$ of over 10 torr all patients were respirator dependent. We then prospectively tried to wean patients from respirator using $AaDCO_2$ of 5 torr as the indication of readiness. Attempts were made at weaning 54 patients who were being mechanicly ventilated for respiratory failure due to neonatal respiratory diseases. Forty-six out of 54 (85%) were successfully weaned and extubated within 48 hrs when $AaDCO_2$ were 5 torr of less. There were 8 accountable failures (4 central apneas due to IVH, 2 severe congenital heart diseases and 2 unilateral diaphrgamatic paralysis). We conclude that $AaDCO_2$ is an excellent indicator for early termination of mechanical ventilation, thus continuous End Tidal CO_2 monitoring helps reduce respirator days, lung trauma, and hospital stays.

1867 ALVEOLAR ARTERIAL CO_2 DIFFERENCE ($AaDCO_2$) IN RESPIRATORY DISEASES IN THE NEWBORN Tzong Wei, Shyan Sun, Amelia Bautista, Wen Lin (Spons. F. Behrle) UMD-N.J. Medical School, Div. Neonatal-Perinatal Medicine, Newark, N.J.

The purpose of this study is to use $AaDCO_2$ as an index to observe ventilatory function in six different neonatal respiratory diseases, i.e. respiratory distress syndrome (RDS), 2. persistant fetal circulation (PFC), 3. meconium aspiration syndrome (MAS), 4. asphyxia neonatorum (asphyx.), 5. uncomplicated recurrent apneas (apnea), 6. transient tachypnea of newborn (TTN). Foregger End-Tidal CO_2 monitoring system was used to determine $P_{ET}CO_2$ via endotracheal tube adapter. $AaDCO_2$ ($PaCO_2$-$P_{ET}CO_2$) was obtained on the first day of each patient while $PaCO_2$ was controlled at 40±5 torr. All patients were on mechanical ventilator. (Bourns BP 200)

	RDS	PFC	MAS	Asph	Apnea	TTN
No pts	36	8	5	5	6	6
m $AaDCO_2$	16.67	20.25	9.40	0.2	4.33	4.36
±SD	6.18	5.37	5.13	5.97	1.37	3.5
m GA(wk)	32	37	41	40	30	36
m BW(gm)	1618	2473	3682	3325	1305	2660

Statistical analysis of variance reveals significant difference in $AaDCO_2$ among 6 diseases. (F ratio 17.49, $p<0.001$). Since $AaDCO_2$ in normal newborn infants is accepted as 3.2, (Sun, et al), it can be inferred that there is little pulmonary ventilatory problem in terms of CO_2 excretion in infants with asphyxia, uncomplicated apneas and transient tachypnea of newborn. However there is significant ventilatory problems (inability to excrete CO_2) among others in RDS, PFC and MAS.

1868 END-TIDAL CO_2 AND ALVEOLAR-ARTERIAL CO_2 ($AaDCO_2$) TRENDS IN RESPIRATORY DISTRESS SYNDROME. Shyan Sun, Tzong Jer Wei, Amelia Bautista (Spons. F. Behrle) UMD-New Jersey Med. Sch., Div, Neonatal-Perinatal Medicine, Newark, New Jersey

Sun et al reported (1982) that $ETCO_2$ correlates extremely well with arterial CO_2 ($PaCO_2$) in newborn infants with normal lungs and emphasized the advantage of continuously and non-invasively following pulmonary function using $ETCO_2$ and $AaDCO_2$ of RDS infants from day one on respirator until the last day on ventilator. Foregger End-Tidal CO_2 monitoring system was used in this study. End tidal gas was collected via ET tube adaptor at the sampling flow rate of 150 ml/min. Thirty-six RDS infants, (m GA 31.9 wks m BW 1618 gms, age 1 to 8 days) who required FiO_2 >40% were studied daily for 8 days or until they were extubated.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
No	20	30	28	22	19	11	11	8
$P_{ET}CO_2$	21.3	24.1	27.3	29.7	36.3	39.0	40.7	38.9
±SD	5.4	7.0	5.9	6.1	6.0	4.3	4.6	9.4
$AaDCO_2$	16.6	13.7	9.1	6.4	2.9	3.0	1.8	0.8
±SD	7.3	5.9	5.6	4.7	3.9	3.8	3.1	3.7

$P_{ET}CO_2$ and $AaDCO_2$ showed inverse relationship. While $P_{ET}CO_2$ increased stepwise $AaDCO_2$ decreased daily as patients showed clinical and blood gas improvement. The correlation coeficient of $P_{ET}CO_2$ trend was $r=0.963$, $p<0.001$, that of $AaDCO_2$ was $r=0.955$, $p<0.001$. We hypothesize that as patients improve daily, more alveoli become available for CO_2 excretion thus $P_{ET}CO_2$ increases while alveolar arterial CO_2 gap narrows.

†**1869** CAROTID BODIES MEDIATE THE ATTENUATING EFFECT OF BETA-ADRENERGIC AGONISTS ON APNEA REFLEX RESPONSE TO LARYNGEAL WATER ADMINISTRATION IN NEWBORN LAMBS. Jens Grogaard, Annick Van den Abbeele, Elizabeth Krueger, and Hakan Sundell. Vanderbilt University School of Medicine, Dept. of Pediatrics, Nashville, TN.

Terbutaline (T), a beta-adrenergic agonist, was reported to attenuate the apnea reflex response to laryngeal water stimulation in newborn lambs (Pediatr. Res. 17:213, 1983). In order to delineate the mechanism of this drug action--central or via arterial chemoreceptors--laryngeal water administration was performed before and after bilateral carotid body denervation (CBD) in 4 term lambs, 2-4 weeks old. The apnea reflex response was expressed as % decrease in ventilation (ΔV) during water administration. Before CBD, T reduced ΔV significantly* (60 ± 11 to 23 ± 12%)†. This drug effect on ΔV was abolished by CBD (97 ± 4 vs 97 ± 3%). The effect of T on an index of "central respiratory drive" was studied by airway occlusion technique (P0.1) before and after CBD. T given before CBD increased P0.1 (4.5 ± 1.0 to 9.1 ± 1.5 cm H_2O)*. No change in P0.1 was seen when T was given after CBD (2.0 ± 0.4 vs 2.0 ± 0.2 cm H_2O). Two sham operated lambs did not show the above described changes related to CBD. It is concluded that the attenuating effect of T on the apnea response to laryngeal water administration is mediated by the carotid bodies. An increase in "central respiratory drive" as determined by P0.1 was seen after T. This effect, however, also appears to be mediated by the carotid bodies. *$p < 0.05$, and †values are Mean ± SEM (Supported by MOD 1-739 and BRSG 21-25).