number exceeds the present accepted safety levels at cord and breast milk samples. Preventing ETS, limiting fish consumption and improved living conditions for pregnant women may decrease exposure levels.

99 PELOD-2: AN UPDATE OF THE PEDIATRIC LOGISTIC ORGAN DYSFUNCTION SCORE

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Background and aims Organ dysfunction scores, such as the PEdiatric Logistic Organ Dysfunction (PELOD) score developed in 1999, are primarily designed to describe the severity of organ dysfunction. This study was undertaken to update and improve the PELOD score, using a larger and more recent dataset.

Methods We did a prospective, observational, multicentre cohort study in nine French-speaking multidisciplinary, tertiary-care PICUs of university-affiliated hospitals between June 2006 and October 2007. We collected data on variables considered for the PELOD-2 score at seven time-points after PICU admission: days 1, 2, 5, 8, 12, 16 and 18, plus PICU discharge. For each variable, the most abnormal value observed during each time point was collected. Identification of the best variable cutoffs was performed using bivariate, multivariate regressions and bootstrap process. The outcome was vital status at PICU discharge. We used area under receiver operating characteristic curve (AUC) to evaluate discrimination and Hosmer-Lemeshow goodness-of-fit test to evaluate calibration.

Results We included 3671 consecutive patients (median age 15.5 months IQR 2.2–70.7). Mortality rate was 6.0% (222 deaths). Discrimination and calibration of the PELOD 2 score were 0.93 and 9.31 (p=0.317) respectively.

Conclusion We developed and validated the PELOD-2 score, which allows assessment of the severity of cases of MODS in PICU with a continuous scale. The score will be in the public domain, which means that it can be freely used in clinical trials.

100 NEONATAL DISEASE SEVERITY SCORES AND THEIR PREDICTIVE VALUE 3FOR EARLY MORTALITY: A POPULATION-BASED STUDY ON SUBGROUPS OF VLBW INFANTS

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Background and aims Benchmarking of newborn mortality needs risk-adjustment of data for heterogeneous sub-populations. To assess utility of neonatal disease severity scores CRIB, CRIB-II and PREM and impact of influenceable items (FiO_2max, FiO_2min, body temperature (BT) base excess (BE)) to predict mortality in VLBW infants (*VLBW*), ELBW infants < 750g (*BW750*), g.a. 22–25 weeks (*GA22–25*).

Methods Analysis of birth cohorts of years 2003–2008 from the Baden-Württemberg registry. Inclusion criteria: GA < 33 weeks and BW < 1.500g. Variables considered: GA; BW; gender; BT; FiO_2max; FiO_2min; BE; malformation; death. Calculation of standard CRIB, CRIB-II and PREM with/without omission of selective items. Calculation of predictive value of scores/subscores for whole cohort *VLBW*, subgroups *BW750* and *GA22-25* using AUC of ROC curves. Wilcoxon/Mann-Whitney U-test, Fishers exact test, Pearson-Chi-Square test.

Results Total of 5.340 cases, 862 cases < 750g. AUC for *VLBW/BW750*: CRIB 0.89*/0.77, CRIB-II 0.86*/0.78, PREM 0.86*/0.77 (*p<0.01). For *GA22-25* AUC of CRIB/PREM was 0.80/0.70. Lower AUC of all 3 modified scores without BT and/or BE, for instance PREM=0.82 *(VLBW)* and 0.73 *(BW750)*. AUC of CRIB without influenceable parameters dropped for *VLBW* from 0.89 to 0.81, for *BW750* from 0.77 to 0.66 (compared to modified CRIB-II=0.71, modified PREM=0.73).

Conclusions Standard CRIB is superior to standard CRIB-II, standard PREM, and all score modifications without influenceable items. No difference exists between the 3 scores when omitting influenceable parameters. For ELBW infants < 750g all standard scores are equally predictive, but without influenceable parameters AUC of CRIB is inferior to that of CRIB-II or PREM.

101 FETAL NUTRITION—WHAT CAN WE LEARN TO BETTER NOURISH THE PRETERM INFANT?

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Most preterm infants fail to grow after birth and end up growth restricted by term. The main reason is inadequate nutrition. From studies of normal fetal growth and development, we have gained important insight into the requirements for such growth and development that could be applied to the preterm infant of the same preterm gestational age. Maintaining normal blood **oxygen** content values to support the high rates of cellular metabolism and protein synthesis is essential to promote normal rates of growth. **Glucose** should be supplied at rates that maintain normal fetal glucose concentrations. Normal human fetal development involves considerable body **fat** deposition, but more emphasis should be placed on providing essential fatty acids to promote membrane development in neural tissue. Amino acid utilization rates based on fetal animal growth data, when scaled to human fetal growth rates, predict amino acid requirements of 3.6–4.8 g//kg/day at ~24–30 weeks gestation. There is a linear correlation between **amino acid** supply to preterm infants and **protein** balance, at least through 3 g/kg/day. While energy is required for protein synthesis, above 80–90 non-protein kcal/kg/d, there is no further increase in protein gain for an increase in energy intake. Improved protein and energy intake in preterm infants that more closely matches fetal nutrition is associated with improved brain growth and neurocognitive outcomes. **Insulin** concentrations that result from such nutrition probably are sufficient for normal growth; insulin infusions do not add more to promote growth than increased amino acid/protein nutrition and produce significant adverse effects.

102 RANDOMIZED, CONTROLLED TRIAL OF SLOW VERSUS RAPID ENTERAL FEEDING ADVANCEMENTS ON THE CLINICAL OUTCOMES OF PRETERM INFANTS 750–1250G

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Objective To evaluate the effect of slow versus rapid rates of advancement of enteral feed volumes upon the clinical outcomes in preterm infants with 750–1250g birth weight.
Study Design A total of 92 stable neonates with the birth weight 750–1250g and gestational age less than 32 weeks were randomly allocated to enteral feeding advancement of 20ml/kg/day (n=46) or 30ml/kg/day (n=46). The primary outcome was days to reach full enteral feeding defined as 180ml/kg/day. Secondary outcomes included rates of necrotizing enterocolitis and culture-proven sepsis, days of total parenteral nurition, length of hospital stay and growth end points.
Result Neonates in the rapid feeding advancement group achieved full enteral volume of feedings earlier than the slower advancement group. They received significantly fewer days of parenteral nutrition, exhibited a shorter time to regain birth weight and shorter duration of hospital stay. The incidence of NEC and the number of episodes of feeding intolerance were not significantly different between the groups while the incidence of culture-proven late onset sepsis was significantly less in infants receiving a rapid feeding advancement. Excluding infants who were small for gestational age at birth, the incidence of extrauterine growth restriction was significantly reduced in the rapid advancement group at 28 days and at hospital discharge.
Conclusion Rapid enteral feeding advancements in 750–1250g birth weight infants reduces the time to reach full enteral feeding and the use of TPN administration. Rapid advancement enteral feed also decreases extrauterine growth restriction with improved short-term outcomes for these high-risk infants.

103 A RANDOMISED TRIAL COMPARING FISH OIL (SMOFLIPID) VS. OLIVE OIL LIPID EMULSION (CLINOLEIC) IN PRETERM (< 30 WEEKS) NEONATES

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Background Fat emulsions used in Australia for PN in preterm neonates have been based on either soybean oil (SO) or olive oil (OO). OO based lipid Clinoleic has high ratio of n-6 to n-3 fatty acids (9:1) this may not be ideal for LC-PUFA supply. Newly available SMOFlipid has appropriate ratio n-6 to n-3 fatty acids (2.5:1). SMOFlipid also contains OO (25%), coconut oil (30%) and SO (30%). Better lipid clearance, reducing the risk of liver toxicity, reduced oxidative stress, lower immune-activity and anti-inflammatory effects are other potential advantages of SMOFlipid.
Method Preterm neonates (23–30 weeks) were randomised to receive Clinoleic or SMOFlipid emulsion for 7days using a standard protocol. Investigators and outcome assessors were masked to allocation. Plasma F_2-Isoprostanes (lipid peroxidation marker), RBC fatty acids, vitamin-E were measured before and after the study. Blood culture positive sepsis and growth was monitored for safety.
Results 30/34 participants (Clinoleic-15, SMOFlipid-15) completed the study. Both emulsions were well tolerated without any adverse events. F_2-isoprostane levels were reduced in SMOFlipid group as compared to baseline. Eicosapentanoic acid (EPA) and vitamin-E levels were significantly increased in SMOFlipid group. Oleic and Linoleic acid levels were increased in both groups. No significant differences were noted in post study Docosahexaenoic acid (DHA) levels in both groups despite higher levels of DHA in SMOFlipid.
Conclusions SMOFlipid was safe, well tolerated and also showed beneficial effect in terms of reduction of oxidative stress by reducing lipid peroxidation levels in high risk preterm neonates.

104 CEREBRAL AUTOREGULATION IN THE NEWBORN

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Vascular pressure reactivity is the ability of vascular smooth muscle to respond to changes in transmural pressure. In the cerebral circulation this reactivity - or autoregulation - limits cerebral blood flow variation over a range of cerebral perfusion pressures ensuring adequate perfusion and oxygenation to the brain.

In adults cerebrovascular pressure reactivity can be determined by observing the response of intracranial pressure (ICP) to changes in mean arterial blood pressure. Non-invasive techniques such as transcranial Doppler ultrasound and near-infrared spectroscopy have been validated against ICP measurements, which have enabled continuous assessment of cerebral autoregulation to be investigated in newborn infants.

A number of different techniques have been described, including static and dynamic measurements and analysis in the time and frequency domain, yet despite many years of research the characteristics of cerebral autoregulation in the newborn are still not clear.

Both the presence and limits of autoregulation has been much debated although there is increasing evidence that autoregulation, while present in healthy infants, is impaired in sick term and preterm neonates and that this impairment may be a predictor of poor outcome.

In clinical practice there is a reliance on blood pressure measurements alone to make informed clinical decisions, which ignores the complex circulatory control mechanisms that exist to optimize oxygen delivery to the brain. The ability to obtain continuous quantitative information on cerebral autoregulation at the cotsie would represent a significant advance in the management of these patients.

105 NON-INVASIVE MEASUREMENTS OF HEMODYNAMIC TRANSITION AT BIRTH

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Objective To investigate the hemodynamic changes during transition at birth obtaining non-invasive physiological data in healthy term infants.
Methods In 18 newborns (GA 39 weeks (38–39)) born by a caesarian section; arterial oxygen saturation (SaO_2) (preductally), heart rate (HR) and non-invasive blood pressure (BP) were measured and echocardiography using M-mode and Doppler flow was performed at 2, 5 and 10 minutes after birth.
Results Oxygen saturation and HR were within recommended target ranges. Mean BP did not change between measurement intervals (55 mm Hg at 2 min, 54 mm Hg at 5 min. and 54 mm Hg at 10 min) and was similar as BP measured at day 1. Left ventricle output (LVO) significantly increased between 2 min and 5 min