VAGAL CONTROL OF RESPIRATORY FREQUENCY IN THE UNANESTHETIZED NEWBORN RABBIT. B.T. Thach, I. Wyszogrodski, W. Lee-Foon, J. Milic-Emili, and M.E. Avery. Dept. of Physiology, McGill University-Montreal Children's Hospital Research Institute.

Vagotomy in newborn, unlike older animals, causes irregular respiration and apnea. We have differentiated the influence of volume (stretch receptors) from non-volume related vagal input, by comparing the duration of a ventilatory cycle (T_{tot}) and inspiration (T_i) immediately before and after tracheal occlusion at functional residual capacity (FRC) (Clark and von Euler, J. Physiol., 222:267, 1972). A miniature spirometer or plethysmograph was used to measure breath duration in tracheotomized rabbits (22 pups <36 hrs and 6 pups 2-14 days old) before and 15-30 min after vagotomy.

	Occlusion at FRC				Vagotomy			
	Mean Increase in				Mean Increase in			
Age	T_i(%)	Range	T_{tot}(%)	Range	T_i(%)	Range	T_{tot}(%)	Range
< 36 hrs	17	(0-36)	21	(0-72)	42	(0-114)	68	(21-132)
2-14 days	50	(27-80)	25	(21-34)	14	(0-50)	22	(0-51)

Although the mean slowing on occlusion(reflected in T_{tot}) was similar in both groups, there was less change in T_i in newborn than in older pups($p<.01$). Slowing of respiration after vagotomy was greater in newborn pups($p<.01$). These data demonstrate that volume related vagal afferents in rabbit pups function to increase respiratory rate. The increased slowing after vagotomy in newborn pups over that of occlusion alone ($p<.01$), suggests that non-volume related vagal afferents may be particularly important in stimulating respiration in newborn rabbits.

RESPIRATORY MOVEMENTS AND BLOOD GASES IN THE OVINE FETUS. Molly E. Towell, Dept. of Obstetrics & Gynecology, Univ. of B.C., Vancouver, Canada,(Intro. by L. Stanley James)

The purpose of this study was to determine whether there is a relationship between spontaneous fetal respiratory movements (FRM) and fetal blood gases. A hysterotomy was performed at 105-120 days gestation in 3 pregnant ewes and 6 pregnant goats; catheters were introduced into the fetal carotid artery, fetal trachea and amniotic cavity. Thereafter observations were made on unanesthetized animals for periods of 3 to 27 days. Periods of apnea and FRM were identified from simultaneous recording of intratracheal and intraamniotic pressure; samples of fetal blood were obtained during both apnea and FRM. In both fetal lambs and fetal goats, mild hypoxemia was present during episodes of FRM and there were significant differences in blood oxygen values for the group of fetal goats; mean PO_2 was 29.9 mmHg vs. 27.6 mmHg ($P<0.01$) and mean O_2 saturation was 75.6% vs. 69.7% ($P<0.01$). There were no significant differences for pH, PCO_2 and base excess. However, when blood samples were analyzed in relation to the amplitude of FRM, there was a significant increase of PCO_2 with increasing amplitude of FRM. These observations suggest that, in the ovine fetus, mild fluctuation of blood gases are present even under relatively undisturbed intrauterine conditions and that these are associated with FRM; it is speculated that a cause and effect relationship may be present.

LONG-TERM CHANGES IN VITAL CAPACITY OF PATIENTS WITH CYSTIC FIBROSIS RECEIVING MIST TENT THERAPY. Warren J. Warwick, Joyce T. Warshawsky,* and Elsa J. Roe.* Dept. of Pediatrics, University of Minnesota, Minneapolis, Minn.

Since mist tent therapy for treatment of cystic fibrosis is acclaimed effective because of improved survival associated with its use, judged ineffective because of lack of improvement in short term studies of pulmonary function, we elected to estimate the change in vital capacity with years of mist tent treatment.

Patients in this survey have been seen at one to three month intervals. Peak respiratory flow rate, one second forced expiratory volume, and vital capacity were obtained at each examination. All patients received mist tent therapy with either sterile 0.25% saline from a WinLiz nebulizer or sterile 5% propylene glycol from a DeVilbiss ultrasonic nebulizer. Bronchial drainage was prescribed twice a day. Antibiotic treatment was based on sputum or "gag" cultures obtained at each visit.

The vital capacity of the cystic fibrosis patients were compared to predicted values based on height and sex and the standard deviation of the difference calculated. Altogether the group showed an average follow up of 5 years with an average change in standard deviation of less than 0.1 standard deviation per year of follow up. Two-fifths showed improvement for periods of 2 to 7 years, one-fifth were unchanged for 5 to 7 years, two-fifths worsened during 2 to 7 years observation.

MEASUREMENT OF MUCOCILIARY AIRWAY CLEARANCE IN PATIENTS WITH CYSTIC FIBROSIS (CF) AND ITS STIMULATION BY TERBUTALINE. Robert E. Wood, Adam Wanner, and Judith A. Hirsch, (Intr. by Paul A. di Sant'Agnese), NIH, Bethesda, Md., and Mt. Sinai Hosp., Miami Beach, Fla.

Mucociliary airway clearance (MAC) as measured by tracheal mucus velocity (TMV) was evaluated in 14 patients with CF (18-43 years, mean = 25 yrs). A fiberoptic bronchoscope was passed transnasally into the trachea with topical Xylocaine anesthesia, and Teflon discs (0.68 mm dia, 0.13 mg) were blown onto the mucosa (Xylocaine has been shown previously not to alter TMV in unanesthetized sheep). The discs were filmed at ½-sec. intervals and TMV calculated from image size and film speed (J.Appl.Physiol. 43:495, 1973). TMV was slower in CF than in 20 normal volunteers (NV) (18-44 yrs, mean = 27 yrs): 2.6±3.3 mm/min (std. dev.) *vs.* 20.1±6.4 mm/min ($p<.001$). There was no correlation of TMV with age, sex, clinical status, pulmonary functions, or tracheal appearance.

Immediately after measurement of TMV, 0.25 mg Terbutaline (T) (1-(3,5-dihydroxyphenyl)-2-(t-butylamino)-ethanol), a new beta adrenergic agent, was given subcutaneously. TMV 15 min later increased to 5.5±3.6 mm/min ($p<.001$). In NV there was no significant effect of T on TMV. Each CF subject appeared to produce more secretions in the trachea and main-stem bronchi after T than before.

This is the first time that MAC has been evaluated in CF by a direct method. These data suggest that pharmacologic agents may be useful in increasing MAC in CF.

GENERAL

THE CLINICAL ASSESSMENT OF KNOWLEDGE. Floy Helwig. Northwestern Univ. Med. Sch.,(Intr. by H.L. Nadler)

Performance evaluation is an important obligation of a clinical teaching faculty. Our student evaluation consists of a rating profile and narrative comments. Eight ratings relate to observable performance such as "quality of written workups, presentations," etc. The ninth is an assessment of scholastic ability and is stated "application of basic medical knowledge to clinical problems." The clinical evaluation of basic knowledge of the 1971-2 junior students was compared to their National Board I score. The groups were divided Honor, Above the median, Below, and Fail. The grade groups were significantly different (x^2 25.46, $p<.001$) and the correlation was not significant. Our faculty did not recognize insufficient, or Fail, level of knowledge and their assessment was weighted to the group "Above the median". Our written examination correlated better with Part I (x^2 11.76, $p<.01$; $r=.35$, $p<.001$) and Part II (x^2 0.49, n.s.; $r=.40$, $p<.001$). The use of clinical estimation versus examination to evaluate scholastic ability will be discussed, and the evaluation profile described. Although our clinical evaluation was performed by skilled clinicians, *our study suggests that subjective rating profiles be limited to observed performance, and valid examinations be used to evaluate cognitive ability.*

PEDIATRIC BONE MARROW TRANSPLANTATION-A BIO-ETHICAL MODEL. M.D. Levine, B. Camitta, D.G. Nathan, W.J. Curran. Children's Hosp. Med. Cent. and Harvard Sch. Pub. Health, Boston, Mass.

Informed consent for children is traditionally obtained by agreement between physicians and parents acting for themselves and their child. In marrow transplantation, donors undergo a hazardous procedure of no physical benefit. Parental ability to consent for donor or critically ill recipient is compromised. A system was devised to represent the interests of parents, donor and recipient in this setting. This included peer review, a court appointed donor guardian, psychiatric consultation, full age-appropriate explanations to all parties and judicial review. Despite fears about over-publicity and over-informed participants, outside observers agreed that maximum information transfer occurred which allowed easier hospitalization. Three cases of severe unresponsive aplastic anemia are presented in which selection of decision-makers, use of veto power, and the concept of consensus were involved. In 1 consent for transplantation was unanimous. The patient recovered. Parents refused permission in the second case. The patient died. In a third case consent was felt to be unobtainable from a brain damaged donor. A court permitted this donation. Assessing the competence of a minor to protect his interests and to give consent should be a critical objective of developmental pediatrics. Bone marrow transplantation in aplastic anemia can be regarded as a model for the study and development of approaches to ethical decisions in the application of advanced lifesaving technologies.