Invited Speaker Abstracts

Catch-Up Growth

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HORMONAL REGULATION OF GROWTH PLATE CARTILAGE
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In the past, the growth hormone (GH) - insulin-like growth factor-I (IGF-I) axis was thought to be the central system regulating childhood growth and therefore responsible for short stature and tall stature. However, recent findings have revealed that the GH-IGF-I axis is just one of many regulatory systems that control chondrogenesis in the growth plate, the biological process that drives height gain. Consequently, normal growth in children depends not only on GH and IGF-I but on multiple hormones, paracrine factors, extracellular matrix molecules, and intracellular proteins that regulate growth plate chondrocytes. Mutations in genes encoding many of these local proteins cause short stature or tall stature. Similarly genome-wide association studies have revealed that the normal variation in height appears to be due largely to genes outside the GH-IGF-I axis that affect growth at the growth plate through a wide variety of mechanisms. These findings point to a new conceptual framework for understanding short and tall stature, which is centered not on two particular hormones but rather on the growth plate, the structure responsible for height gain.
Catch-up growth (CUG) is characterized by a period of supranormal height velocity following a transient period of growth inhibition. Tanner described three types of CUG. Type A (true CUG) is characterized by fast growth up to target height (TH) standard deviation score (SDS) followed by a stable height SDS. In type B, height velocity (HV) is only slightly faster than normal for age, but normal for bone age. In type C, HV is normal for age. In both types B and C an adult height close to TH can be reached if puberty is delayed. We proposed an intermediate form (AB) characterized by an incomplete type A catch-up followed by a stable height SDS below TH SDS. Basically there are two hypotheses to explain CUG. According to the neuro-endocrine hypothesis, a central mechanism would be able to recognize the degree of mismatch between actual size and target size. So far, no experimental evidence has been found. According to the growth plate hypothesis, first suggested by Williams and later modified by Baron, growth is regulated locally according to a preset cellular program of senescence, characterized by decreasing growth proliferation rate. Therefore, after resolving a temporary disturbance of this program (thus at the onset of CUG), senescence would be delayed in local tissues, so that growth would resume from a less senescent state, thus at a higher rate than normal for that age. None of these hypotheses can fully explain the observations made in human and animal models of CUG. Unilateral CUG in animal experiments argue against the neuro-endocrine hypothesis. With respect to the growth plate hypothesis, the observed type B CUG in young infants and children with celiac disease is supportive, but the fast HV observed in type A CUG, much faster than normal for bone age, speaks against it.
Catch-Up Growth

6 NUTRITIONAL CATCH-UP GROWTH
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Background: We have recently reported the results of phase-I of a 12-months study aimed to determine the effectiveness of a nutritional supplement on growth in short and lean 3 to 9-years children. This phase-I was a 6-months randomized double-blind placebo controlled study of which results showed a significant positive dose-dependent effect of the study formula on linear growth. We now report the results of phase-II of the study which was a 6-months open-extension where all participants received the study formula.

Methods: All participants were instructed to consume the formula at dinner in addition to their regular diet. Height, weight and 3-days food diary, were assessed at baseline, 6 and 12-months of intervention.

Results: 150 children continued their participation in phase-II when 129 completed it (86%). Good-consumers (intake of >50% of the recommended dose) of the formula at phase-II, which were at the placebo group in phase-I, improved significantly their height-SDS (0.12±0.11 vs. 0.04±0.13, p=0.001, respectively) and replicated the results of the good-consumers of the formula during phase-I (0.12±0.12). All-year good-consumers of the formula maintained their phase-I height growth response, Other participants who had all-year average intake of <50% of the formula recommended dose, from both formula and placebo groups, did not improve their height-SDS. No serious adverse events were reported.

Conclusions: One-year of intervention with the formula is effective and safe in promoting linear growth of short and lean prepubertal children.
While patterns of weight gain in early life have been associated with later body composition and obesity, this association appears to differ according to the period of development during which weight gain occurs, and between high and low/middle income settings. Broadly, the association between weight gain and later obesity risk strengthens with increasing age, but several factors contribute to this relationship. Beyond weight gain, much attention has been directed to differences between breast-fed and formula-fed infants in their immediate and long-term body composition. This is relevant to the assessment of ‘healthy growth’ in early life, and the risk of obesity in the long-term. Increasingly, there is also interest in how variability within breast-feeding may affect body composition of the offspring. Possible mechanisms underlying such variability could include characteristics of both the mother (eg: body composition, breast-milk milk composition, weaning schedule) and the offspring (eg: gender, size at birth, temperament, gut microbiota). There is increasing evidence for dynamic interaction between mother and offspring, in which the volume of milk transfer, and its composition, may be influenced by both parties. Infant temperament has been linked with the rate of weight gain in several studies; hormones are likely to be an important mechanism in this relationship, as demonstrated in recent primate studies. Maternal leptin has also been suggested to programme the body composition of the offspring. Improved understanding of these issues will have many benefits for public health, aiding in the support of breast-feeding, while also promoting healthy growth patterns.
Social Preferences and Body Ideals Impact Growth, Nutrition and Health

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THE QUEST FOR HEIGHT - SEEKING GH TO MAKE CHILDREN AND ADOLESCENTS TALLER

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Height is a physical trait on a continuum. The threshold between “normal” and “abnormal” is arbitrarily set. Results from a survey of 1820 parents of pediatric primary care patients will be reviewed, asking where they draw the line and analyzing associated factors. The presentation will also consider social influences on our perceptions of height and the impact on health care utilization for children and adolescents with short stature.
The preponderance of data suggests that both male and female athletes are at greater risk for developing disordered eating and eating disorders than the general population. The data also strongly suggest that athletes in weight sensitive sports (aesthetic, endurance, and weight-class) are more at risk than those in less weight sensitive sports. The prevalence of eating disorders is about 13% among adolescent female elite athletes, and 3% in adolescent male elite athletes, respectively. The prevalence differs significantly between sports. A need for education regarding risk factors, early identification, appropriate management, effective treatment, and preventative efforts for the special subpopulation of young athletes have been requested. However, to date, no controlled studies on young elite athletes concerning prevention of eating disorders have been published. Therefore, we designed and tested the effect of a one-year multifaceted intervention program on the development of symptoms associated with eating disorders and disordered eating among adolescent elite athletes. First-year students representing the total number of Elite Sport High Schools were randomized at school level to intervention or control. A total of 465 (94%) athletes completed the study. The athletes completed Eating Disorder Inventory (EDI) and issues related to eating disorders at (pretest), after the intervention (posttest 1) and 9-months follow-up (posttest 2). We conducted clinical interviews (Eating Disorder Examination, EDE) after the pretest and at posttest 2 all athletes were interviewed. Results showed that among girls, the risk of symptoms was 55% lower in the intervention schools than control schools at posttest 1. This effect was diminished at posttest 2. There were no new cases of eating disorders among girls in the intervention schools while there were 8 (13%) at the control schools. The risk of dieting (present and repeated attempts ≥3) was 61% lower in the intervention schools than control schools at posttest 1 and 65% at posttest 2. Among boys, there was no difference in the risk of symptoms between groups at posttest 1 or 2. At posttest 2 there was one new case of ED among the boys (control school). In conclusion, the prevalence of eating disorders is too high among young elite athletes, but it is possible to prevent development of eating disorders and symptoms associated with eating disorders among elite athletes.
Social Preferences and Body Ideals Impact Growth, Nutrition and Health

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As closing remarks in the Social Preferences and Body Ideals Impact Growth, Nutrition and Health symposium, this presentation will highlight how general society, governments, academic and health organizations and other authoritative bodies may serve to protect the health, nutritional status and optimal growth of children. Examples introduced by the previous symposium speakers, such as the Food and Drug Administration (FDA in US) role in regulating growth hormone treatment indications and of European legislative efforts to address malnutrition in professional fashion models, will be expanded and next steps considered. Government and other child-advocacy stakeholders (ie, parents, teachers, coaches, dietitians, nurses, doctors) influence on attitudes, availability and regulation of foods and beverages in school and daycare settings will be reviewed. Lastly, we will discuss the role of pediatric medical societies and national organizations such as the country-based National Academy of Medicine to contribute to health care provider awareness and to regulate standards of medical care to prevent child and young adult undernutrition and obesity in our complex health care and socio-cultural settings.
Complementary Feeding

INTRODUCTION OF SOLIDS, NUTRITION ADEQUACY AND THE RISK OF ALLERGY

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Complementary foods (CF) are required in the middle of the first year to provide nutrients that can no longer be supplied in adequate amounts by breast milk alone, including energy, protein and micronutrients, notably iron. Nutrient requirements from solid foods depend on the type of milk consumed by the infant; but overall the CF diet should provide a good source of iron and adequate protein, whilst avoiding excessive amounts which may contribute to the development of obesity.

Beyond the nutritional requirement for CFs, there is interest in the concept that exposure to small, possibly nutritionally insignificant amounts of allergenic foods such as cows’ milk, egg, fish, gluten, peanut, and seeds may induce tolerance and protect against the development of food allergies. Systematic reviews have concluded that there allergy risk may be increased if solids are introduced before 3–4 months. However, there is no evidence that delaying the introduction of allergenic foods beyond 4 months reduces risk, either for high or low risk infants. Randomised trials are investigating causal relationships between timing of introduction of allergenic food and later allergy. Data from the LEAP study suggest that early repeated exposure to peanut reduces peanut allergy at age 5 years in high risk infants; and interim advice was recently published recommending that such infants should have peanut introduced from 4 months. This advice will be updated in the near future and will also consider whether guidelines should be extended to the general population of infants without risk factors.
Complementary Feeding

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GLUTEN INTRODUCTION AND CELIAC DISEASE
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Celiac disease represents a unique disorder in which consumption of a food ingredient, namely gluten, in conjunction with genetic susceptibility, is essential for the development of an insidiously evolving autoimmune reaction affecting the gut and other organs. Celiac disease affects approximately 1% to 3% of the general population in most parts of the world.

The European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) recommended, in 2008, based on observational data, to avoid both early (less than 4 months) and late (7 or more months) introduction of gluten and to introduce gluten while the infant is still being breastfed as this may reduce not only the risk of celiac disease, but also type 1 diabetes mellitus and wheat allergy. These recommendations were based on observation.

Contrary to previous advice, recent evidence from 2 randomized controlled trials, showed that the age of gluten introduction into the infant’s diet does not have an effect on the cumulative incidence and prevalence of celiac disease during childhood, though earlier introduction causes the disease to present itself at an earlier age. These findings suggest that primary prevention of CD through nutritional intervention is not possible at the present time. The new evidence prompted ESPGHAN to revise these recommendations.

The new ESPGHAN guidelines recommend that gluten may be introduced into the infant’s diet anytime between 4-12 completed months of age.

These guidelines state that although breastfeeding should be promoted for its other well-established health benefits, current evidence suggests that neither any breastfeeding nor breastfeeding during gluten introduction can reduce the risk of CD.
Objective: To assess the prevalence of skeletal dysplasias (SD) in patients with idiopathic short stature (ISS) or small for gestational age (SGA) status.

Setting: Rare Endocrine/Growth Diseases Center in Paris, France.

Design: A prospective study on consecutive patients with ISS and SGA enrolled from 2004 to 2009.

Method: We used a standardized workup to classify patients into well-established diagnostic categories. Of 713 patients with ISS (n=417) or SGA status (n=296), 50.9% underwent a skeletal survey. We chose patients labeled normal or with a prepubertal slowdown of growth as a comparison group.

Results: Diagnoses were ISS (16.9%), SGA (13.5%), normal growth (24.5%), transient growth rate slowing (17.3%), endocrine dysfunction (12%), genetic syndrome (8.9%), chronic disease (5.1%), and known SD (1.8%). SD was found in 20.9% of SGA and 21.8% ISS patients and in only 13.2% in our comparison group. SD prevalence was significantly higher in the ISS group than in the comparison group, especially (50%) for patients having at least one parent whose height was < -2 SDS.

Dyschondrosteosis and hypochondroplasia were the most frequently identified SD, and genetic anomaly was found in 61.5 and 30% respectively. Subtle SD was found equally in the three groups and require long-term growth follow-up to evaluate the impact on final height.

Conclusion: SD may explain more than 20% of cases of growth retardation ascribed to ISS or SGA, and this proportion is higher when parental height is < -2 SDS. A skeletal survey should be obtained in patients with delayed growth in a context of ISS or SGA.
Nutrition Interventions: Science and Sensibility

META-ANALYSIS IN NUTRITION INTERVENTIONS: STATE OF THE ART AND FUTURE CHALLENGES

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Meta-analysis is a quantitative statistical analysis of results from several separate but similar studies in order to summarize scientific evidence on a specific issue. It is a subset of systematic review, a secondary research tool, which at the moment represents the strongest methodology to assess the strength of the scientific evidence. Such tool allows to summarize available data and minimize the reporting bias thorough a comprehensive and transparent procedure which includes: a) developing the question to which the systematic review is intended to answer, b) defining eligibility criteria of the included studies, c) defining the search terms and conducting literature searching, d) selecting studies of interest and extracting data, e) assessing the quality of the studies, f) performing meta-analysis, if appropriate, and finally g) synthesizing and discussing the results. The strength of this procedure is the objectivity, transparency and rigorousness of the process.

Systematic reviews and meta-analysis become popular in the medical community, since they allowed to offer guidance to clinical and policy decision making based on the best available research evidence. More recently, the use of systematic reviews and meta-analysis in the nutrition field has been proven to be an essential tool for supporting the development of science-based dietary recommendations and guidelines, identifying the state of science including knowledge gaps and associated research needs, and serving as the foundation for updates as new data emerge. However the unique characteristics of nutrition require new efforts to develop innovative research strategies for answering to more complex questions than those traditionally encountered in other fields. The importance of a rigorous methodology in nutrition related issues for assessing the quality of the scientific evidence is exemplified by the history the dietary recommendations on saturated fatty acids. Now, such recommendations are strongly questioned and recent meta-analyses are unable to show the negative health effects, which were the rationale for such dietary recommendations. Paradoxically, inadequate scientific evidence and its use in policy recommendations discouraged the consumption of saturated fatty acids and favored the introduction in the food market of trans fatty acids, which are now recognized as harmful.
In a growing number of jurisdictions, economic evaluation (eg. cost-effectiveness analysis) is being used to support decisions on the inclusion of health care interventions for payment under national health or social security systems. This approach is mostly used to assist decisions on the pricing and reimbursement of drugs, but in some jurisdictions extends to public health interventions. In those countries where economic evaluation is formally required, methods guidelines are normally proposed to assist the manufacturers or sponsors of health technologies in making submissions of data and analyses to the authorities. However, these guidelines have often been developed to apply to narrowly-defined health technologies such as drugs and may pose challenges when applied to public health interventions.

This paper will review the available methods guidelines for economic evaluation and discuss the potential and limits of applying them to nutrition interventions.
Nutrition Interventions: Science and Sensibility

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COST-BENEFIT ANALYSIS OF NUTRITION INTERVENTION: THE WAY FORWARD
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We reviewed the published literature on the economic evaluation of government interventions to improve dietary habits of healthy individuals. Given the social and economic consequence at stake, it appears scant, mainly focused on Anglo-Saxon countries and methodologically heterogeneous. Cost-Effectiveness Analysis (CEA) is the dominant method used by researchers. Although CEA has proved to be very successful to rationalize the use of healthcare resources, its use for providing guidance to policy making in the nutrition field posits major challenges.

First, consumption of food is mainly private rather than public. Through interventions aimed at changing nutrition behaviour, public policies try to modify the allocation of households’ disposable income, which greatly varies in the society, rather than the allocation of governments’ budgets. As a consequence, equity concerns and wider impacts of consumption choices risk to be undervalued by recommendations based on CEA. Second, while healthcare interventions aims only to improve health, nutrition and food consumption meet a number of expectations beyond better health such as pleasure and social rituals. This makes recommendations based on CEA potentially in contrast with the search for improving subjective wellbeing.

Third, in globalised economies, agriculture and food production are specialised and thus are at risk of major shocks due to sudden changes in consumer choices. CEA does addresses directly the impact of health policies on industry and trade. Government interventions at all levels should be based on better scientific evidence and scientific communities should predict socio-economic consequences of policies through the use of sounder methods and more empirical evidence. Both specific developments of the CEA approach and the use of formal cost-benefit analysis, which is based on the monetary quantification of all effects of policies, are viable options.
Many of the claims and counterclaims in the food wars reflect specialized modes of thought driven by disciplinary allegiance to nutrition, public health, individual health, the environment, agriculture and even macroeconomics. A journalist, especially with an anthropological training in going to the sources, is well-placed to notice the rhetorical maneuvers and to “go outside” and connect a few dots. In my book on the demonization of sugar, I found lots of putative lobbies, almost always described by their adversaries. I’ll reflect on what that means, using recent examples including Coca-Cola’s effort to fund research on the importance of physical exercise and on some of the new environmentalist analyses about our food system. Lastly, I’d like to reflect on the media as a keystone species in the ecosystem of the Anthropocene, our current era.
GROWTH AND NUTRITION IN CHILDREN WITH FOOD ALLERGIES

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There is an increasing prevalence of food allergy in recent decades, affecting between 3%-8% of infants and young children. Among food allergic children, 30% have multiple food allergies. The most common allergens encountered at that age include milk, egg, wheat, peanuts, and less commonly fish, shellfish, soy and tree nuts. Most of them, and particularly milk, egg, wheat and fish, are important sources of macro- and micronutrients essential for growth and development of young children. The mainstay of treatment, recommended by all relevant guidelines, is the strict and complete elimination of the offending food allergens. Infants and children are particularly vulnerable in respect to nutritional deficiencies due to increased requirements for growth and maturation. Moreover, the first few years are crucial in respect to long-term development, and any major nutritional imbalance will not only affect current growth and development but could also have negative implication for health outcome in adulthood.

Many studies have assessed growth of allergic children and found that both weight and height are impaired compared to healthy controls. Moreover, several papers reported that children with multiple food allergies were more likely to be affected compared to children allergic to only 1 or 2 foods. The same applies for children with persistent food allergy and/or combined with other atopic diseases such as eczema or asthma. In respect to the etiology of growth impairment, poor dietary intake is certainly the most plausible cause. Studies showing that diettian support and the increased attention to dietary follow-up and supplementation can significantly minimize negative impact of the elimination diets is in favor of this etiology. However, in several studies inadequate nutrient intake could not explain the differences in growth of allergic children compared to healthy controls. Therefore, the continuous inflammation caused by allergy, increased metabolic demands and the negative effect of the treatment such as corticosteroids could provide further explanation for the higher rate of malnutrition and stunted growth in children with food allergies, particularly if they are multiple.

The aims of this lecture are: a. to summarize data on growth of children with food allergies compared to healthy controls, in respect to the number of foods affected, and duration and type of allergy; b. to discuss the origins of growth faltering in food allergic children; c. to summarize other relevant nutritional deficiencies found; d. to present the results of improved dietetic control; e. to address the problem of multiple elimination diets for factitious food allergy due to parent's disbelief.
IMPACT OF ELIMINATION DIETS ON GROWTH AND NUTRITIONAL STATUS DURING MILK ALLERGIES

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Cow's milk is among the most common food allergies, impacting 2-3% of children. Impairment of growth and nutritional deficiencies have been reported in food allergic children, in particular with cow's milk allergy, including decreased weight and height, BMI and skin folds as a measure of adiposity, kwashiorkor, rickets and iron deficiency. Young children avoiding cow’s milk have decreased intakes of energy, fat, protein, calcium, riboflavin and niacin, and trended toward lower vitamin D compared to children without milk allergy. Although growth differences in children with milk allergy are likely related to the dietary importance of milk, these differences may not be entirely explained by milk avoidance or energy intake alone. Other possible causes include decreased absorption of nutrients due to chronic allergic inflammation and increased intestinal permeability, increased nutrient needs due to atopic eczema and other co-morbidities, or other intrinsic factors related to food allergy may be responsible. We have shown that whereas milk allergic children were shorter than their peers, additional elimination of wheat in their diet did not have further impact on nutritional status, nutrient intake or height for age and weight for height when counseled by dietician specialized on food allergies on regular intervals. Close physician and dietitian follow-up are essential for food allergic children to eliminate food allergens and to adequately supplement the diet are essential to preserve the intestinal integrity and ensure proper nutrition and growth when avoiding one or more foods, which are staples of the diet.
Nutrition and Allergy

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GENETIC PREDISPOSITION TO THE DEVELOPMENT OF FOOD ALLERGIES

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Atopy is defined as the genetic or acquired predisposition to develop IgE antibodies to environmental substances, mainly proteins, and is associated with food allergy, atopic eczema, and allergic respiratory disease. These diseases are often referred to as the atopic diseases and the observation that they tend to lump together in the same individuals is termed ‘the atopic march’. Food allergy is typically the first manifestation of ‘the atopic march’, with a peak incidence in infancy, often co-occurring with atopic eczema. The prevalence of atopy and related diseases has increased over the last 5 decades mainly in populations adopting a Westernized, affluent, and urban lifestyle. In some countries the epidemic now seems so enter a second phase involving a rise in food allergies. A family history of atopic disease is the strongest and most consistently confirmed risk factor for development of atopic disease suggesting that genetic predisposition plays an important role. New technologies such as array-based genotyping of thousands of genetic variants have resulted in a breakthrough in the identification of genes involved in common chronic diseases including atopy, asthma, and eczema, but are still limited with regard to food allergy. In 2006, the candidate gene approach produced a remarkable breakthrough when discovering that mutations of the filaggrin gene, resulting in a genetically impaired skin barrier, were strong risk factors for atopic eczema and surprisingly also food allergy. This discovery seems to have initiated a change of paradigm in the field of atopic disease and our understanding of the pathogenesis of food allergies. For obvious reasons recommendations for primary prevention of food allergy in infancy have focused on feeding practices such as promotion of breast feeding and delayed introduction of solid foods. The claimed beneficial effects of these recommendations have been questioned by recent scientific evidence. In future, primary prevention of allergies should probably focus on promotion of tolerance to allergens e.g. from foods rather than avoidance of allergens.
Breastfeeding and Complementary Feeding in Relation to BMI at Age 7 and 11 Years - A Path Analysis within the Danish National Birth Cohort

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Background and Aims
Infant feeding may affect the risk of a high BMI in childhood. We aimed to examine whether duration of breastfeeding, timing of introduction of complementary food and intake of protein during infancy were related to BMI at age 7 and 11 years.

Method
We included mothers and children participating in the Danish National Birth Cohort. The children were born between 1997 and 2003 and were followed up until age 7 and 11 years, (n= 36,439 and 22,507). Information on exposures, outcomes and confounders originated from interviews, questionnaires and health examinations. Path analysis was used to assess the total, direct, and indirect effects of infant feeding on BMI z-scores at age 7 and 11 years.

Results
Low socioeconomic position, smoking, increasing maternal age, maternal BMI, paternal BMI, birth weight and BMI in infancy were positively related to BMI at age 7 and 11 years. Duration of breastfeeding was not associated with BMI at 7 or 11 years. Early introduction of solids were associated with a slightly lower BMI at age 11 years (-0.07 zBMI), but not at age 7 years. High protein intake was not associated with BMI in girls, but in boys there was a trend for a positive association with a high dairy intake at age 7 (0.03 zBMI) and a high meat intake at age 11 years (0.04 zBMI).

Conclusion
In these preliminary analyses there were no strong and consistent associations with early feeding and childhood BMI. Potential gender differences in the early effects of protein intake should be explored further.
ASSOCIATION BETWEEN GENETIC OBESITY SUSCEPTIBILITY AND EATING BEHAVIOR IN CHILDREN AGED 1 TO 5 YEARS, RESULTS FROM THE EDEN MOTHER-CHILD COHORT

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Background and Aims
Many genetic polymorphisms identified by genome wide association studies (GWAs) on body mass index (BMI) would be involved in the regulation of food intake. The objective was to examine the links between a genetic obesity risk score and eating behavior of children up to age 5 years.

Method
A combined obesity risk-allele score was calculated from genotypes at 16 variants, identified in GWAs of early onset obesity, among 1,340 children from the EDEN mother-child cohort. Children’s appetite and food neophobia were reported by parents at 1, 2 and 3 years and the eating behavior was assessed using the Difficult Feeding Questionnaire at 5 years. Associations between genetic obesity risk score and eating behaviour were tested using logistic regressions, adjusted first for center and child’s age and secondly for child’s BMI.

Results
A high genetic obesity risk score was associated with a greater appetite, at 1 and 2 years, a lower food neophobia from the age of 2 years and less feeding difficulty at the age of 5 years. These associations precede those we previously found between the genetic obesity risk score and child’s BMI, which appeared at 3 years (Elks, JAMA Ped, 2014).

Conclusion
Genes involved in childhood obesity could therefore promote easier eating behavior in children in the first years of life, followed by a subsequent increase in body mass index.
Oral Presentations Session 1: Obesity

EFFECT OF MEAL FREQUENCY ON APPETITIVE TRAITS AND WEIGHT STATUS OF CHILDREN

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Background and Aims
Research on influence of early eating habits on appetite-related eating behaviours using a prospective approach is scarce, especially in children. We aimed to assess the effect of main meals vs. snacks frequency at 4 years of age on appetitive traits and weight at 7 years of age.

Method
Participants are from the population-based birth cohort, Generation 21, assembled in Porto, Portugal. Our analysis included 2098 children evaluated at both 4y and 7y follow-ups, who provided a 3 non-consecutive days food diaries at 4y, and complete information on children the Children’s Eating Behaviour Questionnaire, at 7y. Weight and height were measured at both evaluations. A time-of-day approach was used to distinguish a main meal from a snack. A decision tree was applied to define different meal times, and the eating occasion (EO) with higher energy content (>=50kcal) was defined as the main meal; all other EO, separated by 30min, were considered as snacks. Associations were evaluated through linear regression models.

Results
Increasing number of EO (>7/day vs. <=6/day) and snacks (>=5/day vs. <=3/day) at 4y had a positive association with the ‘Satiety Responsiveness’ domain ([β=0.102(95%CI:0.029;0.175); β=0.151 (95%CI:0.065;0.238), respectively] at 7y. An inverse association between snacks at 4y and ‘Enjoyment of food’ domain at 7y was also found ([β=-0.145(95%CI:-0.221;-0.070)). There was no association of frequency or type of EO at 4y with Body Mass Index at 7y.

Conclusion
The frequency of main meals and snacks in early childhood influences children’s behaviours related with appetite a few years later.

Oral Presentations Session 1: Obesity

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CAESAREAN BIRTH IS NOT ASSOCIATED WITH EARLY CHILDHOOD BODY MASS INDEX: A POPULATION-BASED STUDY
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Background and Aims
The microbiome has been implicated as a factor in childhood adiposity. The microbiome of infants born by caesarean section is markedly different to vaginal birth. We aimed to compare anthropometry of children born by caesarean section and vaginal birth.

Method
In a large population-based dataset, we identified women who previously had a caesarean birth (n=16375) and then opted for another caesarean (n=9925 (61%)) or for a vaginal birth (n=1842 (11%)). The weight and height of 3- to 6-year-old children was collected in community health clinics and converted to age- and sex-adjusted z-scores of height-for-age (HFAz), weight-for-age (WFAz) and BMI-for-age (BMIz). The average treatment effect (ATE) of caesarean compared with vaginal birth was calculated from augmented inverse probability weighted (aipw) analyses including a wide range of potential confounders.

Results
In unadjusted analyses, HFAz was similar, but WFAz and BMIz were higher among children born by caesarean section compared with vaginal birth. The more rigorous aipw analyses suggested no effect of caesarean on HFAz, WFAz, or BMIz (HFAz ATE=0.37 95% CI -0.38, 1.12, n=3251; WFAz ATE=0.46, 95% CI -0.31, 1.22, n=3909; BMIz ATE=0.03, 95% CI -0.47, 0.54, n=3180).

Conclusion
Caesarean section was not associated with higher BMI z-scores among 3 to 6-year-old children.
INTEGRATED EFFECT OF EARLY EXCLUSIVE BREASTFEEDING AND PRE-PREGNANCY MATERNAL WEIGHT STATUS ON YOUNG CHILDREN’S BMI - A CHINESE BIRTH COHORT

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Background and Aims
To assess if the maternal pre-pregnancy weight status (MPWS) alters the association of early infant feeding pattern (at one and three months) with infant BMI in the first two years of life.

Method
A cohort of 2,220 neonates were recruited in the community-based study conducted in China. Body weight and length were measured at birth, at age one and two, with BMI calculated accordingly. BMI-Z was computed according to the WHO Growth Standard (2006). Feeding patterns were classified as exclusive breastfeeding (EBF), mixed feeding (MF), and formula feeding (FF). General linear models were employed to estimate main and interaction effects of EBF and MPWS on children’s BMI-Z, with the potential confounders adjusted.

Results
No main effect of MPWS was found on child BMI-Z at ages one and two, nor the feeding patterns. A significant interaction was detected between MPWS and feeding patterns (p<0.05). Among the children who were formula fed during the first month, those who were born to overweight/obese (OW/OB) mothers had a significantly greater BMI-Z at ages one and two, compared with those with underweight/normal weight (UW/NW) mothers. FF children had greater BMI-Z at ages one and two compared with their EBF and MF counterparts, only if they were born to OW/OB mothers.

Conclusion
Maternal Prepregnancy weight control and early initiation of EBF for children are essential for healthy development in children’s BMI. This is especially important for early obesity prevention of children who were born to women with a higher pre-pregnancy BMI.
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26 TRIGLYCERIDE GLUCOSE INDEX AND METABOLIC PROFILE OF OBESE CHILDREN AFTER 12-MONTHS NUTRITIONAL-BEHAVIORAL INTERVENTION
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Background and Aims
Triglyceride glucose index is an emergent useful indicator to estimate insulin sensitivity [1]. Only one study examined its usefulness in pediatric age, showing that it could be used in the metabolic evaluation in obese adolescents [2]. The aim of this trial was to evaluate the effect of a 12-months nutritional-behavioral intervention (based on normocaloric diet and physical activity) on body mass index (BMI), blood lipid profile and glucose metabolism.

Method
Ninety obese children, aged 6-15 years, were recruited. BMI z-scores were calculated. Fasting blood samples were analyzed for lipids, insulin and glucose, at baseline and at the end of intervention. Insulin resistance was estimated by the homeostatic model assessment (HOMA). Triglyceride glucose index, quantitative insulin sensitivity check index and HOMA-β% were calculated.

Results
At the end of intervention children (n=85) showed lower [mean (SD)] BMI z-score than recruitment [2.96 (0.96) vs 3.54 [1.04], P<0.0001], lower triglycerides [0.94 (0.40) vs 1.29 (0.66) mmol/L; P=0.024] and triglyceride glucose index [8.09 (0.43) vs 8.38 (0.51); P=0.030] and increased HDL cholesterol [1.32 (0.26) vs 1.26 (0.21) mmol/L; P=0.034]. Prevalence of insulin resistance declined from 51.8% to 36.5%.

Conclusion
Twelve-months nutritional-behavioral intervention may improve blood lipid profile and insulin sensitivity. This trial is, to our knowledge, the first intervention study that evaluated triglyceride glucose index in pediatric age and found that it decreased at the end of the intervention. This result suggests that assessment of triglyceride glucose index might be profitably included in future research investigating on glucose-metabolism alterations in obese children.
BMI GROWTH PATTERNS OVER FIRST FIVE YEARS DIFFERS BETWEEN CHILDREN BEING OBESE AND OVERWEIGHT AT FIVE YEARS OF AGE COMPARED WITH NORMAL/UNDERWEIGHT CHILDREN

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Background and Aims
Growth patterns in early childhood have been shown to be important for predicting adult overweight and obesity (1). The aim was to compare these patterns over first five years in children being obese, overweight and normal/underweight at five years of age.

Method
Longitudinal study of 2666 children participating in the Halland Health and Growth Study, followed from 0-5 years. Measurements of weight and height were made at 0, 3, 6, 12, 18 months and at 2, 3, 4 and 5 years of age.

Results
Obese and overweight boys, according to isoBMI at five years, had a higher mean BMI at infancy peak (18.6; p= 0.006 respectively 18.9; p=0.000) compared with normal/underweight boys (17.5), (Graph 1). Obese and overweight girls had a higher mean BMI at infancy peak (19.0; p=0.001 respectively 18.4; p= 0.000) compared with normal/underweight girls (17.1), (graph 2). Obese and overweight children reached adiposity rebound at around 48 months, illustrated by a higher mean BMI difference between 48 and 60 months (obese boys, 0.97; p=0.002 and obese girls, 0.76; p=0.000) compared with normal/underweight children that at five years still had not reached it (boys, -0.33 and girls, -0.32).
Conclusion
BMI growth patterns during the first five years and timing of adiposity rebound differs between obese, overweight and normal/underweight children at five years of age.

Reference:
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EXTREMELY OVERWEIGHT INFANTS AND RISK OF OVERWEIGHT AT AGE 7 IN RELATION TO DURATION OF EXCLUSIVE BREASTFEEDING- BASED ON THE DANISH NATIONAL BIRTH COHORT
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Background and Aims
Rapid weight gain increases the risk while breast-feeding seems to protect against childhood overweight. We aimed to examine the difference in risk of overweight at age 7 years for extremely overweight infants exclusively breastfed for at least 5 months compared to infants breastfed for a shorter period.

Method
The study is based on mothers and children participating in the Danish National Birth Cohort (n= 20,395). The children were born between 1997 and 2003 and the mean age at follow-up was 7.02 years. Extreme overweight at age 5 months was defined as > 2.5 SD above the median weight-for-age from the WHO Growth Standards. Exclusive breastfeeding was defined as a minimum of 5 months of exclusive breastfeeding. Overweight at age 7 years was defined according to the IOTF criteria. We used logistic regression analysis to examine the associations. The included covariates (p<0.05) were gender, birth weight, maternal pre-pregnancy BMI, gestational weight gain, smoking, physical activity during pregnancy, socioeconomic status and paternal smoking and BMI.

Results
Extremely overweight infants had an adjusted OR for overweight at age 7 years at 3.6 (95% CI: 2.9; 4.4) when compared to non-overweight infants. The interaction between extreme overweight and exclusive breastfeeding was non-significant (p=0.95) indicating that the risk of overweight at age 7 was not statistically significant different between the two groups.

Conclusion
Extremely overweight infants have high risk of overweight at age 7 regardless of whether they were exclusively breastfed for 5 months or for a shorter period.
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GROWTH ATTENUATION IS ASSOCIATED WITH HISTONE DEACETYLASE 10-INDUCED AUTOPHAGY IN THE LIVER

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Background and Aims

Our previous data suggested that the epigenetics is involved in mediating the effect of nutrition on growth. The aim of the present research was to study the mechanism by which additional HDACs may be involved in nutrition-induced linear growth

Method

The in vivo studies were performed in young male Sprague Dawley rats that were either fed ad libitum (AL) or subjected to 10 days of 40% food restriction (RES) and then re-fed (CU). For in vitro studies, Huh7 hepatoma cells were used.

Results

Food restriction led to significant reduction in liver weight, concomitant with increased autophagy (i.e. a decrease in the level of P62 and an increase in the expression level of Ambra1 and Atg16L2 genes in the RES group). At the same time we found that the level of HDAC10 was significantly increased. Over expression of HDAC10 in Huh7 hepatoma cells led to reduced cell viability and increased autophagy as shown by increased conversion of LC3-I to LC3-II. An increase in the level of HDAC10 was also obtained when mTOR was inhibited by Rapamycin. siRNA directed against HDAC10 abolished the effect of Rapamycin on cell viability and Ambra1 and Atg16L2 increased expression.

Conclusion

These results suggest that increased levels of HDAC10 may mediate the effect of malnutrition on growth attenuation and autophagy. Deciphering the role of epigenetic regulation in the nutrition–growth connection may pave the way for the development of new forms of treatment for children with growth disorders.
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**EFFECT OF DIET CONTENT ON CU GROWTH IN YOUNG SPRAGUE DAWLEY RATS**

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**Background and Aims**

The most effective environmental factor that affects longitudinal growth is nutrition, however the specific components required to enhance the efficiency of linear growth especially in periods of catch up (CU) growth are currently unknown. In human breast milk (HBM), about 50% of the dietary calories are supplied as fat with palmitic acid (PA) comprising 17–25% of the fatty acids. Previous studies showed that PA is best absorbed as sn-2 monoacylglycerol (as in HBM). In contrast, the free PA originating from the -1 and -3 positions of vegetable oils, may lead to loss of calcium and fatty acids in the stool. We studied the effect of two similar diets, differing in PA configuration, on bone growth, quality and gene expression.

**Method**

Young male Sprague Dawley rats were subjected to 17d of 40% food restriction, followed by 9 days of refeeding with chow containing PA in the 1,3 position (Control diet, CD) or in the sn-2 position (Infat oil, IO). Food consumption, weight gain, bone length and growth plate (EGP) height were measured; bone parameters were measured with Micro CT, gene expression in the liver and the EGP was studied with Affymetrix gene chip.

**Results**

No effect was noted in food consumption and weight gain. A slight increase was noted in bone length, EGP height and trabecular number in the IO group compared to the CD. Affymetrix results demonstrated a significant effect of palmitic acid on liver gene expression.

**Conclusion**

These results suggest that sn2 palmitic acid may have beneficial effect on linear growth.
The aim of this study was to check if the quantity and identity of dietary proteins affects the efficiency of catch up (CU) growth. As large observational studies showed that milk consumption stimulates linear growth we focused on the main dairy proteins (casein and whey).

**Method**
Young male Sprague Dawley rats were subjected to 36 days of 40% food restriction (RES), followed by 24 days of refeeding with either standard rat chow (CU) or chow containing casein (Cas) or whey (Whey) as the sole source of protein. Rats fed ad libitum served as control (AL). Spearman correlations were used to identify widespread and statistically significant correlations between the animals’ growth parameters and gut microbiota.

**Results**
Microbiota analysis at phylum level showed that RES significantly reduced *Firmicutes/Bacteroidetes* ratio. Comparing CU to RES we found an increase in *Firmicutes/Bacteroidetes* ratio. Bioinformatics analysis showed that gut microbiome of the Whey and Cas groups were clustered together and were significantly different from CU group, indicating the significant effect of protein source. Animal's body weight and humerus length were strongly positively correlated with *Firmicutes/Bacteroidetes* ratio (R=0.515; R=0.532, respectively).

**Conclusion**
These results indicate that the quantity of the food and the protein identity affect gut microbiota.
Background and Aims
Growth of children and adolescents is influenced by many factors of which genetics, diet, environmental and living conditions are just a few (Bogin, 1999). We studied the association of body weight and weight variability among populations from different geographic, historic and socioeconomic background.

Method
We re-analyzed data from 833 growth studies of 78 different countries from 1920 to 2013. We used data from two age groups: infants (age 2) and juvenile (age 7); and divided the studies into two geographic-socioeconomic groups.

Results
Multiple regressions showed significant interactions between weight, sex, historic year of study, continent and within-study standard deviation. Multiple regression revealed $R^2=0.256$ (p<0.001) at age 2 and $R^2=0.478$, p<0.001 at age 7. Although infants and juveniles of more affluent countries are heavier than children less affluent countries (p<0.001), the within-study standard deviation of the two geographic-socioeconomic groups differs at age 7 (p<0.001) but not at age 2 (p>0.15).

Conclusion
The environmental adversity hypothesis - small mean values for weight go along with large standard deviations for weight - has to be neglected for infants and juveniles. Body height and body weight are differently associated with socioeconomic and environmental conditions, they seem to be decoupled.
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LONG TERM EFFECTS OF CHILDHOOD CANCER ON BODY COMPOSITION, DIETARY INTAKE AND PHYSICAL ACTIVITY
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Background and Aims
Childhood cancer can have significant long term effects on nutrition and growth. The aim of this study was to define the body composition, nutritional intake and physical activity of childhood cancer survivors (CCS).

Method
Measurements included anthropometry, whole body potassium counting, air displacement plethysmography, and 3 day physical activity and diet diaries. Body composition was compared to matched controls.

Results
This cross-sectional study involved 74 subjects (15.0 ± 4.5 years) who were at least 3 years post treatment. There was no significant difference in the weight Z score (p=0.63) and BMI Z score (p=0.30) between the CCS and controls, however, the CCS had significantly lower height Z scores (p=0.03). The CCS in this study had significantly reduced body cell mass Z score compared to controls (p=0.0001), with 59% considered malnourished. The CCS had a significantly higher percent fat (p=0.002) than the controls, with 27% classified as obese. The CCS group had a light active lifestyle (PAL=1.45) with 64% spending more than two hours daily on screen time. The intake of 60% of CCS met estimated energy requirements, but the CCS consumed high amount of energy from fat and low amount of energy from carbohydrates. A high percentage of CCS did not meet their dietary requirements for calcium (61%), magnesium (46%), folate (38%) and iodine (38%).

Conclusion
Short stature, reduced body cell mass and increased fat mass are evident in CCS. Interventions to improve diet quality and activity levels should be considered to optimise long term growth and body composition of CCS.
EFFECT OF IODINE FOR GROWTH AND COGNITIVE DEVELOPMENT AMONG SCHOOLCHILDREN IN RURAL MOUNTAINOUS AREA OF MOROCCO

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Background and Aims
Iodine is required for the production of the thyroid hormones triiodothyronine and thyroxine, both being essential for the growth and development of the brain. All forms of Iodine deficiency (ID) affect the mental development of the child. Our study aims to assess the impact of ID on growth and on the intellectual development of Moroccan schoolchildren and to evaluate the effect of consumption of fortified milk on reducing ID.

Method
In a double-blind controlled trial conducted over schoolchildren (n=360) who were divided in two groups to receive fortified milk or non-fortified milk. For 9mo, children of the intervention group were fed everyday with 30% of RDI for iodine. Urinary iodine were analyzed using the Sandell-Kolthoff reaction, a dynamic cognitive test using Raven’s Standard Progressive Matrices to assess learning potential and anthropometric measurements were performed to schoolchildren at base and end line.

Results
The study included schoolchildren who were severely iodine deficient. The prevalence of malnutrition was high in both groups, with a mean height-for-age and weight-for-age of less than –2 SD; in this study we found that improvements in mental performance and anthropometric measurements were limited to those children showing an improvement in iodine status only.

Conclusion
Our study showed that the consumption of fortified milk led to a clear improvement in iodine status. However, the follow-up period of 9mo may have been too short to notice a difference in mental performance and anthropometric measurements.

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DEVELOPMENT OF MASTICATION ABILITIES OF INFANTS AND TODDLERS: IMPACT OF AGE AND FOOD TEXTURE

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Background and Aims
Exposure to foods with different textures is a critical factor to the development of feeding skills. Unlike other motor skills such as walking or speech, little is known about the motor development of chewing. The current models of chewing development are descriptive and are based on long-standing assumptions about development. The purpose of this study was to describe how the control over the mandibles changes as young children learn to accommodate different food textures during early chewing development.

Method
Ten typically developing children in 5 age groups (9-, 12-, 18-, 24, and 36- months) were enrolled in this study (ClinicalTrials.gov Identifier: NCT02156986). Commercially available cereal-based products with varying mechanical properties were tested. Jaw movements were recorded in 3-dimensions during chewing using optical motion capture and muscle activity of the chewing muscles was recorded using electromyography. Using custom algorithms, we determined product- and age-related effects on chewing biomechanics.

Results
The results of this study suggest that children in these age groups progress through phases of chewing development in which they establish the basic coordination for chewing, explore the dynamics of their motor system for chewing, and then finally refine movement patterns required for chewing. Products that were well accommodated at a given age were characterized by decreased chewing duration, number of chews and horizontal motion; and increased chewing muscle coupling and vertical motion.

Conclusion
Understanding the developmental trajectory can assist in determining which products are safe and developmentally appropriate for children, as well as better understanding factors of food texture acceptance.
Background and Aims
Recent research has demonstrated that stunted children can recover from growth faltering and resulting cognitive deficits. Little is known about the dietary factors that allow children to experience rapid growth after growth faltering. Our objective was to examine the association between dietary diversity and conditional growth among children aged 0-89 months.

Method
We analysed cohort data collected from 529 mothers and children living in a remote and food-insecure region in the mountains of Nepal. Children were aged 0 to 59 months at baseline and followed-up twice over a period of 29 months. Conditional growth was calculated as the deviation from the expected height-for-age difference (HAD) trajectory based on previous measures of HAD and the pattern of growth in the population. Dietary diversity was assessed using a count of the food groups consumed in the previous 7 days out of 7 food groups. The association between dietary diversity and conditional growth in two growth periods was estimated using ordinary least squares regressions.

Results
Dietary diversity was positively associated with conditional growth in the later (post-infancy) but not the earlier growth period. After adjustment, increasing the dietary diversity by one food group was associated with a 0.09 cm (95% CI: 0.02, 0.17) increase in conditional growth in the second growth period.

Conclusion
Increasing dietary diversity for children reduces the risk of stunting and improves growth after growth faltering. Future efforts should be directed at enabling families in food insecure areas to feed their children a more diverse diet.
FATTY ACID PATTERN IN BREAST-FED 4 MONTH OLD INFANTS IS ASSOCIATED WITH OSTEOCALCIN LEVELS

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Background and Aims
It is well-known that breast-feeding correlates to low IGF-I levels during infancy and prevents later development of obesity. The mechanisms are only partially known. Osteocalcin levels are also known to be inversely related to BMI, waist circumference and blood pressure. We postulate that favorable essential fatty acid pattern in breast milk stimulates secretion of osteocalcin in brown tissue, which in turn stimulates insulin sensitivity.

Method
A longitudinal population-based cohort from Sweden comprising 388 healthy infants was followed from birth to 12 months of age. Breast milk at two days and four months and serum from cord blood and at 2 days, 4 and 12 months of age were collected and analyzed for fatty acids and serum also for IGF-1 and osteocalcin. Length and weight were measured. Complete series of all measures were obtained in 126 infants. Serum phospholipid fatty acids were analyzed by capillary gas-liquid chromatography and IGF-I using the IDS-iSYS-technique.

Results
Breast-feeding leads to significant lower IGF-I levels, lower omega-6/omega-3 ratio and higher osteocalcin levels at four months of age. At that age, only DHA in breast milk correlated to osteocalcin in infants serum (r=-0.32, p=0.005). In serum, but not breast milk, Arachidonic Acid correlated at 4 months of age negatively to IGF-I (r=-0.36, p<0.001) but positively to osteocalcin (r=0.25, p=0.02).

Conclusion
Breast feeding seems to influence serum PUFAs, which in turn seems to be important for adipose tissue. Based on lack of correlation to leptin data, we postulate that it is through brown adipose tissue. This remains to be shown.
Background and Aims
Modifications of early environment such as alteration of nutrition or exposure to EDCs can affect homeostasis and lead to increased risk of disease later in life, supporting the concept of developmental origins of health and disease (DOHaD). Modifications of epigenetic processes elicited by the fetal environment may provide explanatory mechanisms underlying that concept. Convincing experimental evidence suggests that an inappropriate environment affects placental programming.

Our project aims at evaluating modifications of DNA methylation at the level of the placenta in rats after gestational exposure to BPA in order to identify potential epigenetic biomarkers of exposure. The placenta could be further studied in humans based on rodent data obtained in this project.

Method
Pregnant rats were exposed orally to BPA (10mg/kg/d) from gestational day 6 to 18 and placentas were harvested at GD 19. Genome-wide DNA Microarray analysis was performed to identify genes with aberrant methylation following gestational exposure to BPA. Expression of DNA methyltransferases (DNMT1 and DNMT3a), enzymes that catalyze DNA methylation, was examined by RT-PCR.

Results
In female placenta, four genes exhibited hypermethylation after BPA exposure (adjusted p-value<0.05): SF-1; Hmx2; Tctn2 and Mamdc4. In male placenta, one gene was significantly hypermethylated: Tnks2.

After BPA exposure, DNMT3a mRNA levels were significantly increased in male but not in female placenta. There was no effect of BPA on DNMT1 mRNA levels neither in male nor female placenta.

Conclusion
In conclusion, prenatal exposure to a high dose of BPA lead to changes in DNA methylation pattern of various CpG islands in placenta in a sexually dimorphic manner.
ASSOCIATIONS BETWEEN DIETARY INTAKE OF PROTEIN IN EARLY CHILDHOOD AND GROWTH AND BODY COMPOSITION

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Background and Aims
High protein intake in infancy might lead to a higher BMI in childhood. However, not much is known about different protein sources, or whether body fat or lean mass are affected. We investigated associations between total, animal, and vegetable protein intake at 1 year and growth and body composition until 6 years of age.

Method
This study was performed in 3,564 children participating in the Generation R Study, a population-based prospective cohort study. Protein intake at 1 year was assessed using a semi-quantitative FFQ. Height and weight were measured around the ages 14, 18, 24, 30, 36, 45, and 72 months. Fat-mass index (FMI), and fat-free mass index (FFMI) were measured at 6 years using DXA. We calculated age- and sex-specific standard deviation (SD) scores for all outcomes.

Results
Linear mixed models showed that an increase of 10 g/d in total protein intake at 1 year was associated with a 0.03 SD higher height (95%CI 0.01;0.06), 0.06 SD higher weight (95%CI 0.04;0.09), and 0.05 higher BMI (95%CI 0.03;0.08) until 6 years. Linear regression models showed that a higher protein intake was associated with a 0.06 SD higher FMI (95%CI 0.01;0.11), but not with FFMI at 6 years. Associations were stronger for animal than for vegetable protein intake.

Conclusion
Higher protein intake in early life was associated with a higher height, weight, and BMI in childhood. The increase in BMI was fully explained by an increase in fat mass. Future studies should investigate if protein intake in early childhood affects health later in life.
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IMPROVING THE MANAGEMENT OF ACUTE MALNUTRITION IN INFANTS AGED UNDER 6 MONTHS: MALNUTRITION RISK FACTORS IDENTIFIED FROM SECONDARY ANALYSIS OF TWENTY DEMOGRAPHIC AND HEALTH SURVEYS

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Background and Aims
Worldwide, 8.5 million infants aged <6m are acutely malnourished. Improving their treatment is an internationally recognized public health priority. Better understanding risk factors for infant malnutrition is vital for effective development and roll-out of future treatment packages. We aimed to identify these through secondary analysis of Demographic and Health(DHS) Surveys.

Method
From a sampling frame of 36 “high-malnutrition-burden” counties, we identified 20 which had DHS surveys done in the last 10 years and included infant anthropometric data. Using STATA v.13, we constructed mixed effect multivariable models comparing non-wasted against wasted infants (weight-for-height <-2 z-score).

Results
A total of 16,213 infants <6m were included in our analysis. 8,207(50.6%) were male; 11,352(70%) lived in rural areas. Prevalence of infant wasting was 23.7% overall, range 6%(Burundi) to 30.5%(India). Preliminary outputs from our multivariable model identify the following as statistically significant (p<0.05) risk factors for infant wasting: starting breastfeeding >1 day after birth(Odds Ratio 1.36, 95%CI 1.10-1.69); being born at home(OR 1.19; 1.01-1.40); no toilet at home (OR 1.28; 1.08-1.51). Protective factors included: mother with primary education (OR 0.8; 0.67-0.97); maternal BMI in normal range (OR 0.68; 0.56-0.82); ever breastfed (OR 0.06; 0.01-0.22).

Conclusion
The protective effects of breastfeeding that we identified reinforce the importance of breastfeeding support in future malnutrition treatment packages. However, whilst necessary, breastfeeding support alone is unlikely to be sufficient: home environment and maternal nutrition/caring capacity also matter. A holistic package of care across sectors is essential.

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THE ASSOCIATION BETWEEN FEEDING MODE, GROWTH AND DEVELOPMENTAL OUTCOMES IN INFANTS WITH COMPLEX CONGENITAL HEART DISEASE AT 6 AND 12 MONTHS OF AGE

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Background and Aims

Background and Aims: To assess the association between early anthropometric measurements, device assisted feeding and early neurodevelopment in infants with complex congenital heart defects (CHD).

Method

Method: Bayley Scales of Infant Development II, were used to assess cognitive and motor skills in 72 infants with CHD at 6 and 12 months of age. Linear regression models were used to assess the association between mode of feeding and anthropometric measurements with neurodevelopment at 6 and 12 months of age.

Results

Results: Of the 72 infants enrolled in the study, 34 (47\%) had single ventricle physiology. The mean Mental Developmental Index (MDI) and Psychomotor Developmental Index (PDI) scores at 6 months of age were 92 ± 10 and 81 ± 14, respectively. At 12 months of age the mean MDI and PDI scores were 94 ± 12 and 80 ± 16, respectively. Lower length-for-age z-score (p<0.01) and head circumference-for-age z-score (p<0.05) were independently associated with lower MDI at 6 months, while both increased hospital length of stay (p<0.01) and lower length-for-age z-score (p=0.04) were independently associated with lower MDI at 12 months. Tube feedings at 3 months (p=0.04) and lower length-for-age z-score (p<0.05) were independently associated with lower PDI at 6 months. Both lower weight-for-age z-score (p=0.04) and lower length-for-age z-score (p=0.04) were independently associated with PDI at 12 months.

Conclusion

Conclusion: Neonates with complex CHD who required device assisted feeding and those with lower weight, length and head circumference z scores at 3 months were at risk for neurodevelopmental delay at 6 and 12 months,
RAPID WEIGHT GAIN IN THE FIRST 2 MONTHS OF LIFE: ASSOCIATIONS WITH CHANGES IN EARLY BODY COMPOSITION AND OVERWEIGHT/OBESITY AT 2 YEARS

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Background and Aims
The effects of rapid growth during infancy on body composition are unclear. We aimed to stratify body composition measurements at birth and 2 months by rapid growth in the first 2 months of life and to examine associations with overweight/obesity at 2 years.

Method
Body composition was assessed using air displacement plethysmography at 2 days and 2 months in 605 infants from the Cork BASELINE Birth Cohort Study. Rapid growth was defined as an increase > 0.67 in weight standard deviation score between birth and 2 months.

Results
The median fat mass index (FMI) and fat free mass index (FFMI) [kg/length(m)^2] at 2 days was lower in rapid growers (12.1%) than in non-rapid growers, P < 0.001. However, by 2 months, both FMI and FFMI were higher in rapid than non-rapid growers, P < 0.001. The proportion of rapid growers with a FMI in the highest quartile increased from 2.7% at 2 days to 63% at 2 months. Rapid growth was associated with an increased risk of overweight/obesity at 2 years [OR (95% CI): 5.45 (2.92, 10.14), P < 0.001]. A FMI in the highest quartile (vs. quartiles 1-3) at 2 months, but not 2 days, was also associated with an increased risk [OR (95% CI): 4.22 (2.72, 6.56), P < 0.001].

Conclusion
These data are the first to show using direct measures of body composition that rapid growth in the first 2 months of life is associated with greater increases in adiposity. This accelerated fat accretion in the early postnatal period may mediate subsequent obesity risk.

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Oral Presentations Session 3: Nutrition in Infancy I

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TERM INFANT FORMULA SUPPLEMENTED WITH HUMAN MILK OLIGOSACCHARIDES (2’FUCOSYLLACTOSE AND LACTO-N-NEOTETRAOSE) SUPPORTS AGE-APPROPRIATE GROWTH AND REDUCES LIKELIHOOD OF MORBIDITY

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Background and Aims
Human milk oligosaccharides (HMOs) may provide benefits to formula-fed infants. We evaluated infant formula supplemented with 2 HMOs (2’fucosyllactose [2’FL] and Lacto-N-neotetraose [LNnT]).

Method
Healthy term infants 0-14 days old (n 175) were randomly assigned to intact protein cow’s milk-based infant formula (Control) or formula with 1.0 g/L 2’FL and 0.5 g/L LNnT (Test) from enrolment to 6 months; all infants received intact protein cow’s milk-based follow-up formula from 6-12 months. Primary endpoint was weight gain through 4 months. Secondary endpoints included anthropometry, digestive tolerance and morbidity, including adverse event (AE) reporting.

Results
Mean difference in weight gain (Test vs. Control) was -0.30 g/day (95% CI -1.94–1.34, p=0.72), within the non-inferiority margin. Infants receiving Test (vs. Control) did not differ in weight, length, head circumference, BMI, or corresponding z-scores through 12 months; digestive tolerance was generally similar between groups. Infants receiving Test (vs. Control) were less likely to report bronchitis (AE) through 4 months (OR 0.16, 95% CI 0.02-0.78, p=0.010), 6 months (p=0.005) and 12 months (p=0.004), and lower respiratory tract infection (AE cluster) through 12 months (OR 0.45, 95% CI 0.21-0.95, p=0.027). Infants receiving Test were also less likely to report receiving antipyretics through 4 months (OR 0.44, 95% CI 0.20-0.98, p=0.032), and antibiotics through 6 months (OR 0.53, 95% CI 0.27-1.02, p=0.047) and 12 months (p=0.016).

Conclusion
Infant formula with 2’FL and LNnT is safe, well-tolerated, and supports age-appropriate growth; it reduced the likelihood of reporting morbidity, particularly bronchitis, and medication use vs. Control.
Background and Aims
Early introduction of complementary feeding may interfere with breastfeeding, the infants’ self-controlled appetite, and increase growth. The aim of the present study was to investigate predictors for early introduction of solid food.

Method
In an observational study 4503 Danish mothers answered a self-administered questionnaire 6 months after birth including questions about socio-demographic, psycho-social, child- and feeding factors. Data were analyzed using ordered logistic regression models. Outcome was time for introduction to solid food.

Results
Almost all the included infants 4386 (97%) initiated breastfeeding. At week 16, 17-24, 25 or thereafter 330 infants (7%); 2923 (65%); and 1250 (28%) had been introduced to solid food, respectively. Among feeding factors still being breastfed at 5 weeks were the most influential predictor for earlier introduction of solid food (OR=2.52 CI: 1.93-3.28); among infant, maternal and attachment factors: being a boy, increased gestational age, and higher birth weight; lower maternal age, and being primipara; mothers’ reported perception of the infant as being temperamental, and not recognizing the baby’s early cues of hunger. Supplementary analysis of interactions showed that the association of maternal perceived infant temperament was restricted to primiparae, mother’s BMI was without impact if the infant was only breastfed at week 5, and birth weight was particularly influential if the mother had reported uncertainty in recognizing infants’ early cues of hunger.

Conclusion
Modifiable factors pointed to the importance of supporting breastfeeding and teaching primipara and mothers with small babies to read and respond to their babies’ cues to prevent early introduction to solid food.
CORD BLOOD LEPTIN AND GAINS IN BODY WEIGHT AND FAT MASS DURING INFANCY

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Background and Aims
Low umbilical cord leptin concentrations may promote a fast growth trajectory in infancy and predispose to obesity. We aimed to determine associations between cord leptin and changes in weight and body composition during infancy.

Method
Participants were from the Cork Baseline Birth Cohort Study (n = 2137). Cord and 2-year leptin were measured in 334 and 303 children, respectively. Weight was measured at birth, 2, 6, 12 and 24 months. Body composition was assessed using air displacement plethysmography at 2 days and 2 months. Associations between cord leptin and changes in weight standard deviation score (SDS) in the first 2 years and changes in fat mass index (FMI) [kg/length(m)^2] and fat free mass index (FFMI) [kg/m^2] were explored.

Results
Cord leptin was positively associated with weight SDS and FMI at birth and was inversely associated with changes in weight SDS over the first 2 years. There was an inverse association between cord leptin and increases in FMI between birth and 2 months. Those in the lowest quartile of cord leptin were more likely to be overweight/obese at 2 years compared with those in the higher three quartiles. There was no association between cord and 2-year leptin concentrations. Two-year leptin concentrations were higher in children who were overweight/obese at 2 years.

Conclusion
These are the first data to show that associations between low cord leptin and faster weight gain in infancy are driven by greater increases in fat mass, at least in the early postnatal period.
MACROSOMIA AND LARGE FOR GESTATIONAL AGE IN ASIA: ONE SIZE DOES NOT FIT ALL
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Background and Aims
High birth weight confers risk for adverse outcomes for mother and infant during parturition and later life, and is defined as macrosomia (birth weight >4000g) or large for gestational age (LGA; birth weight >90th percentile for gestational age). The macrosomia cut-off is an arbitrary, Eurocentric value whereas LGA is more sensitive, incorporating gestational age and country/region-specific differences in mean birth weight (if country/regional growth charts are used). Reliance on measures derived from Caucasian populations may present an issue for Asia. Our aim was to review the literature to assess incidence of macrosomia/LGA in Asia and evaluate the associated risk factors.

Method
We identified 399 articles using search terms including macrosomia/LGA/high birth weight in 23 Asian countries. Screening using defined inclusion/exclusion criteria excluded 335 articles. Data were extracted from 64 articles.

Results
Most studies only reported macrosomia (72.3%) whilst 6.4% reported both macrosomia and LGA. Incidence of macrosomia varied between 0.9% (Japan) and 13.6% (China), whereas incidence of LGA varied between 4.1% (India) and 18.1% (China). High pre-pregnancy body mass index, excessive gestational weight gain and impaired glucose tolerance during pregnancy conferred increased risk of macrosomia and/or LGA.

Conclusion
Incidence of macrosomia and LGA varies substantially within and between Asian countries. This may indicate differences in intrauterine growth between populations, suggesting that reporting LGA, using country/regional growth charts, would better capture the incidence of high birth weight in countries in Asia. This would result in greater understanding of local drivers of excessive intrauterine growth and risk of aberrant postnatal growth.
A RANDOMISED TRIAL TO TEST PARENT-OFFSPRING CONFLICT THEORY DURING THE LACTATION PERIOD BY MANIPULATING MATERNAL PSYCHOLOGICAL STATE USING RELAXATION THERAPY

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Background and Aims
Trivers parental-investment theory proposed that lactation essentially represents a conflict or ‘tug-of-war’ between the mother and infant to compete for energy. To experimentally test the Trivers theory, maternal psychological state were manipulated during the lactation period.

Method
Pregnant women (n=88) were recruited at antenatal clinics in Malaysia. Following delivery, mothers that were breastfeeding exclusively were randomised into control (n=31) and intervention groups (n=33). Mothers from the intervention group were asked to listen daily to an audio recording with relaxation therapy. Home visits (HV) were performed when the baby was 2-3, 6-8 and 12-14 weeks old to assess their weight, length and head circumference. Maternal stress, infant appetite and temperament were assessed using validated questionnaires, and milk samples were collected during HVs.

Results
The baseline results of maternal stress, infant weight and BMI were not significantly different (p>0.05) between groups. The intervention group has significant lower stress scores (mean:12±4.9 v 15±6.1, p=0.029), and higher weight (mean:6.1±0.6 v 5.5±0.7, p=0.001) and BMI (mean:16±1.4 v 14.6±1.2, p=0.0001) at HV3. Infant appetite and temperament were found not different between groups.

Conclusion
This study suggests that trade-offs may have occurred between the mother and infant during breastfeeding. Mothers who were less stressed may have invested more energy during breastfeeding, supported by the finding of higher weight gain among infants in the intervention group. Alternatively, mothers may produce a low milk cortisol to signal the baby that he/she does not need to signal vigorously for milk supply. To confirm this, further analysis on breast milk composition will be done.
PROTECTIVE EFFECT OF AN INFANT FORMULA SUPPLEMENTED WITH NUTRIEXPERT® FACTOR AGAINST INFECTIONS DURING THE FIRST 18 MONTHS OF LIFE

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Background and Aims
The impact of early nutrition on the infectious diseases prevention in infants has been widely recognized, especially for breastfeeding. The aim of this study was to investigate the effect of a new infant formula supplemented with functional ingredients also present in human breast milk, such as LC-PUFAs, milk fat globule membrane (gangliosides, proteins, sialic acid...) and symbiotics on the incidence of infections.

Method
170 healthy term babies aged between 0-2 months, with maximum 1 month of exclusive/predominant breastfeeding, were enrolled in a prospective double-blind control study. Infants were randomized to receive either an infant formula supplemented with Nutriexpert® factor (NF) or a standard formula (SF). Number of infections, pediatric and emergency visits and hospitalizations were registered during the first 18 months of life.

Results
At 12 months of life, the NF group compared to the SF group showed significantly more infants free of infections and fewer with more than 3 infectious episodes (p=0.044). Infants supplemented with NF presented a trend to have less upper respiratory tract infections (p=0.061) and diarrhea (p=0.082) than those non-supplemented; children who received the NF formula showed less incidence of infections with fever (p=0.025). The number of visits to the doctor, hospitalization and emergency assistance were less frequent in the study group, being significant for pediatric visits at 6 months (p=0.049).

Conclusion
Infant formula supplemented with Nutriexpert® factor consumption seems to be associated to fewer infections and reduced medical care needs.
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98 MATERNAL EXPOSURE TO FOOD CHEMICALS IN RELATION WITH OFFSPRING’S BIRTHWEIGHT AND POSTNATAL GROWTH

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Background and Aims
Total diet studies (TDS) are conducted worldwide to provide population exposure levels to various food contaminants. To our knowledge, no epidemiological study has linked these data to health outcomes. We aimed to study the associations between food contaminants and child birthweight and 5y body mass index (BMI).

Method
A food frequency questionnaires (FFQ) was filled by 1663 mothers of the EDEN mother-child cohort at birth about their diet in the last trimester of pregnancy. The FFQ was combined with the French TDS2 to assess maternal exposure to 454 chemicals through diet. Among the 229 of them above the limit of detection, 106 were selected as allowing to distinguish the proper effect of the chemicals from that of the food items (Spearman correlation coefficients < 0.80). Exposures were analyzed in relation to birthweight and BMI at 5 years in regression models adjusted for covariates selected from Directed Acyclic Graphs.

Results
Nitrite exposure through diet was negatively associated with birthweight (p=0.04). Perfluorinated chemical PFOA (p=0.01) and phytoestrogen coumestrol (p=0.03) were positively associated with birthweight. No significant association was observed between food contaminant exposures and BMI at 5 years.

Conclusion
Very few associations were significant in respect to the large amount of tests. Prenatal exposure to three food chemicals was associated with prenatal but not postnatal growth. Assessment of child exposure to chemicals through their own diet will allow to study another window of susceptibility for postnatal growth.
Background and Aims
Target fortification (TFO) of breast milk (BM) overcomes the uncertainty of macronutrient intake in fixed dose fortification (FDF) resulting from natural variation in breast milk and improves growth of VLBW infants.

We aimed to study variation of macronutrient intake and energy ratios when TFO is done using four different milk fortifiers and based on various frequencies of milk measurements.

Method
Ten BM fed infants, GA:26.1±1.3wks, BW:890±210g. Daily measurements (n=210) of native BM’s fat, protein (near-infrared milk analyzer), & lactose (UPLC-MS/MS) levels provided the basis to add fat, protein and carbohydrates using modular products in FDF with either FM85, FMS, Enfamil, or Similac to meet ESPGHAN recommendations (fat:4.2, protein:3.0, CHO:8.5g/dL). BM measurement frequencies were 7/wk,5/wk,3/wk,2/wk,1/wk and only FDF=0/wk.

Results
Measurement 1-2/wk increased mean macronutrient intake and day-to-day variation was not higher compared to native BM. Day-to-day variation decreased as frequency of milk analysis increased (Fig.). In FDF mean carbohydrate level exceeded in 3 fortifiers and median fat level in 1 fortifier leading to higher calorie intake than target levels.

TFO 7/wk achieved macronutrient levels close to target when routine fortifier was composed with 1.1 g protein/dL (no fat, no CHO) whereas for measurements 1-2/wk, it was achieved with composition of fat 0.4g/dL, protein 1.2g/dL and carbohydrate 1.1g/dL.
Conclusion
Measurements of macronutrient 1-2/wks might provide a reasonable balance between workload and clinical outcome. Due to different composition of fortifiers, either target values for macronutrients or composition of fortifier for use with TFO needs to be reconsidered in order to achieve recommended intake.
ASSOCIATIONS OF NEONATAL CORD BLOOD METHYLATION PATTERNS TO MATERNAL AND NEONATAL METABOLIC MEASURES

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Background and Aims
Epigenetic changes are one mechanism by which the maternal metabolic environment can contribute to fetal genetic programming and thus impact gene expression and the infant’s risk of metabolic disease. We aimed to identify aberrant neonatal DNA methylation patterns in metabolic-related genes in a cohort of healthy maternal-neonatal pairs.

Method
Healthy mothers with normal glucose tolerance and their full term neonates were studied. Neonatal cord blood was collected after birth and later assayed for leptin. The Infinium HumanMethylation 450K Beadchip array was used to measure methylation of candidate genes IGF1R, RXRA, LEP, and HIF3A. Maternal, paternal and neonatal characteristics were collected. Neonatal body composition by air displacement plethysmography was measured within 24-72 hours of life. Multiple linear regression models were used to identify associations with differentially methylated CpGs adjusting for blood cell subtype proportions and batch effects.

Results
In 114 cord blood DNA samples, methylation at an IGF1R gene body CpG site was negatively associated with neonatal percent body fat and fat mass. Methylation at an alternate IGF1R gene body site was positively associated with cord blood leptin. Methylation at CpG sites within the RXRA gene body was associated with paternal BMI and maternal total and early gestational weight gain. Methylation at CpG sites within the LEP and HIF3A transcription start sites and within the IGF1R gene body was negatively associated with maternal BMI. All associations were significant (FDR<0.05).

Conclusion
The maternal metabolic environment may contribute to alterations in the epigenetic regulation of neonatal DNA and impact measures of neonatal adiposity.
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101 RELATIONSHIP BETWEEN DECLARED VITAMIN D SUPPLEMENTATION AND VITAMIN D LEVELS IN MATERNAL SERUM AND UMBILICAL CORD BLOOD

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Background and Aims

Some studies suggest relationship between the concentration of 25(OH)D in mothers blood and the umbilical cord. The aim of the study was to examine the effect of declared vitamin D supplements intake on vitamin D levels in maternal and umbilical cord blood and its impact on neonatal anthropometry.

Method

A single centre prospective cohort descriptive study included 163 uncomplicated singleton term pregnancies. Plasma 25(OH)D levels were measured by LIAISON (DiaSorin) in maternal and umbilical cord blood. Data on vitamin D supplements use, as well as anthropometric data of neonates were registered.

Results

Mean cord blood 25(OH)D serum level was higher than maternal (25 ng/ml ± 11,45 (mean ± SD) versus 18,5 ng/ml ± 8,35). Using a cut-off of 30 ng/ml, 89% of women and 67% of neonates were classified as deficient. No relation was found between 25(OH)D concentration and anthropometry of neonates. A strong correlation was noted between maternal and umbilical cord blood 25(OH)D levels (r = 0,892; p<0,001). Vitamin D supplementation was a significant factor determining maternal serum levels for 25(OH)D (r = 0,482; p<0,001).

Conclusion

The majority of pregnant women showed vitamin D deficiency which was strongly correlated with low umbilical cord blood 25(OH)D levels. Low serum 25(OH)D levels were correlated with insufficient vitamin supplements intake. Only mothers declaring high doses of vitamin D (mean supplementation of 1700 IU daily) were able to rich serum levels of 25(OH)D exceeding 30 ng/ml. Thus emphasize the current recommendations of 1500 - 2000 IU vitamin D daily for pregnant women.

This work was supported in part by educational grant from Polfa Tarchomin S.A.
Background and Aims
The transition to successful oral feeding is a key event for preterm babies, often being the determining factor for safe discharge home. This study investigates current clinical practice around this transition.

Method
A survey of clinical practice within two neonatal networks in 2015. Staff from 24 neonatal units completed a questionnaire regarding views, policies and practices related to oral feeding.

Results
There was significant variation in practices. Transition to oral feeding was viewed by most as a significant event (76%), associated with strong parental emotion. Only 67% of units reported having any policy on oral feeding. The policies most commonly referenced were non-specific enteral feeding policies (17%) and general breastfeeding policies (25%). Infant stability (76%), followed by gestational age (63%) were the most commonly cited factors considered when initiating bottle feeding. For breastfeeding infant stability and infant cues were given equal importance (54%). Training for staff was rarely specific to preterms, and was most likely to be on breastfeeding. Training in bottle feeding was predominantly ‘on the job’. The majority of respondents felt the transition to oral feeding could be improved.

Conclusion
The transition to oral feeding is viewed by staff as an important event. However there is inconsistency in clinical practice, lack of staff training, and lack of guidance to inform best practice. Further research is needed to inform clinical practice. Optimising this transition has the potential to improve outcomes for babies, reduce future feeding difficulties and reduce length of hospital admission.
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MATERNAL DIET WITH LOW PROTEIN DENSITY INCREASES RISK OF LOW BIRTH WEIGHT BIRTH IN JAPANESE

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Background and Aims
Low birth weight birth in Japan has steadily rose for the last 20 years reaching 9.6% in 2013. Contrary to robust findings in animal studies, epidemiological studies show controversial results of whether protein deficiency during pregnancy depresses infant size.

Method
As part of a prospective cohort study of 1062 women bearing singletons in Tokyo, maternal dietary intake during mid to late pregnancy was measured by food frequency questionnaires. Outcomes of interest were infant and placental size.

Results
Participating women had pre-pregnancy BMI of 20.3±2.4 kg/m2, gained 10.0±3.8 kg during pregnancy and delivered infants of 2927±494 grams. Average daily intake was 1758±459kcal, of which 14.1±1.8% was from protein, 30.9±5.5% from fat and 54.1±6.6% from carbohydrates. 375 (27.3%) mothers did not meet the Japanese recommendation of protein density of 13-20%. After adjusting for maternal characteristics, mothers with protein density below 13% were more likely to deliver low birth weight (Odds ratio (OR) 1.74 [95%CI 1.10; 2.86]), with birth height shorter by 0.31 (95%CI 0.00; 0.63) cm and with placenta smaller by 14.5(0.55; 28.5) grams. Effect estimates did not change by additional adjustment of energy intake, gestational weight gain, fat density, or excluding those with a very low protein density (<10%) diet. Adverse effect was larger among female infants, and among mothers who were underweight, had less total caloric intake or gestational weight gain.

Conclusion
Protein deficiency was not uncommon and associated with smaller infants. Maternal diet maintaining protein density above 13% should be encouraged, especially for women who are thinner and not gaining much weight.
SEX-SPECIFIC ASSOCIATIONS BETWEEN MATERNAL DIET AND PLACENTAL WEIGHT AND NEONATAL ANTHROPOMETRIC INDICES

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Background and Aims

The effect of nutritional restriction on birth weight has been indirectly demonstrated in famine studies. However, the role of maternal diet in well-nourished populations is not clear. Furthermore, neonatal outcomes appear to differ between sexes. We sought to examine whether maternal diet affected three neonatal anthropometric indices—birth weight, BMI, and PI—as well as placental weight in a sex-specific manner.

Method

Longitudinal data from the Lifeways Cross-Generation Cohort Study was used. Birth weight and length measurements for 512 term, singleton babies and placental weights for 289 births were retrieved from hospital records. Maternal prepregnancy weight and height were self-reported. Dietary information was obtained from food-frequency questionnaires completed during the first antenatal visit. Univariate regression analysis was used to test associations of maternal diet with neonatal anthropometric indices and placental weight.

Results

Two hundred and fifty eight infants (50%) were boys. In boys, there was a positive correlation between energy-adjusted PUFA and birth weight ($r=0.14$, $p<0.05$). In girls, energy-adjusted starch was also positively and significantly associated with birth weight ($r=0.15$, $p<0.05$) and birth BMI ($r=0.15$, $p<0.05$).

After adjustment for maternal prepregnancy BMI, maternal diet was not associated with birth anthropometrics in either sex.

After adjustment for maternal prepregnancy BMI, energy-adjusted fat ($\beta=-0.20$, CI: -6.87 to -0.50) and carbohydrate ($\beta=0.22$, CI: 0.78 to 6.34) were associated with placental weight in girls only.

Conclusion

Maternal diet during pregnancy was not associated with infant anthropometric indices in either sex. Our results suggest there are sex differences in placental adaptation to maternal diet.
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BODY COMPOSITION (FAT MASS AND FAT-FREE MASS) DATABASE OF PRETERM AND TERM INFANTS MEASURED USING PEAPOD DEVICE
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Background and Aims
Weight measurements alone are insufficient indicators of individual differences in body composition (fat mass and fat-free mass). Air plethysmography (PEAPOD) can be used to create a database of body composition measurements for preterm and term infants.

Method
Longitudinal observational study (gestational age (GA) 23⁷/⁸ weeks - 41⁹/⁷ weeks), with weekly measurements (n=475) during hospital stay stratified by GA (<28 weeks n=156, 28-30 weeks n=150, 31-35 weeks n=130, 36+ weeks n=34), and at 3, 6 and 9 months follow-ups. Infants with respiratory support (CPAP > 6cm H₂O or high-flow nasal cannula > 6L/min) were excluded. Measurements were performed at Corrected GA (CGA) of 30⁷/⁸ weeks to 79⁷/⁸ weeks. Body composition indicators, % body fat (%BF), absolute fat mass (FM), absolute fat-free mass (FFM), fat mass/length² (FMI), fat-free mass/length² (FFMI) were graphed against CGA, and stratified for GA.

Results
In all groups, FMI and FFMI increase postnatally until 42 weeks and remain constant afterwards. At the same CGA, preterm infants develop higher %BF, FM and FMI, while term
infants develop higher FFM and FFMI.

Conclusion
Differences between in utero and postnatal in-unit environments affect body composition development, with implications on postnatal nutrition contributing to greater fat development.
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106 GROWTH AND BODY COMPOSITION IN PRETERM BORN CHILDREN AT 8 YEARS: POSITIVE EFFECTS OF POSTDISCHARGE FORMULA AT 6 MONTHS CORRECTED AGE ARE NOT MAINTAINED

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Background and Aims
Preterm infants (<32 weeks of gestation) are at risk for short stature, increased fat mass (FM) and decreased lean mass (LM). Previously, we showed that feeding preterm infants an isocaloric, protein-enriched PDF from term to 6 months corrected age (CA) may modify this risk. They gained more LM compared to infants fed term formula (TF) or human milk (HM). Here we present the follow-up of this RCT at age 8 years.

Method
The present study included 79 of the original 139 children, 40 males, age 7.9 [IQR 7.6-8.3] years. Height, weight and head circumference were measured. FM, LM, bone area (BA), bone mineral content and density (BMC/BMD) were determined by Dual-Energy X-ray Absorptiometry (DEXA).

Results
At term age, 6 months CA and 8 years, there was no difference in weight, length and head circumference between the PDF, TF and HM group (data not shown). At 8 years, multivariate regression analysis showed no difference in FM, LM, BA, BMC and BMD between the PDF, TF and HM group (Table 1).

Conclusion
At 8 years, the positive effects of PDF on body composition as shown at 6 months CA were no longer present. To achieve long-lasting positive effects, nutritional intervention between birth and term age may be more important than between term age and 6 months.

Table 1. Body composition and bone parameters in HM, PDF and TF fed infants.

<table>
<thead>
<tr>
<th>Age</th>
<th>HM (n=25)</th>
<th>PDF (n=33)</th>
<th>TF (n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM (kg)</td>
<td>1.75 [1.34;2.25]</td>
<td>1.67 [1.34;2.26]</td>
<td>1.68 [1.44;2.29]</td>
</tr>
<tr>
<td>LM (kg)</td>
<td>5.54±0.58</td>
<td>5.9±0.63</td>
<td>5.77±0.68</td>
</tr>
<tr>
<td>BMC (g)</td>
<td>131.4±25.5</td>
<td>146.8±24.1</td>
<td>142±27</td>
</tr>
<tr>
<td>BMD (g/cm²)</td>
<td>0.21±0.025</td>
<td>0.23±0.021</td>
<td>0.22±0.017</td>
</tr>
<tr>
<td>8 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM (kg)</td>
<td>6.9±2.33</td>
<td>7.2±2.4</td>
<td>6.6±2.4</td>
</tr>
<tr>
<td>LM (kg)</td>
<td>25.9±5.3</td>
<td>26.2±5.2</td>
<td>25.0±4.7</td>
</tr>
<tr>
<td>BMC (g)</td>
<td>870±74</td>
<td>509±100</td>
<td>896±129</td>
</tr>
<tr>
<td>BMD (g/cm²)</td>
<td>0.72±0.037</td>
<td>0.74±0.055</td>
<td>0.74±0.064</td>
</tr>
</tbody>
</table>

Values as mean±SD or median [25th-75th percentile]. *HM vs. PDF p=0.034 4TF vs. PDF p<0.05
Background and Aims
Commercial IR milk analyzers are being increasingly used for analysis of macronutrient content in breast milk (BM) prior to its target fortification. These devices, however, may not provide reliable measurement if not properly calibrated. In the current study, we tested a previously-published correction algorithm for a Near-IR milk analyzer (Unity SpectraStar) for fat and protein measurement. Additionally, the impact of pasteurization on macronutrient (fat, protein, and lactose) stability content was examined.

Method
To test the correction algorithm, fat and protein measured with Near-IR analysis was compared against chemical reference methods for 20 pasteurized and 10 unpasteurized samples. To assess the impact of pasteurization on macronutrient stability, we conducted a correlation analysis of breast milk samples before and after pasteurization as measured with (1) Near-IR analyzer (n=50) and (2) chemical reference methods (n=10).

Results
The correction algorithm generated for our device was valid for unpasteurized and pasteurized BM.
Pasteurization had no effect on macronutrient levels.

**Conclusion**

IR analysis can monitor fat and protein content in unpasteurized and pasteurized BM. The stability of Near-IR measurement following pasteurization suggests that the chemical matrix of BM remains unaltered. Additionally, the results show that donated human milk, generally low in protein content, has the potential to be target fortified.
Long-Term Effects of Severe Acute Malnutrition on Growth and Non-Communicable Disease Risks

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**Background and Aims**

There is strong evidence that early nutritional exposures can affect long-term adult health, particularly growth and non-communicable diseases (NCDs). It is important to establish whether severe acute malnutrition (SAM) is likely, through constrained growth, to contribute to NCDs in adulthood.

**Method**

We followed-up 462 Malawian children 7 years after an episode of SAM, comparing them to age/sex matched community controls. Multivariable linear regression was used to compare study groups.

**Results**

320/462 (82%) case children were recruited (median age 9.4 years, range 7-20). They were significantly more stunted and underweight than controls (height-for-age Z-score -1.8 vs -1.3, \(p<0.001\)). Cases had preserved head circumference and torso growth but compromised limb growth, compared to controls. Waist-hip ratio was significantly higher for cases than controls (0.91 vs 0.89, \(p=0.01\)), whereas lean mass assessed by bioelectrical impedance vector analysis was significantly lower. Case children also had evidence of functional impairment with hand-grip strength significantly weaker (12.7kg vs 13.8kg, \(p=0.01\)) and some deficit in daily physical activity. However lung function, glucose tolerance, cardiovascular (blood pressure, cholesterol) and metabolic outcomes (HbA1c, salivary cortisol) appeared unaffected compared to controls at this age.

**Conclusion**

SAM is associated with a number of adverse long-term effects, including stunting, unhealthy body composition and physical activity impairments. Preservation of torso height, lung function, head circumference, cardiovascular and metabolic outcomes indicate sparing of some vital organs. Intervention are needed which look beyond short-term mortality outcomes following SAM treatment, such as better follow-up care and adolescent school feeding.
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IRON INTAKES AND STATUS OF TWO-YEAR OLD IRISH CHILDREN
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Background and Aims
Infants and young children are at particular risk of iron deficiency and iron deficiency anemia, with potential long-term consequences for cognitive, motor and behavioural development.

We aimed to describe the iron intakes, status and determinants of status in two-year old children in Ireland.

Method
Data were collected prospectively in the maternal-infant dyad Cork BASELINE Birth Cohort Study from 15 weeks gestation. At the 24 month assessment, serum ferritin, haemoglobin and mean corpuscular volume were measured (n=729) and food/nutrient intake data were collected using a two-day weighed food diary (n=468).

Results
From the food diary, mean (SD) iron intakes were 6.8 (2.6) mg/day and 30% had intakes < Estimated Average Requirement (5.3mg/day, UK). Iron-fortified formula consumers (21%) had a mean (SD) intake of 9.3 (2.8) mg/day. Using WHO definitions, iron deficiency was observed in 4.6% (n=31) and iron deficiency anaemia in five children (1.0%). 21% had ferritin concentrations <15μg/l. Inadequate iron intakes (odds ratio [95% confidence interval]: 1.94 [1.09, 3.48]) and unmodified cows’ milk intakes ≥400ml/day (1.95 [1.07, 3.56]) were associated with an increased risk of low iron status, while iron-fortified formula consumption was associated with a decreased risk (0.21 [0.11, 0.41], all P<0.05).

Conclusion
In this, the largest study in Europe, a lower prevalence of low iron status was observed, compared to previous reports. Compliance with national recommendations to limit cows’ milk intakes in young children and consumption of iron-fortified products has contributed to improved iron status at two years.

Supported by the National Children’s Research Centre and Danone Nutricia Early Life Nutrition.
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WHAT IS THE ROLE OF MOTHERS’ EDUCATIONAL ATTAINMENT AND EARLY FEEDING ON CHILDREN GROWTH AND WEIGHT GAIN?

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Background and Aims
Previous studies have found difficult to dissociate the wealth and educational factors as both are usually highly correlated. The aim of this paper is to clarify the role of mother’s educational attainment and early feeding practices on their children normal growth and weight gain paths. By combining a set of standardized national representative surveys we gain enough power to differentiate between the wealth and educational components. Additionally, we are taking in consideration mothers’ anthropometrics mesurements as well as other cofounders such as access sanitation and to health care facilities.

Method
We combined 45 Demographic and Health Surveys (DHS) spanning the period 2006-2015 which include over 100,000 children. We split the children population into 3 age groups: 6 to 35 months old; 3 to 5 years old and; 6 to 9 years old. We ran multilevel regression models with country and year fixed-effects considering the WAZ and the HAZ scores.

Results
Preliminary results show that the strongest association between household wealth and child overweight rates is found in children from lower educated mothers. Early feeding types are significantly associated with HAZ score but we fail to identify any statistical relationship between early feeding types and overweight.

Conclusion
These findings highlight the importance of education to break the cycle of developing unfavorable eating and health habits of children. Further work is in progress to test different econometric specifications.
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**VITAMIN D SUPPLEMENTATION DURING WINTERTIME AFFECTS CARDIOMETABOLIC RISK MARKERS IN 4-8-YEAR-OLD DANISH CHILDREN**

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**Background and Aims**

Many observational studies have shown associations between serum 25-hydroxyvitamin D (S-25(OH)D) and cardiometabolic markers, but very few randomized trials have investigated this in children. The aim of this study was to investigate whether vitamin D supplementation during winter affects markers of cardiometabolic health in Danish children.

**Method**

In a double-blind controlled design 125 healthy Danish 4-8 year-old children living at 55°N were randomized to receive supplements with 0 μg/d (control), 10 μg/d (D10), or 20 μg/d (D20) vitamin D₃ for 20 weeks. S-25(OH)D, blood lipid profile, hemoglobin A1c and glucose, blood pressure, heart rate, and anthropometry were measured at baseline (late September-October 2014) and endpoint (February-March 2015). Baseline-adjusted differences in cardiometabolic markers were tested between control and the two intervention groups, respectively.

**Results**

Mean±SD S-25(OH)D was 57±13 nmol/L at baseline (n=125), rose to 61±11 and 75±12 nmol/L with D10 and D20, respectively, and fell to 32±9 nmol/L with control. HDL-C was 0.09 mmol/L (95%CI 0.16; 0.02) (P=0.02) lower and TOT-C:HDL-C was 0.17 (95%CI 0.05;0.30) (P=0.007) higher with D10 compared to control. Diastolic blood pressure tended to be 1.2 mmHg (95%CI 2.5; 0.1) (P=0.07) lower with D10 compared to control. No effects of D20 were found.

**Conclusion**

Wintertime vitamin D supplementation of 10 μg/d but not 20 μg/d tended to lower diastolic blood pressure, but also decreased HDL-C and increased TOT-C:HDL-C in healthy Danish 4-8-year-olds.
Background and Aims
Children living at northern latitudes are at risk of vitamin D deficiency during winter due to negligible cutaneous production of vitamin D₃. However, the dietary requirements for the maintenance of nutritional adequacy of vitamin D in young children during winter are not clear. The aim was to establish the vitamin D intake required to avoid vitamin D deficiency (serum 25-hydroxyvitamin D (S-25(OH)D)<30 nmol/L) and assure adequacy (S-25(OH)D>50 nmol/L) in 97.5% of Danish (55º N) 4-8 year-old children during winter.

Method
In a placebo-controlled, double-blinded design, 119 children (mean age 6.7 y) were randomized to supplements with 0 (placebo), 10 or 20 μg/day of vitamin D₃ for 20 weeks. Blood sampling and measurements of diet and anthropometry were performed at baseline (September /October 2014) and endpoint (February/March 2015). Vitamin D status was measured as S-25(OH)D by liquid chromatography tandem mass spectrometry.

Results
A clear dose-response relationship for S-25(OH)D was observed with increasing vitamin D₃ dose (p<0.0001). A nonlinear model of S-25(OH)D concentration as a function of vitamin D intake was fitted (y = b2+b0*(1-exp(-b1*x)). Vitamin D intakes required to maintain S-25(OH)D>30 and >50 nmol/L in 97.5% of the participants were 7.7 μg/day and 17.7 μg/day, respectively.

Conclusion
In order to ensure that nearly all 4-8 year-old Danish children avoid vitamin D deficiency and have adequate status during winter, intakes of 8 and 18 μg/day, respectively, are needed. This study was conducted within the ODIN project [Food based solutions for optimal vitamin D nutrition and health throughout life, Contract 613977], funded by the European Commission.
Background and Aims
In Morocco, many clinical studies showed that vitamin D deficiency is a public health problem. The major studies were among adult women. To our knowledge, a very few data were available among children. The main propose of this study is to determine the prevalence of vitamin D deficiency and to assess the efficiency of the consumption of fortified milk with vitamin D on the nutritional status of school children in a Moroccan mountain rural area.

Method
This is a double-blinded longitudinal study targeting children aged 7-9y (n =157). Children were divided in two groups: a non fortified group (NFG) received 200ml of non fortified milk and a fortified group (FG) received 200ml of fortified milk with 30% of vitamin D RDI. Blood sample collections were performed at baseline (T0), 4 months (T4) and 9 months (T9).

Results
The prevalence of vitamin D deficiency among children was 72%. After 9 month of intervention the FG showed a significant amelioration of serum vitamin D (increase of 13.1 nmol/l) in comparison with NFG who showed a non significant improvement (1.2 nmol/l).

Conclusion
In addition to observed a higher prevalence of vitamin D deficiency among school children living in Moroccan mountain rural area, the consumption of fortified milk constituted an effective way to fight against vitamin D deficiency among school age children.
Background and Aims
Normal BMI children are generally considered as healthy. However, sedentary behaviour may result in low lean mass that may be a limiting factor for gross motor performance.

Method
Lean mass of n=366 6-12 y old children was measured with bioelectrical impedance analysis (BIA; Tanita BC418). Children were underweight (n=23), normal weight (n=305), and overweight (n=38). Gross motor level was assessed with the Motor Scan, consisting of 4 test items (jumping-force, jumping-coordination, one-leg balance & ball skills) by calculating 'motor lead' in days (motor age minus current age). For normal weight children (Cole criteria), lean mass (kg) was natural log transformed, adjusted for age and height for boys and girls separately, and standard deviation score (sds) calculated (“lean index”). Gross motor level is presented as mean (SD) per lean index group (A <-2; B -2 upto -1; C -1 upto +1; D +1 upto +2; E >+2 sds). Logistic regression analysis relates low lean index (<-1 sds) and delayed motor development (> 1 y delay).

Results
Normal weight children had a mean motor lead of -45 days (SD 465). The lean index groups showed lower gross motor performance for lower lean index (A -610 (n=1); B -163 (515); C -38 (451); D +24 (450); E +273 (494)). Odds ratio for delayed motor development for normal weight children with a low lean index (n=45) was 2.48 (95% CI 1.28,4.82; p=0.007).

Conclusion
Normal weight schoolchildren may have a delay in gross motor performance related to age, sex, and height adjusted lean mass.
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118 VITAMIN D STATUS IN PRE-PUBERTAL CHILDREN WITH ISOLATED IDIOPATHIC GROWTH HORMONE DEFICIENCY: EFFECT OF GROWTH HORMONE THERAPY
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Background and Aims
Some studies suggested a correlation between vitamin D (VD) and the growth hormone (GH)-insulin-like growth factor 1 (IGF1) but few studies, and with controversial results, have prospectively analyzed the vitamin D status in children before and after GH treatment. Thus, we aimed to assess VD status in pre-pubertal children with idiopathic growth hormone deficiency (GHD); and to evaluate effect of GHD and GH treatment on VD levels.

Method
Fifty pre-pubertal children with isolated idiopathic GHD were subjected to anthropometric assessment and measurement of 25 hydroxy vitamin D (25-OHD), calcium, phosphorous, alkaline phosphatase and parathyroid hormone at diagnosis and 1 year after GH therapy (0.025 mg/kg/day). Patients were compared to 50 age-, sex-, and pubertal stage- matched controls. VD deficiency was defined as a 25-OHD < 20 ng/ml, VD insufficiency as a 25-OHD between 20 and 30 ng/ml and VD sufficiency as a 25-OHD > 30 ng/ml.

Results
25-OHD levels were lower in cases than controls. Twenty GHD children (40%) were VD insufficient and 22 (44%) deficient; while 8 (16%) were VD sufficient at baseline. There was a positive correlation between 25OH-D and baseline GH levels. After 12 months of GH therapy, 25OH-D increased. Overall, 13 (26%) of children remained insufficient and 11 (22%) deficient, with an increase in prevalence of children with normal levels [26(52%); p = 0.001].

Conclusion
Hypovitaminosis D is prevalent in GHD children and significantly improved 12 months after GH therapy. VD should be assessed in GHD children both at diagnosis and during the follow-up.
MATERNAL FISH OIL SUPPLEMENTATION DURING LACTATION REDUCES HEIGHT AT 13 YEARS OF AGE AND AFFECTS BLOOD PRESSURE IN A SEX-SPECIFIC MANNER

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Background and Aims
Dietary long-chain n-3 polyunsaturated fatty acid (n-3LCPUFA) in infancy may have long term effects on lifestyle disease risk. The present follow-up study investigates if maternal fish oil (FO)-supplementation during lactation affected growth and blood pressure in adolescents and if potential effects were different in boys and girls.

Method
122 Danish mothers were randomized to receive FO (1.5 g/d n-3LCPUFA) or olive oil (OO)-supplements during the first 4 months of lactation. One-hundred children were followed-up at 13 years with measurements of blood pressure, anthropometry, dietary intake by food-frequency questionnaire and physical activity by 7-day accelerometry. Fifty% of the children also gave whole-blood spots for analysis of fatty acid composition.

Results
Attrition rate (70%) and child age (13.5±0.4 years) did not differ between groups, but there was a tendency for fewer children from the FO-group to have entered puberty compared to the OO-group (P=0.068). The children in the FO-group were found to be 3.4 [95%CI 0.2;6.6] cm shorter (P=0.035), but did not differ from the OO-group with respect to body composition. There was a sex-specific effect of maternal FO-supplementation on diastolic blood pressure (DBP) (sex×group-interaction P=0.020), which was driven by a 3.9 [0.2;7.5] mmHg higher DBP among boys from the FO-group compared to OO-group (P=0.041) and no difference among the girls (-2.1 [-6.3;2.0] mmHg, P=0.298). No differences between the randomized groups were observed in diet, whole-blood n-3LCPUFA or physical activity at 13 years.

Conclusion
Our results indicate that early n-3LCPUFA intake may reduce height in early adolescence and increase DBP specifically in boys.
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CONSUMPTION OF FRUIT, VEGETABLES AND PROTEIN FOODS INCREASED WITH DIETARY COUNSELING AND ORAL NUTRITIONAL SUPPLEMENTATION (ONS) USAGE IN CHILDREN

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Background and Aims

Background and Aims: Pediatricians and caregivers are often resistant to utilizing ONS with children because they believe children will replace consumption of “real” foods or not learn to eat properly. This study was designed to determine effects of long-term ONS use on anthropometrics, sick days, appetite and physical activity levels, and nutritional adequacy in children.

Method

Methods: A 48-week intervention study was conducted in the Philippines in children ages 3-4 years between the 5th and 25th percentile for weight-for-height (WHO standards) with measurements at 4, 8, 16, 24, 32, 40 and 48-weeks. 199 children received 450 kcal ONS daily and dietary counseling at baseline, 4-weeks and 8-weeks. The counseling provided guidelines about food groups, appropriate portion sizes, limiting high sugar foods, and positive eating environments. Two 24-hour dietary recalls were collected, averaged and analyzed at each post-baseline visit.

Results

Results: After completing the intervention, children consumed more calories, met dietary recommendations for B vitamins, vitamins A and C, iron, and calcium, and increased the diversity of their food choices. After 4 weeks, children consumed more vitamin A rich fruits and vegetables (p=0.0105), other fruits and vegetables (p<0.0001), meat/fish (p=0.0043) and eggs (p<0.0001). These positive dietary changes were maintained for the remaining study period though dietary counseling was stopped at 8-weeks.

Conclusion

Conclusions: A combination of initial dietary counseling and ONS was associated with an increased consumption of a greater variety of foods including fruits, vegetables, and protein-rich items. ONS does not appear to interfere with food consumption in this study.
Oral Presentations Session 6: Nutrition in Infancy II

USUAL NUTRIENT INTAKES OF US INFANTS AND TODDLERS COMPARED TO REFERENCE INTAKES (DRI): FINDINGS FROM THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES) 2009-12

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Background and Aims
The reported national estimates of nutrient intakes of young children are not current. The objective of the current study were to describe the usual nutrient intakes (UI) of a nationally-representative sample of 6-23 month old children examined in NHANES 2009-12, and compare the UI to DRI when available.

Method
NHANES is a cross-sectional survey with a complex design that provides national estimates on nutrition and health of the US population. Two 24-hour dietary recalls, obtained from caregivers for 381 infants (6-11 months) and 516 toddlers (12-23 months) using the USDA’s Automated Multiple-Pass Method, were used to determine nutrient intakes from food and beverages. UI and % children meeting DRI were estimated using the National Cancer Institute (NCI) method.

Results
The UI of young children met or exceeded DRI with minimal risk of macronutrient, vitamin, and mineral deficiencies, with a few exceptions among toddlers. Most toddlers did not meet recommended intakes (“EAR”) for fiber (99%), vitamin E (82%) and vitamin D (74%). With regard to adequate intake (AI), only 21% infants and 1% toddlers met or exceeded the age-specific AI for vitamin D and potassium, respectively. In contrast, for at least 16% and 41% children, usual intake exceeded the recommended upper limit (UL) for vitamin A and zinc, respectively. One in two toddlers had sodium intakes exceeding the UL.

Conclusion
The usual intakes of infants were adequate for most nutrients. A majority of toddlers were at risk for inadequate intakes of fiber, vitamin D and vitamin E. The authors have no grants to declare.
Oral Presentations Session 6: Nutrition in Infancy II

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GROWTH VELOCITY PREDICTS CHILD MORTALITY BETTER THAN ATTAINED GROWTH

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Background and Aims
Growth velocity is a potential measure to objectively quantify changes in the child’s growth. Nevertheless, the WHO Growth Velocity Standards are rarely used to identify children at risk of adverse health outcomes. We aimed to determine the ability of various growth velocity measures to predict child death within three months and to compare it to those of attained growth measures.

Method
In a cohort study in the Democratic Republic of Congo, in which 5,657 children were measured up to six times every three months, 246 (4.3%) children died. We estimated the risk of dying for weight and length velocity and changes in mid-upper-arm-circumference (MUAC) with GEE models. ROC curves present balance in sensitivity and specificity to predict child death.

Results
For all velocity indices, the risk of dying increased exponentially with every unit decrease (by 40-90%). Having a Z-score <-3 in weight or length velocity was associated with a 6.7 and 11.7 fold increase in relative risk of death respectively (confidence interval 3.4–13 and 4.1–33) compared to a Z-score ≥0. Z-scores for length and weight velocity and absolute MUAC performed substantially better in predicting mortality (area under the curve (AUC): 0.69, 0.67 and 0.63 respectively) than commonly used attained growth measures, WLZ (0.56) and LAZ (0.52). The best discriminating power had weight velocity in the subgroup of wasted children (AUC 0.87).

Conclusion
Our results suggest that despite their higher complexity, growth velocity Z-scores could be used more for identifying children at increased risk of death.
Background and Aims
Serum ferritin concentrations in umbilical cord blood reflect neonatal iron stores and low iron stores at birth have been associated with poorer neurodevelopmental outcomes in childhood.

We aimed to explore all pre-, peri- and postnatal determinants of serum ferritin concentrations at birth and describe its associations with iron status at two years.

Method
Data were collected prospectively in the maternal-infant dyad Cork BASELINE Birth Cohort Study from 15 weeks gestation. Serum ferritin concentrations were measured in umbilical cord blood (n=415) and at two years.

Results
The median [IQR] cord ferritin concentration was 185.7 [131.7, 385.5] μg/l; 8% (n=33) had low iron stores (ferritin <76μg/l). Delivery by caesarean section (adjusted estimate [95% confidence interval (CI)]; -41.75 [-72.59, -10.90]) and maternal obesity (BMI≥30kg/m2) at 15 weeks gestation (-66.38 [-106.87, -25.88], all P<0.05) were inversely associated with cord ferritin concentrations. Maternal smoking at 15 weeks gestation (odds ratio [95% CI]: 2.88 [1.18, 7.03]) and being born small-for-gestational age (3.43 [1.31, 8.94], all P<0.05) were associated with an increased risk of low iron stores at birth. Cord ferritin concentrations were positively associated with ferritin concentrations at two years (adjusted estimate [95% CI]; 0.03 [0.02, 0.04], P<0.001).

Conclusion
This novel study shows that caesarean delivery, being born small-for-gestational age and a poor maternal lifestyle, characterised by smoking and obesity in pregnancy, were all associated with significantly lower ferritin concentrations at birth. Potential impacts on later neurodevelopmental outcomes are under investigation.

Supported by the National Children’s Research Centre and Danone Nutricia Early Life Nutrition.
Oral Presentations Session 6: Nutrition in Infancy II

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FISH OIL SUPPLEMENTATION FROM 9 TO 18 MONTHS OF AGE AFFECTS THE INSULIN-LIKE GROWTH FACTOR AXIS IN A SEX-SPECIFIC MANNER IN DANISH INFANTS

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Background and Aims
Several studies have investigated the effects of fish oil (FO) on infant growth, but little is known about the effects of FO and sex on insulin-like growth factor-1 (IGF-1), the main regulator of growth in childhood. This study explored whether FO versus sunflower oil (SO) supplementation from 9 to 18 months of age affected IGF-1 and its binding protein (IGFBP-3) and whether potential effects were sex-specific.

Method
Danish infants (n=115) were randomized to 5 mL/day FO (1.2 g/day n-3 long-chain PUFA; LCPUFA) or SO. We measured growth, IGF-1, IGFBP-3, and erythrocyte eicosapentaenoic acid (EPA), a biomarker of n-3 LCPUFA intake, at 9 and 18 months.

Results
Erythrocyte EPA increased strongly with FO compared to SO (P<0.001). There were no effects of FO compared to SO on IGF-1 in the total population, but a sex×group interaction (P=0.02). Baseline-adjusted IGF-1 at 18 months was 11.1 μg/L (95% CI 0.4; 21.8) (P=0.04) higher after FO compared to SO supplementation among boys only. The sex×group interaction was borderline significant in the model of IGFBP-3 (P=0.09), with lower IGFBP-3 with FO versus SO among girls only (P=0.03). The results were supported by sex-specific dose-response associations between changes in erythrocyte EPA and changes in IGF-1 and IGFBP-3 (both P<0.03). Moreover, IGF-1 was sex-specifically associated with BMI and length.

Conclusion
FO compared to SO resulted in higher IGF-1 among boys and lower IGF-BP3 among girls. The potential long-term implications for growth and body composition should be investigated further.

Oils were kindly provided by Axellus A/S, Norway.
IS THE NUTRITIONAL STATUS AT ADMISSION ASSOCIATED WITH DISEASE SEVERITY IN CHILDREN HOSPITALIZED FOR MODERATE TO SEVERE BRONCHIOLITIS?
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Background and Aims
Infants with bronchiolitis are frequently hospitalized because of insufficient intake. We investigated the association between nutritional status at admission and bronchiolitis disease severity.

Method
Children hospitalized with moderate to severe bronchiolitis, with intake <75% of normal, were eligible for inclusion (clinical trials.gov NCT02316015).

Exclusion criteria were admittance to intensive care (PICU), malabsorption, breastfeeding and age >24 months. Standard anthropometry was done within the first day. Weight faltering was calculated using conditional national growth curves. Disease severity was assessed using the Respiratory Distress Assessment Instrument (RDAI).

Results
111 children were admitted with bronchiolitis, 92 were excluded (breastfeeding n=29; normal intake n= 14; PICU n=18; other n=31), leaving 19 children (12 boys, 7 girls) with a median (range) age of 3.7 (1.5-23.3) months. Median (range) duration of fever and decreased intake was 2 (0-7) and 2 (1-6) days, respectively. At admission, 14 (73.7%) children required oxygen (ODA), 11 (57.9%) had a moderate and 8 (42.1%) severe RDAI score. None was wasted at admission, median (range) weight for age (WFA) and conditional weight gain for age (cWFA) was 0.17 (-1.59 – 1.58) and -1.00 (-2.25 – 1.74), respectively. The cWFA was significantly lower in children with severe than moderate RDAI scores (-1.35 vs -0.54; p=0.026); no differences were found in median WFA, mid-upper arm circumference (MUAC) or triceps skin fold (TSF) (p-values 0.618 to 0.804). No correlations were found with ODA.

Conclusion
A “dynamic parameter” (weight faltering) was related with disease severity in children hospitalized for bronchiolitis; none of the more “static parameters” (WFA, MUAC, TSF) were.
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AGE OF INTRODUCTION OF FOODS AND SYMPTOMS OF ASTHMA AND ALLERGY IN CHILDREN: COHORT SCAALA


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Background and Aims
Current guidelines recommend a delayed feed introduction in order to prevent allergic diseases. To analyze whether the late food introduction is a protective factor against the symptoms of asthma and eczema in children.

Method
This study included 560 children, studied between 1997 and 2005, using a randomly sample, in Brazil. The time of food introduction was obtained only for children under two years old by a standardized questionnaire. Information of asthma and eczema symptoms were obtained in 2005, when children had between 4 and 11 years old, by adapted version of the International Study of Asthma and Allergies in Childhood questionnaire. Analyses were conducted with estimates made about the odds ratio and their respective 95% confidence intervals using multivariate logistic regression.

Results
Early introduction (≤4 months) of rice (OR=2.20; 95% CI 1.04; 4.65) and cassava flour (OR=2.15; 95% CI 1.14; 4.04) were positively associated for wheezing, while there were not significant associations with others outcomes.

Conclusion
This study found no evidence to support a late introduction of foods for the prevention of asthma, atopy and eczema in preschool and school age. Positive associations found in this study should be looked carefully. From a biochemical perspective, rice and cassava flour are a great sources of polysaccharides or glycan and their interaction with proteins play a key role in regulating the immune system physiology, as thymus maturation, migration activation and apoptosis of T cells, these glycoproteins being able to modulate lymphocyte physiology through specific interaction with endogenous lectin, selectins and galectin.
Oral Presentations Session 7: Neonatology II

131 COMPARISON OF AIR DISPLACEMENT PLETHYSMOGRAPHY AND DUAL-ENERGY X-RAY ABSORPTIOMETRY
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Background and Aims
Infant body composition promises a more clinically relevant assessment of nutritional adequacy compared to the current practice of weight gain evaluation. Air displacement plethysmography (ADP) and dual X-ray absorptiometry (DXA) are commonly used. However, there is little literature comparing ADP with DXA, particularly in the preterm population.

Method
72 concurrent DXA (Hologic QDR4500) and ADP (PEAPOD, COSMED) measurements were compared from 72 preterm infants (born <30 weeks of gestation). Measurements were performed at three points: <40 weeks of corrected gestational age, term and 3 months corrected age (n=21, 33, and 18 respectively). In addition, total mass measurements from DXA and ADP were compared against a third method, an electronic scale (SmartScale® Model 65).

Results
DXA and ADP were significantly correlated for total body mass ($R^2=0.997$), absolute fat mass ($R^2=0.910$), absolute fat-free mass ($R^2=0.961$) and %fat mass ($R^2=0.713$). However, the Bland-Altman analysis revealed significant bias (p <0.001) in all these estimates. Both the DXA and ADP total mass against the independent electronic scale showed a high correlation ($R^2=0.995$ and $R^2=0.998$ respectively). However, only the DXA total mass showed a significant bias from the electronic scale (p<0.001) in the Bland-Altman analysis.
Conclusion
Body composition estimates by DXA and ADP were highly correlated, but significantly biased. DXA mass deviates systematically from both the independent scale and the ADP scale, and %fat mass is underestimated compared to ADP. Further studies are needed to identify the basis of the large inter-method biases.
ATTAINMENT TARGETS FOR PROTEIN INTAKE USING STANDARDISED, CONCENTRATED AND INDIVIDUALISED NEONATAL PARENTERAL NUTRITION REGIMENS

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Background and Aims
Neonatal parenteral nutrition (NPN) regimens that are individualised (iNPN) or standardised concentrated NPN (scNPN) are currently used in preterm clinical practice. Two recent trials (one iNPN and one scNPN) each compared standard and high protein dosages. We hypothesised that scNPN regimens would achieve a higher percentage of the target parenteral protein intake than their corresponding iNPN regimens.

Aim: To compare target attainment between iNPN and scNPN regimens for parenteral protein intake at standard (maximum 3g/kg/day) and high (maximum 4g/kg/day) dosages.

Method
We performed a secondary analysis using the nutritional data (day 1-15) from both trials. We identified the individual target parenteral protein intake and the parenteral protein intake for the period each infant received full aqueous NPN. Target attainment (%) for parenteral protein intake in each infant was calculated.

Results
There were no differences in birthweight or gestation between iNPN (n=74) and scNPN (n=76) infants receiving the standard protein dose or between iNPN (n=68) and scNPN (n=74) infants receiving the high protein dose. The mean protein intake and median target attainment is higher with scNPN than iNPN regimens for both standard and high protein doses.

Table 1: Comparison of parenteral protein intake (g/kg/d) and target attainment (%)

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th></th>
<th>High</th>
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<tbody>
<tr>
<td>N (infants)</td>
<td>iNPN</td>
<td>scNPN p</td>
<td>iNPN</td>
</tr>
<tr>
<td>Mean (sd) protein intake</td>
<td>1.31 (0.52)</td>
<td>2.36 (0.18) &lt;0.01</td>
<td>1.61 (0.70)</td>
</tr>
<tr>
<td>Median (IQR) target attainment</td>
<td>77 (67-85)</td>
<td>94 (91-96) &lt;0.01</td>
<td>75 (66-83)</td>
</tr>
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</table>

Conclusion
scNPN regimens have better target attainment for parenteral protein intakes than iNPN regimens.
Oral Presentations Session 7: Neonatology II

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A NEW APPROACH AND TOOL TO PREDICT PRETERM INFANTS’ INDIVIDUAL GROWTH TRAJECTORIES
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Background and Aims
Individual growth trajectories (IGT) for preterm infants are needed to guide postnatal growth and nutrition. Reference data is available for intrauterine growth (Fenton) and for postnatal growth after completed adaptation at term (WHO growth standards, WHOGS). A recently published paper predicts Preterm Postnatal Adjustment to a new Growth Trajectory at day 21 (PPAnGT). For the subsequent period of stable growth, guidelines suggest that preterm infants follow healthy fetuses remaining in-utero until term; however, currently there is a trajectory gap between PPAnGT and WHOGS.

We aimed to apply two concepts for the stable growth period and to compare achieved weights at 42 weeks PMA to target weights (WHOGS) for identical birth weight (BW) percentiles.

Method
IGTs for BWs at 7 major percentiles were studied (24-34 weeks). 1)Percentile-course approach (PCA): IGT following the percentile (Fenton) achieved at day of life (DoL) 21 until term; 2) Growth-velocity approach (GVA): from DoL 21 onwards IGT is calculated using median day-specific growth rates (Fenton) until term.

Results
Two sets of 77 IGTs were analyzed. Maximum difference between weights achieved with predicted IGT vs. WHOGS at 42 weeks was 930g for PCA and 11g for GVA.

Conclusion
This study showed that IGTs created using GVA matched with target WHOGS weights after PPAnGT. This new IGT calculator tool only requires BW, gestational age and sex, and should be validated in future studies. Figure shows the concept: (1):IGT, (2):Fenton intrauterine growth, (3):PPAnGT, (3):stable growth with median growth rate, (4):WHOGS.
Oral Presentations Session 7: Neonatology II

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POSTNATAL GROWTH VELOCITY CALCULATION: ACCURACY OF DIFFERENT METHODS
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Background and Aims
Postnatal growth in premature infants is an indirect measure of health status, nutritional adequacy and long-term health outcome. In clinical practice, growth is described as change in weight over time and given as growth velocity (GV) in g/kg/d. There is no general agreement for calculation of GV. This study aims to assess the accuracy of methods for GV calculation.

Method
Real weight data of 20 infants (<30 weeks gestational age) was used with 5 different methods for GV calculation: 1) Solver (exponential equation optimized by least sum of residuals) 2) exponential regression 3) linear regression 4) 2-point-linear 5) 2-point-exponential. For 2 and 3-weeks periods each method was applied to the entire period (all), starting at day 3 (1-3), and starting at day 3 with 2 additional days at the end (1+3). We calculated average growth velocity of all methods and correlated with individual velocities. We also assigned a random set of infants to two groups and calculated the average GV for each method.

Results
GV calculated with solver method has highest agreement with the line of identity(Fig.A). GV between two groups was significantly different using solver(p=0.044), 2-point-linear(p=0.005)
Conclusion
The GV is significantly affected by the methods used. Caution should be exercised when interpreting GV from different studies. GV calculation needs to be standardized to allow for comparison across nutritional studies.
BREASTFEEDING IMPROVED BONE MINERAL DENSITY AT 6 YEARS OF AGE AMONG CHILDREN BORN VERY PRETERM

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Background and Aims
Infants born very preterm are at risk of developing metabolic bone disease. Adequate nutritional intake is important to reduce the risk of severe bone disease. The aim was to evaluate bone mineral density (BMD) at six years in very preterm born infants according to post discharge diet.

Method
Very preterm born infants (VPI) (gestational age ≤32+0 weeks) were included in a prospective, multicentre RCT on post discharge nutrition of VPI from discharge to 4 month corrected age. The infants fed human milk (HM) were randomized to supplementation with human milk fortification or not. Those not fed human milk received a preterm formula (PF). Nutrition groups consisted of A) HM, B) Fortified HM or C) PF. At 6 years of age a BMD was assessed by dual-energy X-ray absorptiometry (DEXA-scan) (Lunar Prodigy) measuring the bone mineralization using the recommended value of “total-body-less-head”.

Results
A total of 190 infants had a DEXA scan performed at 6 (5.8-8.3) years of age. No significant difference was found comparing nutrition groups (t-test) as regards height, bone area and BMC for bone area (BMD). In multiple regression analysis breastfed infants (group A+B) had higher BMD compared to formula fed infants (group C) (p=0.002). Children with a BMD below normal range (<-1SD) had a new DEXA-scan performed after at least 6 months, and they all (Group A: 11, B: 8, C: 15) normalised their BMD.

Conclusion
Feeding HM compared to PF post discharge was associated with increased BMD at 6 years of age among VPI.
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HEIGHT GAIN AFTER TWO-YEARS-OF-AGE IS ASSOCIATED WITH BETTER COGNITIVE CAPACITY AT 15-YEARS-OF-AGE IN MALAWI

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Background and Aims
Stunting is a measure of chronic undernutrition, and it affects 160 million children worldwide. Cognitive development of stunted children is compromised, but the evidence about the association between height gain in late childhood and adolescent cognitive capacity is scarce. Our aim was to determine the association between height gains at different ages, including late childhood, and cognitive capacity at 15-years-of-age.

Method
We conducted a prospective cohort study in a rural African setting in Southern Malawi. The study cohort was enrolled between June 1995 and August 1996. It originally comprised mothers of 813 fetuses, and the number of children born live was 767. These children were followed up until the age of 15 years. The anthropometrics were measured at one and 24-months-of-age and 15-years-of-age, and cognitive capacity of participants was assessed at 15-years-of-age with Raven’s Coloured Matrices score, mathematic test score, median reaction time (RT) (milliseconds) and RT lapses. The associations between growth and the outcome measures were assessed with linear regression, and possible confounders were identified through additional regression models.

Results
Raven’s Coloured Matrices score was predicted by height gain between 24 months and 15-years-of-age (coefficient=0.85, P=0,027), but not by earlier growth, when possible confounders were included the model. The association weakened when school education was further added in the model (coefficient=0.69, P=0,060).

Conclusion
In rural Malawi, better growth in late childhood is likely to lead to better cognitive capacity in adolescence, partly through more school education. In the light of these results, growth promotion should not only be limited to early childhood.
Oral Presentations Session 8: Diet, Nutrition and Health Outcomes III

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WEIGHT SINCE BIRTH IS ASSOCIATED WITH CHILDHOOD DIETARY INTAKE - A PROSPECTIVE COHORT STUDY
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Background and Aims
Unhealthy dietary habits develop very early and track through life, being independent and modifiable risk factors for disease. Hence, understanding its determinants is essential. We aimed to evaluate the associations of birthweight (BW), newborn weight change (NWC) during the first 96 hours of life and childhood longitudinal weight trajectories with dietary intake at age 4.

Method
As part of Generation XXI birth cohort, children were recruited in 2005/2006 at all public units providing obstetrical and neonatal care in Porto. Information was collected by face-to-face interview and abstracted from clinical records. At age 4, weight measurements recorded from birth to current age were abstracted and weight trajectories estimated. Food frequency questionnaires were applied and three dietary patterns (DP) were identified: “Energy-dense food (EDF)+Dairy”, “Lower in Healthy Food” and “Healthier”. Logistic regression models were used to compute odds ratio and 95% confidence intervals [OR (95% CI)] in a sample of 775 children.

Results
Children with higher BW were less frequently in the “EDF+Dairy” DP [0.94 (0.89-0.98), per 100g increase in BW]. Children with higher NWC had lower odds of eating fruit ≥3/day [0.93 (0.87-0.99), per 1% increase in NWC]. Children with higher weight during childhood had higher odds of belonging to the “EDF+Dairy” DP [1.90 (1.04-3.47)] and lower odds of eating vegetable soup ≥2/day [0.56 (0.34-0.91)]. Children showing catch-up grow in the first year of life had higher odds of eating dairy products ≥3/day [3.76 (1.31-10.80)].

Conclusion
The way children grow during childhood played a major role on dietary intake at age 4.
Background and Aims
Picky eating involves unwillingness to eat familiar foods or to try new foods, as well as strong food preferences. This may be associated with a higher risk of being underweight and poor growth with time. Our aim was to investigate if picky eating identified in preschool years was associated with changes in height, weight and body composition during childhood and adolescence.

Method
Picky eaters were identified in the Avon Longitudinal Study of Parents and Children cohort from a parental questionnaire completed at 38 months of age. Height and weight were measured on seven occasions from age 7 to 17 years. Body composition (DEXA) was measured on five occasions from age 9 to 17. Data were analysed with adjusted multiple regression analysis.

Results
Children who were identified as picky eaters during preschool years were shorter than non-picky eaters at all ages from 7 to 17. Picky eaters were also lighter and had a lower body mass index at all ages from 7 to 17 (Table 1). They also had a lower body fat percentage and fat mass index than the non-picky eaters from 9 to 17 and lean mass index from age 11 to 17 (Table 2). Differences for all measures except height were greatest at age 17.
Conclusion
There was evidence for associations of picky eating at 38 months with indices of growth and body composition up to 17 years old that may be of concern. These findings will be explored further with adjusted multilevel modelling.
LONG-TERM FOLLOW-UP OF BONE MINERALIZATION IN PRETERM BORN CHILDREN: COMPLETE CATCH-UP OF BONE MINERALIZATION AT AGE 8 YEARS IN THOSE BORN SMALL-FOR-GESTATIONAL-AGE

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Background and Aims
Very preterm infants (<32 weeks of gestation), in particular those born small-for-gestational-age (SGA), are at risk for suboptimal bone mineralization. Previously, we showed that preterm SGA infants had a lower gain of bone mineral content (BMC) at 6 months corrected age (CA) compared to appropriate-for-gestational-age (AGA) born infants. Here we present bone mineral parameters at the age of 8 years.

Method
The present study included 79 of the original 139 children, 40 males, age 7.9 [IQR 7.6-8.3] years. Children were classified as SGA if birth weight/length or both were <-2SDS. At term age, 6 months CA and 8 years, anthropometry was performed and bone area (BA), bone mineral content and density (BMC/BMD) were determined by Dual-energy X-ray Absorptiometry (DEXA). Statistics: multivariate linear regression or Mann-Whitney-U test comparing AGA and SGA.

Results
At term age and 6 months CA, weight, length and BMC adjusted for gender and gestational age at birth were lower in SGA (n=17) compared to AGA (n=59) born infants, while BA and BMD were not different. At age 8 years, height (129.3±5.5 vs. 129.6±6.1cm), weight (25.9±4.7 vs. 25.3±4.0kg), BMI (14.8 [14.0;16.5] vs. 14.7 [13.7;16.3]kg/m²), head circumference (52.1±2.0 vs. 52.3±1.7cm), BA (1,212±67 vs. 1,233±75cm²), BMC (880±94 vs. 920±119g) and BMD (0.72±0.05 vs. 0.74±0.05g/cm²) were not different between those born AGA and SGA.

Conclusion
This study suggests that complete catch-up of growth and bone mineral parameters occurred in SGA preterm-born children between 6 months CA and age 8 years. Due to small sample size, these findings should be interpreted with caution.
Oral Presentations Session 8: Diet, Nutrition and Health Outcomes III

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BODY CELL MASS CHANGES IN CHILDREN WITH CROHN’S DISEASE DURING THE FIRST YEAR POST DIAGNOSIS
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Background and Aims
Body cell mass (BCM) is the metabolically active component of fat-free mass. Changes in BCM are clinically important as it is a good indicator of functional nutritional status. We report novel data detailing BCM changes over 12 months in children newly diagnosed with Crohn’s Disease (CD).

Method
Children were recruited as part of ongoing research on the effect of CD on growth. BCM was measured using total body potassium\(^{40}\) counting. Longitudinal measurements were available in 18 children (14 boys; 4 girls) of mean (±SD) age 12.39 (±2.18) years at diagnosis. Anthropometry and BMC measurements were compared using repeated measures ANOVA.

Results
At diagnosis, mean (±SD) height, weight, body mass index (BMI) and BCM z scores were -0.43 (±1.20), -1.00 (±1.17), -1.12 (±1.22) and -1.41 (±1.60), respectively. At 6-months, height z scores had decreased from baseline (-0.54±1.23), but had increased by 1 year (-0.36±1.16). Weight and BMI z scores significantly increased 6-months following diagnosis (-0.55±1.15, p=0.02; -0.34±1.04, p=0.02; respectively), and remained stable thereafter, being not statistically different at 1 year (-0.55±1.16 and -0.45±1.12, respectively). No significant differences in BCM z scores were seen over the year following diagnosis, although there was a trend towards improved z scores at 6-months (-0.76±1.39) and 1 year (-0.89±1.38).

Conclusion
Our cohort demonstrates relatively fast recovery of body weight and BMI during the first 6 months following diagnosis of CD, however, significant improvements in height and BCM were not seen. This suggests weight is able to respond rapidly to treatment, whereas height and body composition are less responsive.
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NEURODEVELOPMENT IN PREMATURE INFANTS AND ITS RELATION WITH PROTEIN INTAKE

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Background and Aims
To study the correlation between protein intake in the first 28 days of life and neurodevelopment at 2 years corrected age (CA) in premature infants.

Method
Observational study that included all premature infants (birth weight <1500g) born from January to August 2011 in two hospitals. Protein intake (including enteral and parenteral nutrition) was analyzed by calculating the average percentage of requirements, (considering ESPHGAN 2009 recommendations as the goal standard) in each infant.

Neurodevelopment at 2 years CA was obtained by reviewing medical history. Neurodevelopmental disability was defined as cerebral palsy or developmental delay (composite score of cognitive, language or motor subscales <mean-SD of Bayley-III-scale).

Results
Thirty-one infants were born and survived 28 days of life. Neurodevelopment data of 26 infants were recollected at mean±SD of 20,5±3,2 months CA.

The mean±SD and median percentage of protein reached in the first 28 days of life was 83,8±8,8% and 84,8% respectively.

None of the infants presented cerebral palsy. Four of them had neurodevelopment delay. Dividing them into two groups, taking the median percentage of protein intake as the cutoff point (83,8%), we got two groups of patients.

<table>
<thead>
<tr>
<th>% protein</th>
<th>Infants (n)</th>
<th>Infants with neurodevelopment delay (n, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;83,8%</td>
<td>13</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>&gt;83,8%</td>
<td>13</td>
<td>1 (7,7%)</td>
</tr>
</tbody>
</table>

Conclusion
Many factors contribute to neurological development, adequate early postnatal protein intake has been pointed out as one of them in literature. In our study, we found that development delay at 2 years CA was more frequent in the group of patients who received lower protein intake.
Neonatal & Prematurity

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A NOVEL COMPOUND ENHANCES CEREBELLAR DEVELOPMENT AFTER PRETERM BIRTH: EVIDENCE FROM PRETERM PIGS
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Background and Aims
Fetal growth restriction is known to be associated with perinatal mortality and subsequent metabolic disorders in adulthood. However, there has been no report elucidating lipoprotein properties in cord serum fetal growth and cardiovascular risk. There has been scarce information regarding compositional or functional changes in lipoprotein from a growth-restricted fetus. In order to identify unique lipoprotein biomarkers for fetal growth restriction in cord blood, we analyzed lipoprotein compositions and functions.

Method
Lipoprotein compositions and functions were compared in cord blood among SGA neonates (n= 15, 2496 ± 138 g), AGA neonates (n=15, 3364±132 g), and LGA neonates (n=10, 3872 ± 183 g).

Results
Cord blood from SGA group showed 2-fold higher triglyceride (TG) level compared to AGA group and showed significantly lower paraoxonase activity. The SGA and LGA groups showed significantly higher CETP activities (around 37-39%) than AGA group. For lipoproteins, SGA neonates showed elevated apo-B content in VLDL, 52% reduction of apoA-I content in HDL, and a 30% increased glycation level compared with AGA neonates. Especially, LDL from the SGA group showed 1.9-fold higher sensitivity to oxidation as well as 3-fold greater uptake by macrophages, suggesting LDL from the SGA group had stronger pro-atherosclerotic properties. Upon microinjection of cord blood into zebrafish embryos, the SGA group showed the most severe embryonic death and ROS production along with the slowest developmental speed.

Conclusion
Cord blood lipoproteins from SGA neonates showed functional and structural impairment with more pro-oxidant and pro-atherosclerotic changes. The modifications in cord blood lipoproteins can be a biomarker for fetal growth.
A WIDE RANGE OF CALCULATIONS METHODS ARE USED TO DESCRIBE WEIGHT GAIN GROWTH VELOCITY OF PRETERM INFANTS

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Background and Aims
Clinicians assess growth of preterm infants in part by comparing to published values of growth velocity. In a systematic review we determined the frequency of use of numerical methods used to quantify weight gain (g/kg/day, g/d, z-scores, percentiles) in preterm infants (< 37 weeks at birth).

Method
A search was conducted of the MEDLINE Database using PubMed up to April 2015 for studies that measured growth as a main outcome in preterm neonates between birth and hospital discharge or 40 weeks postmenstrual age. English, French, German and Spanish papers were included. Two reviewers extracted the data, with any disagreements being resolved in discussion with a third reviewer.

Results
Of 1542 studies located in the search, 366 (24%) calculated growth velocity of the infants studied. Preliminary results revealed a wide range of methods used: g/kg/day: 40%, g/d: 35%, change in z-scores/standard deviation scores: 24%. For g/kg/day, the time for the calculations varied: 63% began at birth/admission, 39% began at the weight nadir or after birth weight was regained; 16% used a unit-less exponential formula. For the denominators used in g/kg/day calculations, 59% did not define the denominator, 34% used an average weight, 19% used the initial weight, 12% used birthweight, and 0% used the final weight.

Conclusion
The lack of standardization of methods used to calculate preterm infant growth velocity makes comparisons between studies difficult and presents an obstacle to the use of research results to guide clinical practice.
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MILK ANALYSIS USING MILK ANALYZERS IN A STANDARDIZED SETTING (MAMAS):

STUDY DESIGN
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Background and Aims
Human milk analyzers (MA) are increasingly used to rapidly measure the macronutrient content in breast milk for target fortification, in order to reduce the risk of postnatal growth restriction. Although clinical decisions are made using MA, many MA are used without quality assurance, validation or calibration. Hence, we have launched the MAMAS study, a multicenter quality initiative, to implement standard procedures following good laboratory and clinical practice (GLCP). We will investigate the quality of measurements between different MA, test whether the accuracy and precision of devices can be improved by establishing individual calibration curves, and assess the long-term stability of measurements, following the GLCP guidelines (daily quality control samples and ring trial).

Method
We contacted 14 international neonatal centers, including McMaster University. Breast milk samples will be prepared and sent out to participating centers for measurement purposes, using their MA. There will be 3 sets of samples: i) initial assessment of the device performance; ii) long term stability and quality control; iii) ring trial. This study will run until June 2016.

Results
Of the 14 centers, 12 agreed to participate, including centers from France(1), Germany(3), Poland(1), Switzerland(1), Austria(1), Canada(4) and the United States(1). Centers will transfer their data on a weekly basis. We will analyze the data, and provide feedback regarding the device’s performance.

Conclusion
This is the first trial to compare MA measurements in a multicenter setting. This study is important to help further understand MA, and to implement GLCP when using MA. We welcome units engaged in improving MA performance.
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PILOTING A MHEALTH INTERVENTION TO IMPROVE EXCLUSIVE BREASTFEEDING AWARENESS AMONG RURAL CAMBODIAN MOTHERS
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3People in Need, Cambodia Office, Phnom Penh, Cambodia
4RACHA, Cambodia, Phnom Penh, Cambodia
5NutriFoods, Statistics, Phnom Penh, Cambodia
617 Triggers, Creative, Phnom Penh, Cambodia
7InsteDD iLab, Technology, Phnom Penh, Cambodia
8Open Institute, Software Development, Phnom Penh, Cambodia

Background and Aims
The Cambodia DHS 2014[1] reports that 65% of children less than six months are exclusively breastfed. However, 12% of infants under six months receive water or other liquids alongside breast milk. In order to improve the mothers’ knowledge and promote local National Policy on Infant and Young Child Feeding, which are in line with the WHO recommendations, People in Need Cambodia (PIN) piloted a mHealth (the use of mobile devices to improve health outcomes)[2] intervention.

Method
PIN piloted an Interactive Voice Response system that sends pre-recorded messages to mothers of newborns using the theme ‘It takes a village to raise a baby’. Between September – December 2013, PIN enrolled 455 mothers of newborns in this pilot intervention which involved delivering seven 60-90 second voice-messages directly to the mobile phones of these mothers over the first 28 days of life. One of the seven messages is about exclusive breastfeeding, featuring a fictional mother sharing her own experiences.

Results
An evaluation of the pilot was conducted in December 2013. 129 mothers were interviewed using a questionnaire. Results of 126 respondents included for analysis (by SPSS v22) indicate that the intervention was well accepted. 71% of respondents reported that they would recommend the intervention to other mothers, and 83% reported that they would be willing to pay for the service.

Conclusion
This type of mHealth intervention is an acceptable way of improving the mothers’ awareness of exclusive breastfeeding and neonatal care.
EFFECTS OF PASTEURIZATION ON REDOX PROPERTIES OF COLOSTRUM AND MILK FROM MOTHERS OF PRETERM INFANTS

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Background and Aims
Donated milk represents a desirable alternative to formula feeding, especially for preterm infants. Milk banks collect both preterm and term human milk and apply pasteurization to remove possible infectious contaminants.

We examined the effects of pasteurization on redox properties of milk from mothers of preterm infants and its fractions.

Method
Electron paramagnetic resonance spectroscopy of hydroxyl-radical generating Fenton system was applied to analyze redox properties of milk from mothers of preterm infants and its fractions (skim milk and whey) and reactive products of oxidation of ascorbate and uric acid in the milk.

Results
Colostrum showed drastically higher capacity for hydroxyl radical removal compared to transient and mature milk from mothers of preterm infants. The signal of ascorbic radical was very weak in pasteurized milk, whereas the intensity of urate radical adduct was higher compared to fresh milk. A significant negative correlation is present (R = -0.797 p < 0.0001) between signal intensities of urate radical adduct and ascorbic radical only in pasteurized milk.

Conclusion
Milk from mothers of preterm infants has high redox capacity, and it is a very important for growth and development of premature infants. However, redox capacity decrease during lactation, and pasteurization appears to undermine the redox properties of the milk.

Acknowledgments
This work was supported by Grants 173014 and 43004 by the Ministry of Education, Science and Technological Development of the Republic of Serbia.
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EPIDEMIOLOGY AND RISK FACTORS OF NEURAL TUBE DEFECTS: MOROCCAN DATA
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Background and Aims
Neural tube defects has a considerable importance because they can be prevented by supplementing Folic acid & Vitamin B12 during periconceptional period and fortification of staple foods. In Morocco, the Ministry of Health launched a national program for fortification of flour with folic acid. The aim of study is evaluating the prevalence of neural tube defects after fortification

Method
This is a retrospective descriptive study at the National Reference Centre for Nutrition and Neonatology of the Children’s Hospital of Rabat over 4 years. Data were identified from the registry of congenital malformations held at the perinatology unit

Results
During the 4 years, 674 congenital malformations were identified. The neural tube defects account for 11.9%. Their annual prevalence decreased significantly from 21.78 in 2008 to 12.1 per 10,000 total births in 2011. The most common form was anencephaly (60%). Neural tube defects were isolated in 85% of cases and associated with other malformations in 15% of cases. 49.4% of infants with neural tube defects were female and 50.6% were male. Perinatal mortality in newborns with neural tube defects was 63.8% versus 25.2% in malformed newborns without neural tube defects.

Conclusion
The neural tube defects seem to be common after supplementing Folic acid & Vitamin B12 during periconceptional period in Morocco. Permanent epidemiological surveillance is needed to determine the true prevalence and risk factors in our context
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ANTENATAL CARE IN RABAT AND OUTSKIRTS, MOROCCO: RISK FACTORS FOR NON-ATTENDANCE
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Background and Aims
Antenatal care is a preventative measure that improves both mother and newborn health outcomes.

The objective is to describe the compliance and determining factors for non-attendance are scarce and urgently needed to improve antenatal care in Morocco, if necessary.

Method
During October 2014, mothers attending an urban paediatric hospital in Rabat or a rural clinic in Benslimane with children older than 6 months were approached.

Oral informed consent was provided and a questionnaire on ANC filled. ANC was defined as done if the mother attended at least once the antenatal clinic. Logistic regression was used to determine independent risk factors for non-attendance to antenatal visits.

Results
In the multivariate analysis, being uneducated was strongly associated with not attending any antenatal visit (OR 37, 95%CI 13-107). Living in a rural area was also an independent risk factor for non-attendance (OR 4.3, 95%CI 1.5-12.5), as was the parity (OR 1.5, 95%CI 1.1-2.1 per unity increase of parity).

Conclusion
Adverse socio-economic factors are an important barrier to antenatal care in women from Rabat and outskirts, leaving mothers and children from poorer families in higher risk of perinatal morbidity. Programmes should be implemented to detect households in risk of exclusion and to promote and facilitate their access to medical care.
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STUDY OF THE IMPACT OF AN OUTREACH ON THE EXCLUSIVE BREASTFEEDING AT THE AGE OF 6 MONTHS
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Background and Aims
Breast milk provides the ideal nutrition for infants. It has a nearly perfect mix of vitamins, protein, and fat -- everything your baby needs to grow. And it’s all provided in a form more easily digested than infant formula. Breast milk contains antibodies that help your baby fight off viruses and bacteria. In our country, the rate of exclusive breastfeeding is not sufficient yet.

The aim of the study is to show that the use of a support counseling in breastfeeding can increase its duration

Method
Comparative prospective study from November 2012 to April 2013 on 400 women who delivered at the maternity Souissi Rabat. Divided into two groups one of which received support counseling AM. Moms We followed for a period of 6 months. The primary outcome studied was breastfeeding rates.

Results
A 6 month breastfeeding rate was 79% against 58% in the control group (P<0.00), with an exclusive breastfeeding rate of 58% in the study group and 19% in the control group (p = 0.000). 36% of women gave formula milk versus 63% in the control group, no woman has given the verbena in both groups.

Conclusion
Support counseling can have an impact on the duration of breastfeeding by increasing the duration and especially the duration of exclusive breastfeeding. Indeed this support has improved some practices of mothers in breastfeeding as early addition of other liquids.
PLACENTAL INTERRUPTED FEEDING SYNDROME (PI-FEEDING SYNDROME) IN PRETERM INFANTS

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Background and Aims
According to previous literature, amino acid (AA) early intake in preterm infants may influence the metabolism of phosphorus and calcium. The aim of our study is to analyze if AA, calcium and phosphorus intake in preterm infants is in accordance to recommendations and to evaluate the influence of AA intake in these electrolytes homeostasis.

Method
Retrospective study that included all preterm infants (birth weight<1500g) who received parenteral nutrition (PN) between September 2014 and September 2015. Infants were divided into two groups according to AA intake: low (<3g/AA/kg/day) and high (>=3g/AA/kg/day). Phosphate and calcium plasma concentrations during the first week of life were evaluated.

Results
Fifty-one preterm infants received PN. 23.6% (n=12) were excluded for not presenting phosphate plasma concentration data in the first week of life.

Mean phosphate intake was 1 mmol/L and mean calcium intake was 2.8 mEq/L.

The incidence of hypophosphatemia (P<5 mg/dl) and hypercalcemia (Ca>11,2 mg/dl) was:

<table>
<thead>
<tr>
<th>AA intake groups</th>
<th>Number of children: % (n)</th>
<th>Hypophosphatemia with hypercalcemia: % (n)</th>
<th>Hypophosphatemia with normocalcemia: % (n)</th>
<th>Normophosphatemia with normocalcemia: % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>79,5 (31)</td>
<td>13 (4)</td>
<td>80,5 (25)</td>
<td>6,5 (2)</td>
</tr>
<tr>
<td>Low</td>
<td>20,5 (8)</td>
<td>0 (0)</td>
<td>12 (1)</td>
<td>88 (7)</td>
</tr>
</tbody>
</table>

Conclusion
Mean phosphate intake (1 mmol/L) was lower than recommendations (1,3 mmol/L).

A high number of patients didn’t have phosphate plasma concentration data. The group of infants who received higher AA intake showed a higher incidence of hypophosphatemia and hypercalcemia, which was consistent with previous literature.
ANALYSIS OF TOTAL PARENTERAL NUTRITION (TPN) PRESCRIPTIONS IN A NEONATAL INTENSIVE CARE UNIT (NICU)

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**Background and Aims**

To assess TPN prescriptions within a NICU in a third-level hospital and to propose improvement measures.

**Method**

Retrospective study that included all infants that received TPN in the NICU between September 2014 and September 2015. Content of macronutrients, electrolytes, vitamins and minerals prescribed was analyzed and compared to Guidelines (ESPEN, SEON, SEFH).

**Results**

Seventy-six infants were included. We found that macronutrients, hydrosoluble vitamins and minerals input was in accordance to recommendations in all cases. As regard to liposoluble vitamins, input was below recommendations in all cases. The median of nutrients provided and the percentage of children that received recommended nutrient input are shown in the table:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Median input</th>
<th>% of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>2.85 g/kg</td>
<td>100</td>
</tr>
<tr>
<td>Lipids</td>
<td>2.25 g/kg</td>
<td>100</td>
</tr>
<tr>
<td>Amino acids</td>
<td>10.17 g/kg</td>
<td>100</td>
</tr>
<tr>
<td>Hydrosoluble vitamins</td>
<td>1.5 mL/kg</td>
<td>100</td>
</tr>
<tr>
<td>Liposoluble vitamins</td>
<td>1 mL/kg</td>
<td>0</td>
</tr>
<tr>
<td>Minerals</td>
<td>1 mL/kg</td>
<td>100</td>
</tr>
<tr>
<td>Calcium</td>
<td>1.61 mEq/kg</td>
<td>77</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.38 mEq/kg</td>
<td>70</td>
</tr>
<tr>
<td>Phosphate</td>
<td>0.73 mmol/kg</td>
<td>11</td>
</tr>
</tbody>
</table>

**Conclusion**

The analysis showed that TPN prescriptions were in accordance to guidelines in most cases. The improvement proposals were:

1- To use omega-3 enriched lipids instead of LCT regular emulsions because of their effect reducing the risk of severe forms of retinopathy and cholestasis.
2- To increase phosphorus input, keeping a calcium/phosphate relation of 1.3:1, since birth.
3- To increase liposoluble vitamin input to 4ml/kg/day.

All proposals were accepted.
THE EFFECT OF MOTHER’S PRE-PREGNANCY WEIGHT AND GESTATIONAL WEIGHT GAIN ON FULL TERM NEWBORN BILIRUBIN LEVELS

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Background and Aims
Newborn jaundice is caused by several factors dependent on both the mother and baby. This study investigates the effect of mother’s pre-pregnancy weight and gestational weight gain on full-term newborn bilirubin levels in the first 15 days.

Method
The study included 208 newborns and their mothers that lacked any risk factor concerning jaundice, dependent on the mother and baby. The study recorded mothers’ pre-pregnancy height, weight, body mass index (BMI), gestational weight gain as well as newborn weight at birth, hematocrit levels at day 2 and total serum bilirubin levels at days 2, 5 and 15. Based on Institute of Medicine’s (IOM) “Gestational Weight Gain Guidelines of 2009”, newborns were separated into 3 groups: mothers who gained weight within the recommended limits, those who gained more and those who gained less.

Results
The hematocrit level of babies whose mothers gained more weight than recommended was significantly higher compared to the other groups (p < 0.05). The bilirubin level measured on day 5 of babies whose mothers gained more weight than recommended was significantly higher than those mothers who gained less weight than recommended. Similarly, bilirubin level measured on day 15 of babies whose mothers gained more weight than recommended was significantly higher than those mothers who gained less weight than recommended and those who gained weight within recommended limits (p < 0.05).

Conclusion
Conclusively we found that the mother’s pre-pregnancy BMI and gestational weight gain had an effect on the bilirubin level in the first 15 days of the baby.
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GROWTH RESTRICTION ACCUMULATES DURING NEONATAL STAY AND IS FOLLOWED BY DELAYED CATCH UP IN FORMER EXTREMELY LOW BIRTH WEIGHT NEONATES

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Background and Aims
Since growth restriction and poor catch-up growth in preterm infants are associated with long-term consequences, we aim to describe growth patterns in the PREMATCH cohort (1) (2000-2005, extremely low birth weight (<1000g), ELBW; n=140) throughout childhood.

Method
Growth characteristics (weight (W), height (H), head circumference (HC)) (1) were collected at birth, discharge, 9 months and 24 months and at PREMATCH assessment (mean age 11.8 [9-15] years). Data were converted to Z-scores (2) if all time points were available (n=58-80) and assessed by repeated measure ANOVA.

Results
Mean Z-scores at birth (W, H, HC) were -0.9, -0.7 and -0.4. Subsequent catch-up takes time and is not (yet) achieved at PREMATCH assessment (Figure 1). All mean Z-scores were statistically different between these time points. Z-scores in small for gestational age (SGA, n=29) cases were obviously significantly lower compared to appropriate for gestational age (AGA, n=51) at birth, with subsequent disappearance of differences because of poorer Z-scores in AGA cases.

Conclusion
Growth restriction accumulates in ELBW neonates during neonatal stay and is followed by delayed catch up, resulting in mean Z-scores still below 0 (reference) at latest assessment. Former ELBW neonates have difficulties reaching their growth potential, irrespective of the growth at delivery.

This study was supported by the "Agency for Innovation, Science and Technology in Flanders (IWT) through the “SAFEPEDRUG” project (IWT/SBO 120033).

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MATERNAL CHARACTERISTICS DURING PREGNANCY AND INFANT BODY COMPOSITION
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Background and Aims
Maternal characteristics during pregnancy affect offspring weight and future risk of obesity and its metabolic consequences. The study aim was to determine the relationships between maternal pre-pregnancy weight status, pregnancy weight gain, physical activity and neonatal body composition, which confers additional information than weight alone.

Method
Skinfold measurements were performed in 101 healthy postpartum women and their neonates born at Sheba Medical Center, in order to assess neonatal body composition. Maternal data collected included demographic factors, pre/late-pregnancy height, weight, and physical activity during pregnancy. Newborn data included gestational age, sex, birth weight, birth length, and measurements of skinfold thickness for assessing body composition. Correlation analyses were performed.

Results
Seventy-three percent of mothers had a normal weight status before pregnancy. The rate of overweight and obesity was 21% and 6%, respectively. One-third of mothers reported performing the recommended amount of physical activity during pregnancy.

Weak positive correlations were found between maternal gravidity/parity and newborn weight percentile (r=0.27 and 0.29, respectively, p<0.01). Negative correlations were found between maternal age, neonatal fat percent (r=-0.22, p=0.02), and between the amount of exercise performed in pregnancy and neonatal fat percent (r = -0.20, p = 0.05). No significant correlation was found between maternal pre-pregnancy weight, overweight status or weight gain during pregnancy and various neonatal anthropometric measures or body fat.

Conclusion
Few maternal factors were found to correlate with neonatal fat percent, though correlations were weak: gravidity and parity, maternal age, and only one modifiable factor- the amount of physical activity during pregnancy.
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IRON STATUS OF INFANTS OF DIABETIC MOTHERS
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Background and Aims
The aim of our study was to assess iron status of newborns of diabetic mothers.

Method
In a case-control retrospective study, twenty (20) newborns divided into two groups (Group 1: newborns of diabetic mothers, Group 2: newborns of healthy mothers), were recruited after parents consent at the Mother and Child Hospital of Tlemcen. The evaluation was conducted through a standardized questionnaire and blood sampling for determining biochemical parameters of iron status (serum iron, serum ferritin and CRP).

Results
CRP values were normal (<6 mg / l) in all newborns. Iron and ferritin levels were significantly lower in newborns of diabetic mothers (NDM) compared with controls (P = 0.001 and 0.03 respectively). Moreover, 30% of NDM had decreased ferritin levels (<25 ng / ml).

Conclusion
Iron status of NDM is suboptimal.
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EFFECT OF FORTIFICATION ON THE ANTIOXIDANT STATUS OF PRETERM INFANTS
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Background and Aims
Human milk is the preferred feeding for all infants, although supplementation with human milk fortifiers is required to meet the nutritional needs of premature newborns. We hypothesized that feeding mother’s milk with added fortifier would affect redox status. The aim of our study was to analyze the effect of breast milk fortification on the antioxidant status of preterm infants.

Method
The antioxidant capacity of 40 plasma samples from 10 preterm infants breast milk fed (before and after fortification), 10 preterm infants fed with a preterm formula, and 10 breastfed term infants, all hospitalized in the neonatology department at the Mother and Child Hospital of Tlemcen, was measured by assaying: ORAC, Vitamin C, and Catalase.

Results
A significant decrease in antioxidant activity was found in preterm infants fed with enriched compared to non enriched breast milk.

Conclusion
Breast milk fortification increases oxidative stress in preterm infants.
LONGITUDINAL CHANGES OF BONE ULTRASOUND MEASUREMENTS DURING THE FIRST YEAR OF LIFE

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Background and Aims
Previous approaches to bone development in neonatology and early childhood have emphasized the determinants of peak bone mass and their relationship to osteoporosis in later life. This suggests that the neonatal period is an important bone mineral accrual, and that peak bone mass may be correlated with subsequent skeletal health. The aim of this study was to obtain longitudinal changes of bone mineral density (BMD) in the first year of life.

Method
BMD was measured by quantitative ultrasound (QUS) (Sunlight Omnisense Premier) on right mid-tibia in the first 48 hours after birth and at the end of 1st, 3rd and 12th months of age. Low BMD was defined as bone speed of sound (SOS) Z score -1.5 for age, weight and sex.

Results
27% out of 73 newborns with a mean gestation age 39,3 ± 1,2 weeks had a low and 72% normal BMD with a mean SOS 2871 and 3103 respectively. There was a rapid reduction in mean SOS in both groups at the end of third month (mean SOS 2868 and 2910) followed by stabilisation that lasts to the end of the first year of life (mean SOS 3190 and 3213) . Comparing first SOS between both groups were statistically different, but there was not any significant difference between the 12th month values.

Conclusion
Our study provides the evidence that bone SOS decreased until the end of third month and infants with low BMD in newborn period reach the SOS pears levels at end of the first year.
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OXIDATION-REDUCTION POTENTIAL IN THE MILK FROM MOTHERS OF PRETERM INFANTS

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Background and Aims

Health benefits of mother’s milk depend on the level of the total antioxidant capacity (TAC). In mother’s milk, the TAC should refer to the sum of activities derived from active enzymatic antioxidant systems (e.g. superoxide dismutase, catalase, glutathione peroxidase etc.), non-enzymatic antioxidants, such as vitamins C and E, and the presence of other bioactive factors (e.g. lactoferrin, uric acid etc.). Measuring oxidation-reduction potential (ORP) using RedoxSYS Analyzer may be an alternative to classic methods of measuring TAC.

We compared the results of OPR and ascorbic acid content in milk from mothers of preterm infants.

Method

Milk was obtained from ten mothers of preterm infants (gestational age 28-36 weeks; birth weight 900-2,470 g). Milk samples were obtained within the first 4 days after delivery (colostrum), from day 4 to two weeks (transient), and 6 weeks and later (mature milk). Static oxidation-reduction potential (ORP) of milk from mothers of preterm infants was measured using RedoxSYS Analyzer (Luoxis Diagnostics, Englewood, CO). Ascorbic acid content was measured in milk samples and results were expressed as mg/l. Procedure suggested by the manufacturer was used (Reflect quant® ascorbic acid test for reflectometerRQflex®, Merck KGaA, Germany, 2006).

Results

There are similarities in the results of OPR and vitamin C concentration in colostrum, transient and mature milk from mothers of preterm infants.

Conclusion

Vitamin C concentration influenced the value of OPR most.

This work was supported by Grants 173014 and 43004 by the Ministry of Education, Science and Technological Development of the Republic of Serbia.
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SILVER RUSSELL SYNDROME AND SGA CHILDREN - WHAT IS THE DIFFERENCE BETWEEN BIRTH DATA?
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3, Sosnowiec,
4, Katowice,

Background and Aims
Silver-Russell syndrome (SRS) is a heterogenous congenital imprinting disorder associated with hypomethylation of ICR1 domain in chromosome 11p15.5 (ICR1hm, 35-65% patients), or maternal uniparental disomy of chromosome 7 (mUPD7, 5-10% cases). SRS children are characterized by intrauterine and postnatal growth retardation, relative macrocephaly, triangular face and body and/or face asymmetry.

Method
86 SRS patients (71 with ICR1hm, 15 with mUPD7) were diagnosed and followed in one centre, and compared to 30 SGA patients (Small for Gestational Age). Birth parameters were standardized accommodating gestational age and expressed as SDS scores.

Results
Mean body weight and length at birth were significantly smaller in ICR1hm than in mUPD7 and SGA groups (-2.9±1.1 vs. -2.3±1.0 vs. -2.4±0.8 and -1.8±1.5 vs -1.0±1.1 vs. -0.9±1.1 SDS). Head circumference was the smallest in SGA comparing to ICR1hm and mUPD7 groups (-1.9±1.0 vs. -0.7±1.1 vs. -1.0±0.8 SDS). Relative macrocephaly at birth was observed only in ICR1hm group. Difference between head and chest circumference was smaller in SGA children (2.4±2.0 cm), but greater in ICR1hm and mUPD7 groups (5.7±3.0 cm vs. 5.1±1.5 cm).

Conclusion
1. The difference between head and chest circumference is specific for SRS newborns regardless of the (epi)mutation.
2. Relative macrocephaly occurs only in ICR1hm patients, not being a diagnostic criterion for mUPD7 patients.
3. Non-syndromic SGA children present lesser birth weight and length deficits and disproportions between head circumference and remaining anthropometry are less apparent comparing to SRS patients.
Background and Aims
At no point during a woman’s life is good nutrition more important than during her reproductive years as her dietary choices affect not only her health but also that of her child. Delta Healthy Sprouts is a randomized, controlled, comparative trial testing the impact of two Maternal, Infant, and Early Childhood Home Visiting programs on health behaviors of mothers and their infants residing in the rural Mississippi Delta.

Method
Usual maternal dietary intake was calculated based on three 24-hour gestational dietary recalls. Descriptive statistics for macro- and micronutrients of interest were calculated. Canonical and stepwise discriminant analysis were used to explore associations between dietary intake and adverse infant birth outcomes – premature birth, low birth weight, and small and large for gestational age.

Results
Based on median amounts for 54 pregnant participants, at least half the maternal diets met recommendations for total fat, cholesterol, folate, iron, and vitamin D. However, less than half the maternal diets met recommendations for saturated fatty acids, fiber, sodium, calcium, vitamin C, or choline. Discriminant analysis yielded potential associations between lower optimal maternal nutrition and premature birth, low birth weight, and small for gestational age infants. Conversely, higher optimal maternal nutrition was associated with large for gestational age infants.

Conclusion
Exploratory analyses revealed that lower optimal maternal nutrition during gestation was associated with some, but not all, adverse infant birth outcomes in this cohort of rural, Southern, primarily African American women.

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Neonatal & Prematurity

172 EARLY DISCHARGE OF PREMATURE INFANTS
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Background and Aims
Since 2002 parents of prematurely born children are taught to give nasogastric tube feeding (NTF) in our hospital. When monitoring of vital parameters is no longer necessary, but full oral feeds have not yet been accomplished, earlier discharge from hospital is possible. Aim of this study was to evaluate duration of NTF at home, complications and parental satisfaction.

Method
Children <37 weeks gestational age (GA), discharged between February 2014 and June 2015, with NTF, were included in a prospective cohort study. Exclusion criteria: syndromal anomalies, asphyxia with neurological sequelae and (psycho)social problems. Duration of NTF at home, number of rehospitalizations or complications (e.g. aspiration pneumonia) and parental satisfaction were evaluated.

Results
33% (n=104) of 312 premature infants were discharged with NTF, of whom 93% were included (Figure 1). Median duration of NTF at home was 8 days (range 0-161 days). Duration of NTF according to GA is shown in Figure 2.
No NTF related complications or readmissions were noted.
94% of parents regarded this procedure as safe and would repeat it in future if necessary.
Conclusion
Earlier discharge (median duration of NTF at home 8 days) of premature children with NTF is considered to be safe and results in high satisfaction rates in parents. This could become the standard of care. A shorter admission time is beneficial for the hospital admission capacity and is financially favorable.
Neonatal & Prematurity

THE INFLUENCE OF NEONATAL DIET WITHOUT COW’S MILK PROTEINS ON THE DEVELOPMENT OF FOOD ALLERGIES IN CHILDHOOD

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Background and Aims
The clinical signs of cow’s milk allergy (CMA) and diagnostic measures in the neonatal period are nonspecific. CMA in the neonatal period is associated with other food allergies (FA) occurring later in life. The aim of the study was to analyze the influence of the diet without cow’s milk proteins (CMP) in newborns with clinical signs of CMA on the occurrence of FA in childhood.

Method
The medical documentation of infants, hospitalized at the Department of Neonatology, University Children’s Hospital Ljubljana, between years 2002 and 2014, due to suspected neonatal CMA was retrospectively studied and answers from questionnaires at the age from 1 to 11 years were analyzed. The relations between type of milk (with/without CMP) in the neonatal period and appearance of FA in the postneonatal period were determinated.

Results
Ninety children were recruited to the study: from 31 children (34.4 %) with the diet without CMP, neonatal CMA was proved in 28 and 13 (41.9 %) developed FA (12 to egg, 1 to peanut). In the group of 59 children without the diet CMA was proved in 6 and FA appeared in 9 (15.3 %) (6 to egg, 3 to peanut). The difference between the groups was statistically significant (p<0.01).

Conclusion
The diet without CMP in the neonatal period did not prevent the development of FA in susceptible children. Hypersensitivity to one food allergen in the neonatal period provokes developmental changes in the intestinal mucosal tolerance to other food proteins that can lead to another FA in a susceptible individual.
Neonatal & Prematurity

The 12 MONTHS FOLLOW-UP OF THE GROWTH AND DEVELOPMENT OF 61 VERY LOW BIRTH WEIGHT INFANTS
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Background and Aims
To investigate the growth and development of very low birth weight infant in the first year after birth

Method
Sixty-one very low birth weight infant born in Obstetrical department and admitted to NICU in the West China 2nd University Hospital from 1st July 2013 to 30th June 2014 were followed up to 12 months. Growth data were collected each month before 6 months-old and every 2 months from 6 to 12 months-old. The DDST were done at 12 months-old after birth. Small for gestational age (SGA) defined as the birth weight <10th percentile compared to the same gestational age

Results
By weight, the incidence of small for gestational age infant was 44.3%. During the corrected age of 9-12 months, the incidence of underweight, wasting, stunting, and microcephalus were 4.9%, 6.6%, 6.6%, and 9.8%, respectively. The peak of WHZ and WAZ occurs before 4 months for corrected age, 8-12 months for HAZ and 8-10 months for HCZ. The peak of BAZ lies within 1 month. The risk factors of underweight, wasting, stunting or microcephalus were
SGA, asphyxia and pregnant hypertension. The incidence of abnormal DQ was 50.8%.

<table>
<thead>
<tr>
<th></th>
<th>n (%)</th>
<th>mean ± SD</th>
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</thead>
<tbody>
<tr>
<td>male</td>
<td>30 (49.19%)</td>
<td></td>
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<tr>
<td>female</td>
<td>31 (50.82%)</td>
<td></td>
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<tr>
<td>SGA</td>
<td>27 (44.3%)</td>
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<tr>
<td>AGA</td>
<td>34 (55.7%)</td>
<td></td>
</tr>
<tr>
<td>GA&lt;28w</td>
<td>6 (9.3%)</td>
<td></td>
</tr>
<tr>
<td>28w≤GA&lt;32w</td>
<td>42 (68.9%)</td>
<td></td>
</tr>
<tr>
<td>GA≥32w</td>
<td>13 (21.8%)</td>
<td></td>
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<tr>
<td>Birth weight (g)</td>
<td>1245 ± 174.5</td>
<td></td>
</tr>
<tr>
<td>Gestational age (w)</td>
<td>30.3 ± 1.8</td>
<td></td>
</tr>
<tr>
<td>twins</td>
<td>14 (23%)</td>
<td></td>
</tr>
<tr>
<td>singleton</td>
<td>47 (77%)</td>
<td></td>
</tr>
<tr>
<td>RDS</td>
<td>24 (39.3%)</td>
<td></td>
</tr>
<tr>
<td>asphyxia</td>
<td>13 (21.3%)</td>
<td></td>
</tr>
<tr>
<td>Severe asphyxia</td>
<td>2 (3.3%)</td>
<td></td>
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<tr>
<td>Pregnant hypertension</td>
<td>10 (16.4%)</td>
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</tr>
<tr>
<td>Pregnant DM</td>
<td>8 (13.1%)</td>
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</tbody>
</table>

**Conclusion**

Very low birth weight infants showed catch-up growth during the first 1 year after birth. The incidence of abnormal DQs are high and needed long time follow-up.
Neonatal & Prematurity

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CATCH UP GROWTH IN PRETERM INFANTS
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Background and Aims
To gain more insight into early postnatal factors associated with catch up growth in preterm infants.

Method
112 preterms (gestational age < 32 weeks) admitted to the VU university medical center NICU between 2007 and 2012 were followed up until 24 months corrected age.

Results
Mean weight, length and head circumference z-scores dropped from respectively -0.30, -0.12 and 0.21 at birth to -1.22, -2.12 and -1.42 at 6 weeks postnatal age and normalized to -0.32, 0.21 and 0.17 at 24 months corrected age.
In contrast to weight and head circumference, catch up growth in length (> 0.67 change in z-score) was not associated with early postnatal protein intake or duration of hospitalization.
However infants with a low calcium and phosphate intake in the first month of life had lower length z-scores at term age (mean difference 1.4 SD 95% CI 0.7 - 2.1 SD) and were less likely to catch up in growth before term age than infants with a higher intake (50% versus 85.3%, p 0.006).
Longer postnatal steroid administration was associated with less change in weight and length z-score between term age and 12 months corrected age (r -0.4, p < 0.01), but did not seem to impact head circumference growth.

Conclusion
Preterms in a resource rich setting primarily seem to compromise on growth in length during hospitalization. Nevertheless nearly all preterms catch up in growth by 24 months corrected age. Early postnatal events impact the timing and rate of catch up growth up to 12 months corrected age.
Infancy

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ASESSMENT OF VITAMIN D STATUS IN HEALTHY CHILDREN FROM BLIDA REGION, ALGERIA

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3Laboratory of metabolic and cellular Biochemistry- Bichat-Claude Bernard Hospital, Paris, Paris, France
4Service of Pediatrics- Ben Boulaid Hospital, Blida, Blida, Algeria
5Faculty of Medicine, Algiers, Algiers, Algeria

Background and Aims
Assess vitamin D status and know the impact of the current schema of vitamin D supplementation on the circulating levels of vitamin D in Algerian children.

Method
The study was conducted in Blida region (North of the Algeria) during the period from November 2007 to April 2008. Sampling focused on healthy children, aged between 1 and 23 months, recruited in the Ben Boulaid hospital paediatric services. Blood samples were taken on 150 children, among them 83% (n = 125) have been supplemented with vitamin D according to a schema currently designed in Algeria (a first intake of 200 000 IU at 1 month and a second intake of 200 000 IU at 6 months).

Results
The mean values of 25(OH) D are respectively of 49.45 ± 19.26 μg/L in 100 supplemented children with vitamin D and 29.86 ± 16.35 μg/L in 25 non-supplemented children with vitamin D. 86% of the supplemented children have normal circulating values of 25(OH) D (30-100 μg/L), however only 48% of children not fortified indicate normal levels of vitamin D. 4 out of 25 (16%) non-supplemented children with vitamin D have a severe vitamin D deficiency (25(OH) D <10 μg/L). None of the children who received vitamin D supplementation presents a severe vitamin D deficiency.

Conclusion
These results show that the schema of vitamin D supplementation (a first intake of 200 000 IU at 1 month and a second intake of 200 000 IU at 6 months) seems relatively efficient on the improvement of vitamin D status.
Background and Aims
Intervention trials to treat and/or prevent stunting (height-for-age z-score (HAZ)<−2)) are limited by the lack of objective markers other than anthropometrics to determine if interventions are effective. Fibroblast growth factor 21 (FGF21) is an endocrine signal of protein restriction that regulates metabolism and growth during periods of reduced protein intake. FGF21 may be useful in determining malnourished children’s responsiveness to nutritional intervention. We sought to determine the association between plasma FGF21 levels and linear growth in children receiving nutritional supplementation.

Method
120 underweight (weight-for-age z-score (WAZ)<−2)) and 56 healthy (WAZ>-1) children aged 6–12 months were enrolled from a slum in Dhaka, Bangladesh. Underweight children received 300kcal feeding supplements daily for 5 months or until reaching WAZ −1. Anthropometry was measured monthly for 12 months. FGF21 was measured in stored plasma from enrolment and month 5 using enzyme-linked immunosorbent assays. Linear regression was used to test for associations between baseline FGF21 and HAZ, and between 5-month change in FGF21 and concurrent changes in HAZ and WAZ.

Results
FGF21 was negatively associated with HAZ at baseline (p= 0.004) after adjustment for age and underweight status. Five-month change in FGF21 was negatively associated with height (p= 0.002) and weight (p< 0.001) change over the same period in underweight children who received supplementation.

Conclusion
Changes in plasma FGF21 were associated with height and weight change among underweight children. FGF21 should be further examined in a prospective study to support
use as a tool for identifying malnourished children likely to benefit from nutritional supplementation.
Infancy

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VIEWS OF FATHERS IN IRELAND ON BREASTFEEDING IN PUBLIC

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Background and Aims

Women who breastfeed in a supportive environment feel more competent when dealing with breastfeeding challenges, and are more likely to breastfeed for a longer duration \textsuperscript{(1)}.

This study aimed to determine the views of men in Ireland who had become fathers within the previous 6 months on breastfeeding in public.

Method

An image of a woman discreetly breastfeeding was shown in a postal survey. Fathers were asked to describe how they would feel if they saw a woman breastfeeding in public as she appeared in the image, and how comfortable they would feel if their own partner ever breastfed in public.

Results

Of the 583 respondents (42\% response rate), the majority (71.5\%, \textit{n}417) had a partner who initiated breastfeeding.

Most fathers (58.0\%, \textit{n}338) reported that they “wouldn’t think anything of it” if they saw a woman breastfeeding in public. Over a quarter (27.4\%, \textit{n}160) reported that they would feel respect for a woman breastfeeding in public, while one in eight (12.3\%, \textit{n}72) reported that they would feel uncomfortable and “wouldn’t know where to look.”

While most fathers (61.7\%, \textit{n}360) reported feeling completely comfortable with their partner breastfeeding in public, a third (32.9\%, \textit{n}192) reported that they would have some concerns, and 5.3\% (\textit{n}31) reported having a lot of concerns.

Conclusion

Whilst most fathers were indifferent to, or comfortable with, women unrelated to them breastfeeding in public, a significant minority had reservations about their own partner breastfeeding in public.

GROWTH AND TOLERANCE OF A ROUTINE INFANT FORMULA WITH VARIOUS DHA SOURCES FED TO TERM INFANTS

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Background and Aims

Docosahexaenoic acid (DHA) is a component of human breast milk and commonly added to infant formula. Use of infant formula with adequate amounts of DHA sourced from DHA-rich single cell algal oils is related to visual and cognitive development in term infants. Recently, an alternative DHA-rich oil became available. The objective of this study was to establish that an investigational cow’s milk-based formula with an alternative DHA source (DHASCO-B) is well-accepted, tolerated and supports typical growth in healthy, term infants.

Method

In this multi-center, double-blind, randomized, controlled, parallel-group, prospective study, infants received one of two formulas: marketed, routine infant formula with the current DHA source (DHASCO) (Control, n=182), or an investigational formula with an alternative DHA source (DHASCO-B, n =172). The primary outcome for this study was growth rate from 14 to 120 days. Growth rates were analyzed by gender using ANOVA. Parental 24-hour recall of formula intake, stool characteristics, fussiness, and gas were also evaluated.

Results

There were no group differences in infant demographic or anthropometric characteristics at enrollment or study completion rate. No significant differences were observed for weight, length, head circumference growth rates by gender from 14 to 120 days. No group differences were detected in the parental-reported fussiness, gassiness, or mean stool frequency/consistency during the study period.

Conclusion

Results of this study demonstrated the investigational formula was safe and well-tolerated when fed to healthy term infants from 14 to 120 days of age.
Infancy

FOOD CONSUMPTION, WEIGHT AND MARTIAL STATUS IN INFANTS AGED 15 TO 36 MONTHS IN THE WEST ALGERIA: A PRELIMINARY STUDY
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³Danone, Danone Nutricia, Algiers, Algeria
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Background and Aims
Anemia, whose primary cause is iron deficiency, is defined by a decrease in hemoglobin to a lower limit threshold which varies with age and sex. The aim of this study was to determine weight and martial status and food consumption in infants.

Method
Infants (n = 22; Girls/Boys: 9/13), with a mean age of 27±5 months, were recruited. Weight, height, socioeconomic status (SES) and food consumption were estimated. Hemogram, ferritin and C Reactive Protein (CRP) were evaluated.

Results
According to the IOTF classification, thinness represented 4%, normal-weight 77% and overweight/obesity 19%. Total energy intake was consistent with recommendations. Protein and carbohydrates intakes were high, while that of fats was reduced. Iron deficiency intake (<7g) was noted (54%). Nine infants presented a mean value of hemoglobin. Anemia concerned 59% of children, 11 children with mild anemia and 2 children with moderate anemia. Iron deficiency, defined according to the mean corpuscular volume (MCV<70μ³) and ferritin <12μg/L was observed in one infant, and that defined by a MCV<70μ³ alone was noted in four infants, or ferritin<12μg/L) only in 6 infants. Ferritin levels represented 39.3±33.1 μg/L compared to usual value (12μg/L), and CRP value was normal. No relationship was observed between SES and normal or anemic infants.

Conclusion
These preliminary results show that more than half of infants have iron deficient diet, and present anemia. To prevent iron deficiency, it is important that parents know diversify feeding of their children, ensuring a balanced diet.

No conflict of interest concerning this study. This work was partly supported by Danone Nutricia.
Infancy

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A PREDICTIVE IN VITRO MODEL FOR STUDYING THE QUALITY OF INFANT NUTRITION
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Background and Aims
To ensure appropriate growth and development of infants, it is important to evaluate the nutritional quality of infant feedings. The same applies for evaluating oral pharmaceutical dosage forms, as those are often manufactured for adults and subsequently manipulated (e.g. crushed) in the daily nursing practices. Specifically for the pediatric population, it is difficult to appropriately evaluate pharmaceutical dosage forms or nutritional products, due to ethical constraints.

Appropriate evaluation should include age-related changes in gastrointestinal conditions, since these impact digestion and uptake of nutrients and pharmaceutical dosage forms.

Method
We describe the development, validation and application of a dynamic, computer controlled in vitro system mimicking the conditions in the upper gastrointestinal tract of neonates, infants and toddlers: TIMpediatric.

Next, one pharma and one nutrition example will be highlighted:

Two frequently applied pharmaceutical compounds (Diclofenac and Ezomprazole) were administered to the TIM system, and their availability for absorption was measured, with i) different age relevant meal matrices and ii) manipulated (crushed) or not.

Two functional ingredients were studied in TIM, cross-linked- and natural caseinate, with or without a meal matrix, expected to affect digestion and coagulation behavior.

Results
Results will describe the impact of drug product manipulation, drug-rug interactions and how food matrices influence the digestibility.

Conclusion
The TIMpediatric model allows the age-specific and dynamic simulation of the stomach and small intestine; the intake of age-relevant type of food; the intake of pharmaceutical dosage forms with or without manipulation and measurement of intestinal absorption (bioaccessibility) of nutritional compounds.
Infancy

EFFECTS OF A LACTOFERRIN AND PREBIOTICS CONTAINING FORMULA ON STOOL CHARACTERISTICS OF HEALTHY TERM INFANTS
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3Maternal and Child Health Hospital of Liuzhou City, Maternal and Child Health, Liuzhou, China

Background and Aims
To assess the effects of a lactoferrin and prebiotics mixture (galacto-oligosaccharide/Fructo-oligosaccharides) supplemented infant formula on body growth and fecal microbiota of healthy term infants.

Method
Healthy term infants (≤ 4 weeks old) were enrolled and assigned to breast-feeding (BF) group or formula-feeding (FF) group. Infants allocated in BF group were exclusively breast-fed, while those in FF group were exclusively fed with a lactoferrin (78mg/100g) and prebiotics (1g/100g) containing formula. Reported adverse events, body weight and head circumference were recorded at 6 weeks and 12 weeks of age. Meanwhile, fecal samples were collected and characteristics of the stools were recorded. Bifidobacterium and Lactobacillus in infant stools were quantified.

Results
A total of 54 infants (25 in FF group, 29 in BF group) completed the study. No significant difference in daily weight gain was observed between FF and BF groups (33.56±7.03g vs. 31.18±6.91g, p=0.22). Infants in FF group had significant less frequent and firmer stools compared with those in BF group at 6 weeks of age (p<0.05). But there was no significant difference in stool frequency and consistency at the end of study. Stool Bifidobacterium and B. Longum amount in BF group were significant higher than those in FF group at 6 weeks of age (p<0.01), however, no significant difference remained after about 8 weeks of intervention.

Conclusion
The lactoferrin and prebiotics supplemented formula was safe and nutritionally adequate for growth of infants. As the infants grow up with nutritional intervention, the difference in fecal characteristics and bifidobacteria under two feeding methods was diminished.
Infancy

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A QUALITY STUDY OF BREAST MILK: EX-SMOKERS BREAST MILK SHOWED LOSS OF FUNCTIONALITY WITH LESS CHOLESTEROL AND SMALLER SIZE OF apoA-I THAN THOSE OF NON-SMOKERS

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Background and Aims
It has been well known that breast milk is the best nutritional source for infant neonate growth. However, there has been no report about quality of breast milk from ex-smokers (11 year smoking for daily 11 cigarette) and nonsmokers.

Method
We compared compositional and functional analysis in terms of lipid content and zebrafish embryo survivability between breast milk and commercially available powder formula.

Results
In lipid content, non-smoker’s breast milk showed 4.3-fold and 5.4-fold higher cholesterol content than smokers and powder formulae, respectively. Powder formula showed remarkably higher glucose and TG level than breast milk. Microinjection of breast milk (50 nL) into zebrafish embryo resulted 59% and 39% of survival for non-smoker and smoker, respectively, while powder formulae injection caused 35% of survival. Cholesterol content in breast milk was positively correlated with embryo survivability, suggesting that cholesterol content is essential to facilitate development. Smokers breast milk contained smaller size of apoA-I band (24. 4 kDa) in breast milk than those of non-smokers (25.1 kDa), suggesting that putative modification was occurred in the smokers apoA-I. Immunodetection with apoA-I C-terminal antibody failed to detect apoA-I band in the breast milk, suggesting that cleavage of apoA-I was occurred in C-terminus.

Conclusion
In conclusion, more cholesterol content in breast milk is correlated well with higher embryo survivability. Higher apoA-I content with intact full length size are important to maintain better quality of breast milk. Smoker’s breast milk showed lower cholesterol content and smaller apoA-I with lowest embryo survivability.
Infancy

ASSOCIATION BETWEEN EARLY INTRODUCTION OF JUICE DURING INFANCY AND
CHILDHOOD CARDIOMETABOLIC RISK PROFILE AMONG CHILDREN BORN FROM
MOTHERS WITH GESTATIONAL DIABETES MELLITUS

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Background and Aims
Offspring born from mothers with gestational diabetes mellitus (GDM) are at high risk of developing an altered cardiometabolic risk profile later in life. Given that early nutrition could predict later health of children, this study investigated whether timing of juice introduction was associated with cardiometabolic risk in children exposed to GDM in utero.

Method
A total of 69 children born between 2003-2010 and exposed in utero to GDM were recruited between 2012-2015. Timing of juice introduction was retrospectively collected for 43 children. Fasting lipid and glycemic profiles, weight, height, waist circumference and body composition were measured. Pearson correlations were performed to study the association between timing of juice introduction and the cardiometabolic risk profile. Children were divided into two groups according to the median of timing of juice introduction (9 months old) and the cardiometabolic risk profile was compared.

Results
Mean age was 6.9±2.4 years. Mean age of juice introduction was 8.8±2.7 months. Timing of juice introduction was negatively correlated to triglycerides (r=-0.42, p=0.025). Children introduced to juice ≤9 months had higher plasma triglyceride values (p=0.035) and tended to consume more added sugar (p=0.078) than children introduced to juice >9 months. Timing of juice introduction tended to be negatively correlated with added sugar consumption (r=-0.27, p=0.083).

Conclusion
Early exposure to juice is associated with an altered lipid profile and tends to be associated with increased added sugar consumption among children exposed to GDM.
Infancy

185 EFFECTS OF BREASTFEEDING ON GROWTH AND DEFCATION AMONG 0-6 MONTHS-OLD INFANTS

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Background and Aims
Stool number and pattern in children can show differences depending on factors such as age and feeding type. The aim of this study was to investigate the effect of breast feeding on growth and defecation patterns among 0-6 months-old infants.

Method
The study was carried out at Well Child Clinic of the Istanbul Medical School in Istanbul University, between June 2010 and January 2011 and included 100 infants aged 0-6 months. A structured questionnaire was filled about infant nutrition and defecation on the day when families arrived at the Well Child Clinic and infants’ anthropometric measurements were recorded. Data analyses were performed in SPSS 15.0 and SigmaStat 3.5 programs. Significance level was accepted as p<0.05 in statistical comparisons.

Results
Seventy four percent of infants defecated daily. Stool frequency of infants decreased with age and infants breast-fed in frequent intervals defecated more frequently (p<0.05). 83.6% of only breast-fed infants defecated daily, whereas 59% of breast-fed with additional nutrition/formula fed infants defecated daily (p=0.012). A positive relation was detected between total weekly amount of stool and number of weekly weight gain (p=0.050, R=0.272). More defecated infants gained more weights. Higher duration of breast-feeding in each session, higher number of weekly weight gain (p=0.016, R=0.337).

Conclusion
In conclusion, our results led us to think that defecation and growth patterns of infants aged 0-6 months show diversity according to the age and feeding characteristics.
Effectiveness of Feeding Interventions in Promoting Growth and Development Among Infants with Cleft Lip and/or Cleft Palate

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Background and Aims
Cleft lip and/or cleft palate (CLCP) is the most common congenital craniofacial abnormality, affecting 1 in 700 live births. Early feeding difficulty in infants with CLCP is a major concern and has been closely linked to failure to thrive. Various feeding interventions have been used to overcome these problems, including the use of modified feeding equipment and obturators.

To evaluate the effects of feeding interventions on nutritional status in infants with CLCP.

Method
Searches of electronic databases (PubMed/MEDLINE, the Cochrane Library, Scopus, and CINAHL) and hand-searching of relevant journals were undertaken to identify studies of CLCP feeding interventions. Two systematic reviews were selected after applying predetermined inclusion and exclusion criteria.

Results
There is weak evidence that breastfeeding may improve weight gain in infants with CLCP compared to spoon-feeding. No statistically significant differences in growth outcomes (weight, length and head circumference) were observed when squeezable feeding bottles, maxillary plates, or obturators were used, although squeezable bottles are easier to use compared to the rigid bottles. Squeezable bottles with specialized teats and nipples, disposable syringes without needle, and lactation education have been found to effectively promote normal growth and development in infants with CLCP, especially when used in combinations.

Conclusion
Feeding interventions do not appear to improve the growth outcomes of CLCP when implemented alone. Combination of various feeding interventions, such as breastfeeding, specialized feeding equipment, and lactation counseling, may successfully meet the nutritional needs and decrease the risk of failure to thrive in CLCP infants.

cleft lip, cleft palate, infant, feeding intervention, failure to thrive
Background and Aims

Background. The urban population generally have a higher economic levels and adequate health facilities, compared to rurals. Growth monitoring has the purpose for early detection of an abnormal growth, nutritional status monitoring and nutritional support, as well as early detection of diseases that underlies growth disorders.

Objective. The aim of the study was to determine the difference pattern of growth of healthy infants less than 1 years old who lived in urban areas dan rural areas.

Method

Methods. A prospective cohort study was conducted to 200 healthy infants from 2 primary health centre in urban and rural areas. We conducted 7 visits at 2-4-5-6-7-8 and 12 months old, and perform examination and anthropometric measurements of lengths, weights and head circumferences. The results of measurements was plotted into WHO grow chart standards 2006, then compared the growth pattern that occurred between the urban and rural areas. The data was analyzed using the one-way ANOVA with SPSS processing program data.

Results

Results. Two hundreds infants consists of 115 boys, with 98 infants from urban area. Subject from rural areas provide a growth pattern of body length in accordance with WHO standards. While in urban areas, provide the growth patterns of body lengths below the standards. For the growth pattern of body weights provide the same pattern both in rural and urban areas. The growth pattern of baby girl’s head circumference had a lower pattern in rural areas compared to urban area.

Conclusion

Conclusion. Infant’s growth pattern in rural area provide a better overview compared to in urban area.

Key words: growth pattern, healthy infants, rural, urban, WHO grow chart standards
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OBSERVATIONAL STUDY OF THE DIETARY MANAGEMENT OF CONSTIPATION IN CHILDREN FROM 1 TO 2 YEARS OLD. OBSERVATORY CONSTANCE: DESCRIPTION OF THE POPULATION, 1st RESULTS

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Background and Aims
30% of Young children are affected by constipation. 40% have symptoms from the first year of life. It is often badly diagnosed by doctors although it is critical to detect and treat the soonest in order to avoid occurrence of complications such as megarectum and anismus, extremely incapacitating on a day-to-day basis.

Describe the population of constipated children at the medical check-up of 12 months.

Method
Prospective and observational collection of clinical data regarding constipated children seen at the 12-months check-up by pediatricians

Results
484 young children (466 eligible) have been included by 90 pediatricians. On an average of 640 young children of 12 months, 68 (11%) suffered from constipation. Constipation has occurred at 7.3 months old on average. At 12 months, 54% already had a diet enriched with fibers according to the parents’ declaratory and 42% of them had already received a treatment. Children have rare stools (less than 1 per day for 77% of them) and often with pain (60%) and apprehension (50%) when defecating. Emission of sizeable stools affected 36% of the patients, showing the constitution of a megarectum. However, the presence of fecaloma or anal fissures affected only 11% and 16.8% of them respectively. Therefore, their quality of life was satisfactory with a QUALIN score of around 30.

Conclusion
Constipation affects 11% of children seen at the 12-months check-up. It starts around the age of 7 months and already shows severe characteristics. It is therefore important to screen for constipation in order to avoid the occurrence of complications.

Infancy
THE LONG-TERM EFFECTS OF BREASTFEEDING ON CHILD OVERWEIGHT AND OBESITY
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Background and Aims
This study exploits data from the KANC birth cohort study sample of children residing in Kaunas, Lithuania, to examine the effect of breastfeeding on child overweight/obesity, and modification of this association by the sedentary lifestyle.

Method
This nested case-control study included 1,489 children of 4–6 year’s age. The Body Mass Index (BMI) status for age was calculated and the risk factors for being obese were estimated. The breastfeeding and sedentary behaviour effect on obesity were examined using multilevel models, adjusting for relevant covariates.

Results
Even 51% of all children were breastfeed 9 months and longer; 6.8% at the age of 4–6 has overweight (> 90th percentile) and 5.4% were obese (>97th percentile). The prevalence for being obese for breastfeeding 1 month and lesser was 9.5%, for 2-6 months it was 7.8%, and for 7 and more months – 6.8%. Sedentary behaviour 3 hours per day and longer was associated with increase of obesity. Odds ratios (OR) of obesity were lower for children breastfeed 3 months and longer who less than 3 hours per day spend by TV or computer (OR 0.52; 95% CI 0.31–0.89). Children who were more sedentary had higher risk for obesity at 4–6 year’s age (adjusted OR 1.91; 95% CI 0.75–4.88).

Conclusion
Breastfeeding is associated with the decreased rates of obesity in the offspring at the 4–6 years. Health care professionals should strongly advise parents to reduce children sedentary behaviour to prevent obesity through childhood.

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An Innovative Infant Formula with Large, Phospholipid Coated Lipid Droplets Supports an Adequate Growth and is Well-Tolerated in Healthy, Term Infants


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8Amphia Ziekenhuis, Breda
9Isala Zwolle, Zwolle
10Nutricia Research, Utrecht

Background and Aims

Lipid droplets in human milk are on average 4 μm in diameter and surrounded by a native biological phospholipid-containing membrane. In contrast, standard infant formulae contain smaller lipid droplets (mode diameter of 0.3 – 0.5 μm) without such natural membrane. This MERCUURIS study evaluated safety and tolerance of an innovative infant formula comprising large, phospholipid coated lipid droplets (mode diameter of 3 - 5 μm; NUTURIS®).

Method

Infants were randomized to receive until 17 weeks of age 1) a standard formula comprising a vegetable oil blend, or 2) an innovative formula with NUTURIS® and replacement of palm oil by 48% milk fat. Breastfed infants were included as reference group. Safety was evaluated by equivalence analysis of weight gain per day within margins of +/- 3 g/d (primary outcome) and recorded number and type of (serious) adverse events, growth and gastrointestinal tolerance parameters.

Results

A total of 311 infants were enrolled of which 88 were breastfed. Equivalence of weight gain per day was demonstrated for the innovative formula compared to standard formula group (PP and ITT population), even when only selecting infants enrolled before 14 days of age, and compared to the breastfed reference group. No relevant differences were observed between formula groups in the reported secondary outcomes, including growth and tolerance parameters and number, severity or type of adverse events.

Conclusion

An innovative infant formula comprising large, phospholipid coated lipid droplets (NUTURIS®) and milk fat supports an adequate infant growth and can be safely used in healthy, term infants.
Infancy

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WEIGHT AND FEEDING ANOMALIES IN INFANTS - A CLINICAL CLUE FOR GENETIC SYNDROMES

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Background and Aims
The authors emphasize feeding anomalies in infants with genetic syndromes. Smith-Lemli-Opitz syndrome (SLOS) is autosomal-recessive inherited disorder including failure to thrive and multiple anomalies secondary to cholesterol synthesis impairment. Bardet-Biedl syndrome (autosomal-recessive inheritance) is characterized by obesity, retinal anomalies, polydactyly and mental disabilities.

Method
The authors present 2 infants with genetic anomalies implying nutritional status anomalies. First case: 6 week-old male infant admitted for feeding difficulties, craniofacial dysmorphism and genital ambiguity. Clinical exam: malnutrition (<3rd percentile), microcephaly, generalised hypotonia, micrognathia, syndactyly affecting toes 2 and 3 – bilateral foot, genital ambiguity. Second case: 5 month-old male infant admitted for breathing difficulties. Clinical exam: overweight (>95th percentile), polithelia, fingers anomalies (brachydactyly, postaxial polydactyly- bilateral foot, unilateral syndactyly affecting toes 5 and 6), hypotonia.

Results
In first case investigations revealed modified sterol profile (increased precursors cholesterol and hypocholesterolemia <30 mg%) confirming biochemically SLOS syndrome. Second case: the next generation DNA sequencing revealed a homozygous nonsense mutation in BBS12 gene (c.1063C>T, p.Arg.355). Treatment. First case received a high-cholesterol diet (250 mg/kg.body weight/day) and bile acids. Because of abnormal sucking reflex, a nasogastric feeding tube was used, but without weight improvement. Gastrostomy placement could also be considered. For second case, the authors used close supervision of hypocaloric diet with growth chart monitoring.

Conclusion
1. Weight and feeding anomalies could represent an important clinical feature for diagnosis of certain genetic syndromes, especially in infants. 2. Certain genetic syndromes represent, for clinician, a real challenge regarding the maintaining of nutritional status in normal range.
Infancy

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INCIDENCE OF MASTITIS IN THE NEONATAL PERIOD IN A TRADITIONAL BREASTFEEDING SOCIETY: RESULTS OF A COHORT STUDY
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Background and Aims
Mastitis is a painful problem experienced by breastfeeding women, especially in the first few weeks postpartum. There have been limited studies of the incidence of mastitis from traditionally breastfeeding societies in South Asia. This study investigated the incidence, determinants and management of mastitis in the first month postpartum, and its association with breastfeeding outcomes at four, and six months postpartum in western Nepal.

Method
Subjects were a sub-sample of 338 mothers participating in a larger prospective cohort study conducted in 2014 in western Nepal. Mothers were interviewed during the first month postpartum, and again at four, and six months to obtain information on breastfeeding practices. The association of mastitis and determinant variables was investigated using multivariable logistic regression and the association with breastfeeding duration using Kaplan-Meier estimation.

Results
The incidence of mastitis was 8.0% (95% confidence interval: 5.1% to 10.8%) in the first month postpartum. Prelacteal feeding (adjusted odds ratio 2.76, 95% confidence interval 1.03, 7.40) and cesarean section (adjusted odds ratio 3.52, 95% confidence interval 1.09, 11.42) were associated with a higher likelihood of mastitis. Kaplan-Meier estimation showed no significant difference in the duration of exclusive breastfeeding among the mothers who experienced an episode of mastitis and those who did not.

Conclusion
Roughly one in ten women experienced mastitis in the first month postpartum and there appeared to be little effect of mastitis on breastfeeding outcomes. Traditional breastfeeding practices should be encouraged, and the management of mastitis should be included as a part of lactation promotion.
Infancy

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METHODOLOGICAL DIFFERENCES IN MEASURING RATES OF EXCLUSIVE BREASTFEEDING IN NEPAL
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3, Dharan- Nepal,

Background and Aims
Measuring exclusive breastfeeding is a complex issue as rates can vary according to the duration and time of measurement, questions asked, infant’s age and definition used. This article reviewed the methodology of reporting exclusive breastfeeding in Nepal, and compared exclusive breastfeeding rates using data from a cohort study undertaken in Western Nepal.

Method
A systematic review was first conducted to review the studies published during 2000-2014. In our cohort study, 735 mother-infant pairs were recruited within the first month postpartum and followed up at fourth and sixth months.

Results
The majority of studies, including national surveys, tended to use the World Health Organization (WHO) recommended definition (only breastmilk with the exception of medicine and vitamin syrup), and the most common measurement period was ‘24-h recall’. The age of infant and recall period also affected the reported rates. Our data demonstrated that the exclusive breastfeeding rate at sixth month was 8.9% using the ‘recall-since-birth’ method but was 18.7% using the ‘24-h recall’ method. Substantial differences in rates were also found at first and fourth months.

Conclusion
In conclusion, current measurements of exclusive breastfeeding appeared to deviate from the WHO definition. The period of measurement was also inconsistent leading to over estimation. A common standard of reporting exclusive breastfeeding is clearly needed for evidence-based decision making.
Infancy

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FACTORS ASSOCIATED WITH THE PRACTICE OF BREASTFEEDING FOR MOTHERS WHO ATTEND THE DR. ROBERT REID CABRAL CHILDREN’S HOSPITAL IN SANTO DOMINGO, DOMINICAN REPUBLIC
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Background and Aims
Exclusive breastfeeding rates in the Dominican Republic are the lowest in all of Latin America. In Latin America 37.9% of mothers breastfeed exclusively for the first six months, while in the Dominican Republic the rate is only 7.8%. Breastfeeding is critically important for maternal and child health. Optimally breastfed children are 14 times more likely to survive than those who are not breastfed. The objective of this study was to describe the factors that limit or favor the practice of breastfeeding for mothers who attended the Robert Reid Cabral Children’s Hospital.

Method
A cross-sectional, descriptive, and observational study with a random sampling method was used to select 60 Dominican mothers over the age of 18 who live in Santo Domingo, Dominican Republic. Data was collected with a semi-structured interview questionnaire in July 2014. Qualitative and quantitative data was analyzed using SPSSv22.

Results
For this data set, the average length of exclusive breastfeeding was 2.34 months and average length of breastfeeding partially (child receives breast milk and food) was 7.36 months (close to national averages). Factors significantly associated with not practicing exclusive breastfeeding longer than 2 months included working full time (OR=5.7, p=.012), lack of correct information regarding breastfeeding (nutritional value of breast milk, OR=10.86, p=.0008), and lack of support. 87% (52/60) of mothers stated that they did not receive any breastfeeding support.

Conclusion
Breastfeeding support, correct information regarding breastfeeding, and work status were the factors significantly associated with exclusive breastfeeding for this sample. These factors should be targeted in culturally appropriate breastfeeding interventions.
Infancy

195 TRANSITION IN INFANTS - FROM MILK TO SOLID FOODS A QUALITATIVE JOINT INTERVIEW STUDY ON PARENTS EXPECTATIONS, NEEDS AND EXPERIENCES

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Background and Aims
Focus on infant nutrition has in many years been on breastfeeding but a successful transition to solid foods is just as important and may influence infants’ well-being and development and prevent eating problems on short and long term. As primary care givers parents have a central role in the transition. But parents receive conflicting information from different sources and there is a mismatch between governmental guidelines on infants’ transition to solid foods and what parents actually do. The aim of the study is to describe parents’ expectations, needs and experiences according to the infant’s transition to solid foods.

Method
A phenomenological approach will be used in qualitative joint interviews to describe parents’ life world experiences in the transition period. First time parents are interviewed together twice, first when the child is 4-5 months and has not started solid foods and second at 7-8 months when the transition is expected to be well underway. Meaning condensation is used as method of analysis. The interviews are conducted in two Danish municipalities in the autumn and winter of 2015/16.

Results
The preliminary results of the interviews will be presented and is expected to describe what first-time parents experience during the transition period and what guidance they may need to be able to facilitate a successful transition.

Conclusion
The results can be used to plan health promotion interventions aimed at improving the guidance for first time parents in order to help parents facilitate a successful transition from milk to solid foods.
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STUDY ON SERUM LEVEL OF 25-HYDROXY VITAMIN D AMONG CHILDREN AGED 6-23 MONTHS OLD IN POOR RURAL AREAS IN YUNNAN
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Background and Aims
To analyze the status of 25-hydroxy Vitamin D (25-OHD) among children aged 6-23 months old in rural areas in Yunnan and provide scientific references for making corresponding intervention measures.

Method
A total of 1220 children aged 6-23 months old by multi phase stratified cluster sampling were tested serum levels of 25-OHD by Chemiluminescence immunoassay (kit from DiaSorin Italy).

Results
There were 1196 qualified samples. Those with serious congenital liver, kidney, bone metabolic diseases were excluded. The overall level of 25-OHD was 21.64±8.16ng/ml. The detection rates of 25-OHD deficiency, insufficient, appropriate were 3.5%, 84.7%, 11.8%, no VitD Excessive. The overall prevalence rate of 25-OHD deficiency and insufficient was 88.2%, without statistical significance between sex or ages. There was statistical significance among 4 different rural areas (χ²=24.589, P=0.000). The rate of children whose insolation more than 1-hour was >95.2%, exposed rate on head and face accounted for 94.7%; Only 28.6% children added VitD agents. According to VitD knowledge survey, the rate of caregivers who heard of rickets was 26.1%, who thought the reason of rickets for lack of VitD or sun exposure was 1.2%, and only 12% caregivers knew that insolation can supplement VitD.

Conclusion
The prevalence of 25-OHD deficiency and insufficient among children aged 6-23 months old in rural areas in Yunnan is higher than that of other southern or even northern areas, which should become the intervention emphasis in children nutritional projects. Health Education of VitD nutrition knowledge need to be further strengthened. And caregivers need to be guided to add VitD agents timely to their children and increase activities outdoor.
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GROWTH CHANGES IN YOUNG CHILDREN WITH POOR WEIGHT GAIN AFTER A MULTIDISCIPLINARY APPROACH

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Background and Aims
It is important that children with poor weight gain (PWG) receive dietetic intervention as poor nutrition in early life has potential adverse effects on cognitive function and psychological well-being.

This study aims to determine changes in growth (weight and height) z-scores, calorie and protein intakes, over a six month period, in children less than two years who were referred by their primary paediatrician to either a dietitian only or dietitian as part of a multidisciplinary team.

Method
Retrospective data review of children seen between January 2012 and January 2014, by a dietitian only or dietitian as part of a multidisciplinary team. Data was analysed using SPSS 21.

Results
There were no significant differences in baseline characteristics between both groups (Table 1). There was an overall increase in weight z-scores (0.409 ± 0.904, p=0.009) and height z-scores (0.138 ± 0.928, p=0.439) in all children. Patients seen by the multidisciplinary team tended to have higher median increase in total calorie and protein intakes and better growth velocities than those who saw the dietitian alone (Table 2) (p > 0.05), including those with multiple co-morbidities (Table 3).
Table 1: Baseline characteristics of children seen by the multidisciplinary team or dietitian only

<table>
<thead>
<tr>
<th>Baseline characteristics</th>
<th>Multidisciplinary team (N = 13)</th>
<th>Dietitian only (N = 25)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age at first visit (months)</td>
<td>5.49 ± 4.92</td>
<td>9.18 ± 5.08</td>
<td>0.067</td>
</tr>
<tr>
<td>Initial mean weight z-scores at first visit</td>
<td>-2.54 ± 1.51</td>
<td>-2.26 ± 0.97</td>
<td>0.390</td>
</tr>
<tr>
<td>Initial mean height z-scores at first visit</td>
<td>-2.25 ± 1.77</td>
<td>-1.26 ± 1.19</td>
<td>0.108</td>
</tr>
<tr>
<td>Medical Issues</td>
<td>None 60%</td>
<td>25%</td>
<td>0.079</td>
</tr>
<tr>
<td></td>
<td>More than one 40%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>Proportion of population not meeting initial calorie requirements at first visit</td>
<td>5/10</td>
<td>15/17</td>
<td>0.613</td>
</tr>
<tr>
<td>Proportion of population not meeting initial protein requirements at first visit</td>
<td>5/10</td>
<td>5/17</td>
<td>0.057</td>
</tr>
</tbody>
</table>

Table 2: Differences in outcomes between multidisciplinary team and dietitian only intervention

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Multidisciplinary team (N = 12)</th>
<th>Dietitian only (N = 25)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance rate to offered follow up (%)</td>
<td>87.21 ± 14.49</td>
<td>80.21 ± 21.31</td>
<td>0.494</td>
</tr>
<tr>
<td>Proportion of population not meeting calorie requirements at final visit</td>
<td>4/12</td>
<td>5/14</td>
<td>1.000</td>
</tr>
<tr>
<td>Median (% difference in caloric intake (as compared to requirements) between first and final visits</td>
<td>8.5 (-12.9 to 56.7)</td>
<td>1.9 (-16.8 to 15.7)</td>
<td>-</td>
</tr>
<tr>
<td>Proportion of population not meeting protein requirements at final visit</td>
<td>0/12</td>
<td>2/14</td>
<td>0.483</td>
</tr>
<tr>
<td>Median (% difference in protein intake (as compared to requirements) between first and final visits</td>
<td>60.2 (-171.2 to 83.2)</td>
<td>87.7 (-197.9 to 180.6)</td>
<td>-</td>
</tr>
<tr>
<td>Average weight velocity (Δ z-score/month)</td>
<td>0.122 ± 0.242</td>
<td>0.044 ± 0.093</td>
<td>0.064</td>
</tr>
<tr>
<td>Average height velocity (Δ z-score/month)</td>
<td>0.067 ± 0.119</td>
<td>0.015 ± 0.177</td>
<td>0.572</td>
</tr>
</tbody>
</table>

Table 3: Differences in weight and height velocity of patients with multiple co-morbidities between multidisciplinary team and dietitian only intervention

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Multidisciplinary team (N = 9)</th>
<th>Dietitian only (N = 10)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average weight velocity for patients with multiple medical issues (Δ z-score/month)</td>
<td>0.716 ± 1.626</td>
<td>0.427 ± 0.715</td>
<td>0.487</td>
</tr>
<tr>
<td>Average height velocity for patients with multiple medical issues (Δ z-score/month)</td>
<td>0.699 ± 0.529</td>
<td>0.027 ± 1.211</td>
<td>0.563</td>
</tr>
</tbody>
</table>

Conclusion
Dietetic intervention, both alone and in a multi-disciplinary setting, results in improved nutritional intake and growth parameters. This emphasises the importance of appropriate selection of patients and utilisation of resources to achieve good outcomes in children with PWG and multiple co-morbidities.
Lean Body Mass Measurement as a Part of Dietitian Assessment in Infants with Cholestatic Liver Disease Before Liver Transplantation

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Background and Aims
Malnutrition is highly prevalent in infants and children with cholestatic liver disease (CLD). Evaluation of nutritional status of these children by anthropometry is difficult due to the presence of edema and ascites. We aimed to evaluate body composition by air displacement plethysmography (ADP) in infants with CLD as part of nutritional and overall assessment before liver transplantation at a pediatric tertiary hospital.

Method
Infants underwent full nutritional assessment by a dietitian that included history, dietary intake, anthropometry (weight, length, mid upper arm circumference and skin fold thickness) and ADP. Laboratory tests were extracted from medical records and Pediatric End-Stage Liver Disease (PELD score) was calculated.

Results
Fourteen infants aged 17.5 (±8) weeks (6/14 boys) were included in the analysis. Eleven infants (79%) had biliary atresia, one PFIC3 and two had CLD of unknown etiology. Mean z-scores for weight and length were -2.11±1.3 and -1.8±1.8 respectively. Mean percent of fat free mass and fat mass by ADP were 83.4%±4.9% and 16.6%±4.9% respectively. There was a significant negative correlation between fat free mass and PELD score and bilirubin (P<0.05) and positive correlation with MUAC z-scores and albumin (P<0.05). There was a significant negative correlation between MUAC and PELD (P<0.05).

Conclusion
In children with severe CLD, lean body mass measured by MUAC and fat free mass percentage evaluated by ADP were closely associated with disease severity. Evaluation of body composition by ADP provides an added value in the nutritional assessment of infants with CLD prior to liver transplantation.
Infancy

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GROWTH AND TOTAL BODY POTASSIUM IN EARLY LIFE
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2Queensland University of Technology, Institute of Health & Biomedical innovation- Faculty of Health- School of Exercise and Nutrition Sciences, Brisbane, Australia

Background and Aims
Measurements of total body potassium provide an indication of the body’s functional mass that is independent of changes in hydration of the fat free mass that occur with growth. The purpose of this study was to determine the growth and total body potassium of infants during the first 6 months of life.

Method
An observational, prospective, cohort study was conducted. Thirty-seven full term, healthy infants underwent assessments of growth and total body potassium (TBK) using whole body counting. Measurement were taken at 1.5 months, 3 months and 6 months. All infants were exclusively breastfed at 1.5 and 3 months, by 6 months all infants had started solids.

Results
Birth weight and length of males (3643 ±485g; 51.9 ± 1.9cm) were not significantly different to the female’s weight and length (3734 ± 560g; 51.4 ± 2.3cm). Length and weight significantly increased over the 6 months (p>0.001) and there was no significant difference in length and weight between males and females at any time point. When TBK (g) was examined, males had significantly higher TBK at 1.5 months (p>0.002) and 3 months (p>0.001). However, there was no significant difference in TBK (g) between the genders at 6 months (p=0.36).

Conclusion
In this small sample of healthy, full term newborns, statistically significantly differences in TBK were evident up to 3 months of age, however, by 6 months of age, these differences no longer existed.
ASSOCIATION BETWEEN MATERNAL SOCIO-DEMOGRAPHIC FACTORS AND INFANT BIRTH WEIGHT IN SAVELUGU

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Background and Aims
Birth weight is considered the single most important predictor of infant mortality, especially deaths within the first month of life. The main objective of the study was to determine the association between maternal socio-demographic characteristics and infant birth weight (BW) in Savelugu.

Method
An analytical cross-sectional study design was used. In all 151 women attending post-natal clinic at the Savelugu hospital were recruited for the study. Birth weights of babies were obtained from their weighing cards. Structured questionnaire was then used to capture maternal socio-demographic characteristic, reproductive history, birth spacing, health issues and antenatal visits, food habits and nutritional issues and household hygiene practices. Frequencies and percentages of variables were obtained using SPSS. Chi square was used to test for statistical significance of p<0.05 within the Confidence Interval of 95%.

Results
Maternal age was found to be significantly associated with low birth weight (P = 0.00). Maternal health during pregnancy was significantly associated with low birth weight (P = 0.00). A total of 30 babies of low birth weight were recorded for mothers who had ≤ 4 antenatal visits while 12 babies of LBW was found in mothers with ≥ 4 antenatal visits. Antenatal visits were significantly associated with low birth weight (P = 0.00). Maternal education level was also found to be significantly associated with low birth weight (P = 0.001).

Conclusion
Maternal age, health during pregnancy, number of antenatal visit, highest education level were found to be significantly associated the incidence of LBW in Savelugu.
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ASSESSMENT OF DIETARY FACTORS ASSOCIATED WITH IRON DEFICIENCY ANEMIA AMONG INFANTS AGED TO SIX TO NINE MONTHS IN KEIYO SOUTH SUBCOUNTY KENYA

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Background and Aims
The complementary feeding period as from six months of age has greatly contributed to iron deficiency anemia due to poor feeding practices. This research assessed dietary factors associated with iron deficiency anemia among infants aged 6 to 9 months in Keiyo South Sub County. The specific objectives of the study were: to establish the proportion of infants with iron deficiency anemia and to determine dietary factors associated with dietary intake among infants aged 6 to 9 months.

Method
A cross sectional study design was adopted then systematic random sampling was then used to select 244 mothers and their infants. Biochemical tests were carried to determine anemia and peripheral blood smears were conducted to ascertain the type of nutritional anemia. Those with hemoglobin levels less than 11g/dl were considered to be anemic.Data was analyzed using Statistical Package for Social the Sciences (SPSS) computer software version 17, 2009. Iron dietary intake was analyzed by the Nutri-Survey 2007 computer software.

Results
The results indicated that the mean hemoglobin values were 11.3± 0.84 g/dl. The infants who had anemia were 21.7% and further all peripheral blood smears indicated iron deficiency anemia. The mean dietary intake was 8.3±1.90 g/day a mean deviation of -2.611, below the recommended RDA of 11.

Conclusion
It was concluded that IDA was evident among infants and policies should be formulated by the Ministry of Health into screening of infants during the first year of life and intensive nutrition education on iron rich diets during child welfare clinics as part of routine check up
NEW BULGARIAN GUIDELINES FOR INFANT FEEDING

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Background and Aims
Wrong practices of infant feeding and serious problems in their nutritional status are identified in the national surveys (short duration of breastfeeding, low prevalence of exclusive breastfeeding, early and inadequate complementary feeding, high prevalence of stunting, underweight and anaemia among infants, especially in minorities). Aim is to update the national guidelines for feeding of infants directed to medical/ healthcare professionals.

Method
Comprehensive overview of current scientific literature and international joint statements on breastfeeding and complementary feeding was done from Infant Feeding Joint Working Group. The identified problems in feeding and nutritional status of infants in Bulgaria are considered.

Results
The main aspects of new guidelines for healthy full-term infants include: exclusive breastfeeding for around 6 months; introduction of complementary feeding between 17-26 weeks of age; iron-rich first complementary food as meat and fortified cereal for exclusively/ partially breastfed infants (for formula fed infants the first complementary food may be vegetables/ fruits); gradually introduction of potentially allergenic foods; introduction of diluted fruit juice after 6th month, milk as main drink after 12th month but as component of meals after 10th month of age; recommendations for vitamin D supplementation; healthy weaning summary chart. Guidance for introduction of allergenic foods to high risk infants, recommendations for feeding of premature/ low birth weight babies are included. WHO standards for infant growth are introduced.

Conclusion
The new guidelines for infant feeding are component of targeted efforts at a national level to improve nutrition of children in Bulgaria and to reduce risk of chronic diseases in later life.
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IMPROVEMENT OF INFANT SLEEP QUALITY BY CHANGING FORMULA TO MARE MILK
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Background and Aims
Sleep problems are common problems in infants and evidence shows link between these problems and obesity in childhood. This study tried to show in some infants with difficulty in sleep changing milk may be curative.

Method
They included 32 infants ages between 6 to 18 months who brought to clinic in Yazd Iran due to sleep problems at 2014, all were partial breast feed or formula fed (different brands) and healthy without clinical sign or history of allergic diseases. They were fed for 5 to 7 days by pasteurized mare milk (150-450 cc/day). Brief infant sleep questionnaire was fill out by parents. Twenty of them had changed formula to hypo allergic ones or soya milk before intervention but it was not effective.

Results
Problems were repeated nocturnal waking 4.1+-2.2/night and prolong nocturnal waking 2.1+-1.1 hr/night. Three cases did not tolerate mare milk due to vomiting and diarrhea. 18 of them had satisfactory response by seven days, 7 have some improvement and 4 Case had not improvement or became worse. Repeated nocturnal waking decrease to 2.3+-1.6/night (p<0.005) and nocturnal waking to less than 2/night (p<0.001).

Conclusion
changing formula to mare milk with lower and different protein composition, higher carbohydrate and unsaturated fatty acid improved sleep in two third of our infants by a week. This preliminary finding may be an idea for improving infant sleep quality. specially impact of poor sleep in infancy and obesity in future is an idea which needs more attention.
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Background and Aims
Sorghum gruel is a breakfast cereal that is commonly eaten by adults and as complementary food for infants in Nigeria.

Method
Seven composite samples [A- G] were produced from the mixture of different concentrations of sorghum flour [SF], date palm flour [DPF] and sweet potato flour [SPF]. Sample A served as the control containing 100% of Sorghum while samples B to G were mixtures of SF, DPF and SPF prepared in ratio 50:10:40; 50:20:30; 50:30:20; 50:40:10; 50:50:0 and 50:0:50 w/w respectively. Proximate composition and selected minerals of the samples were determined using standard methods. Sensory attributes of the gruels were assessed using a nine-point Hedonic scale. Data obtained were expressed as mean ± S.D and analysed using Duncan Multiple Range Test.

Results
The carbohydrate content ranged from 56.97% to 75.9%; protein 5.84% to 7.29%, fat 3.25% to 20.05%. Sample A had the highest carbohydrate, sample G had the highest protein and sample E had the highest fat. Iron content ranged from 124.43mg to 825.63mg, calcium 0.05mg to 0.13mg, zinc 2.63mg to 34.21mg, magnesium 0.01mg to 0.15mg. Calcium in samples E and F were significantly higher than in other samples. Sample F had the highest iron, sample E had the highest magnesium and sample D had the highest zinc. Sample A had low amount of micronutrients compared with other samples. In overall acceptability, samples B, C and D were rated higher than other samples (p<0.05).

Conclusion
Enriching sorghum with DPF and SPF significantly improved its nutritional qualities especially protein and micronutrients and could be used as complementary food for infants.
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ASSESSING EXPENDITURES ON INFANTS DIET AS A DETERMINANT OF GROWTH RATES
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Background and Aims
Social, cultural and economic background families are inseparable determinants of children obesity, interconnected with other medical conditions. The present work was aimed to observe the economy of family budget in relation to children weight. More specifically, our research analyzed the relationship between child nutritional status and amount of money spent on weaning diet.

Method
The authors enrolled patients presenting to mandatory one-year consultation of the pediatrician, with age range of 12 ±1 months. All legal guardians of the subjects were asked to take part to a face to face interview, giving social and economic details.

Results
The study report data from 73 families. Mothers choose to wean their infants with homemade products than buying baby-food (76.5 vs. 23.5 %). Besides formulas milk cost, participants spent more money on diary and meat products when it comes to complementary feeding. In this study, no difference in terms of baby food, cereals or diary expenditure was found between correct or incorrect weaned infants, while those improperly weaned had families that gave more money on buying meat and less fruits (p<0.001).Infants having Z-score for BMI>2 belong to families that spend more money on meat and cereals (p<0.001).

Conclusion
More models of economic factors that influence early nutrition and obesity development even in younger ages are needed in order to identify cost barriers to provide healthy food for children.
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ETHNIC VARIATION IN EARLY INFANT FEEDING PATTERN AND ACTIVITY LEVEL IN RELATION TO INFANT GROWTH
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Background and Aims
Rapid or accelerated growth in early infancy is an important factor found to increase the risk on overweight/obesity. However, accelerated growth is considered a resultant of various factors including infant nutrition and physical activity level, which may differ between ethnic groups. We investigated whether differences in feeding pattern and activity level explain differences in accelerated growth in weight, length and weight-for-length between 1 and 6 months of age for infants of Dutch and Turkish descent.

Method
Mothers of 143 Dutch and 143 Turkish infants were interviewed to obtain detailed data on feeding pattern and activity level. Data on growth was collected and registered during regular health check-ups at Child Health Care centers.

Results
Turkish infants had higher weight and length gain between 1 and 6 months, as reflected in the percentage of infants with accelerated growth (defined as standard deviation score difference >0.67) in weight (Turkish: 21.2%, Dutch: 13.1%; OR adjusted 2.45 [CI 1.07-5.61]) and length (Turkish: 21.4%, Dutch: 8.6%; OR adjusted 3.54 [CI 1.47-8.51]). Children of Turkish descent had a higher reported activity level, were breastfed longer, were fed more often on demand and were given more uncommon complementary foods such as yogurt or soup. Only duration of breastfeeding masked to some extent the difference in accelerated length gain.

Conclusion
Ethnic differences in feeding pattern and activity level hardly explained the observed ethnic differences in growth. Future research needs to focus on other dietary factors such as portion sizes and total energy intake.
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**BLOOD PRESSURE, WAIST CIRCUMFERENCE, LEPTIN AND ADIPOnectin ARE RELATED TO DAILY ENERGY EXPENDITURE AND ENERGY INTAKE IN ADOLESCENTS**

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**Background and Aims**

Several factors in relation either to energy expenditure and/or energy intake may contribute to overweight. The aim of this study was to evaluate the nutritional status and metabolic risk in the West Algerian adolescents.

**Method**

Scholar adolescents (n= 340) aged to 11-17 years (sex ratio G/B=160/190) were recruited. Blood pressure (BP), waist circumferences (WC), and body mass index (BMI) were measured. Daily energy intake (DEI) was estimated using “24 hours recall” followed by 3 days record method. Daily energy expenditure (DEE) was estimated by a questionnaire collecting scholar and daily activities. Leptin and adiponectin were analyzed by enzyme immunoassay.

**Results**

Adolescents were classified in normal weight (NW) (73%), and overweight/obese (O) (27%) groups. BP and WC were higher in NW than O group. The DEE represented 8.6±0.9 MJ/d, 6.67± 1.3 MJ/d in NW and O, respectively, essentially related to domestic and scholar activities. The DEI was of 9.13± 0.5 MJ/d in NW and 13.54± 0.9 MJ/d in O. Animal proteins intake was lower, whereas saturated fats and simple carbohydrates were higher, in O compared to NW (p=0.001). Leptin values were high in O, and low in NW, and adiponectin concentrations were reduced in O compared to NW(p=0.001).

**Conclusion**

This study shows a significant association between BP, WC, leptin, adiponectin and DEE and DEI. These data suggest that prevention of these factors may include a healthy lifestyle management.

No conflict of interest. This study was funded by the General Directory of Scientific Research and Technology Development of the Ministry of High Education and Scientific Research.
Background and Aims
Cardiometabolic risk is associated with overweight and fat distributions during childhood. The aim of this study was to evaluate the relationship between waist circumference and the cardiometabolic risk in normal weight (NW) and over weight (OW) scholar children.

Method
Scholar children (n=125) in Oran city, aged between 6 to 10 years (Girls/Boys=61/64) were recruited. Anthropometric measurements (weight, height, body mass index (BMI), waist circumference (WC)), blood pressure (BP), lipid profile (Total cholesterol (TC), HDL cholesterol (HDL-C), LDL cholesterol (LDL-C), triglycerides (TG)) and Glucose concentrations were measured.

Results
Results showed that 69% of the children had a normal weight (NW) and 31% were overweight (OW) according to the International Obesity Task Force classification. High levels of BMI, WC (P<0.01), weight, systolic BP and diastolic BP, and glucose concentrations (P<0.05) were observed in OW vs NW. There was no significant difference in height, TC, HDL-C, LDL-C, and TG. Moreover, positive correlations were noted between WC and weight and BMI (P<0.001), WC and height, diastolic BP, and glucose concentrations (P= 0.01), and WC and TG (P=0.05).

Conclusion
This preliminary study indicates that these children need interventions on physical activity, and eating behaviors which are modifiable factors to prevent overweight and cardiometabolic risk.

No conflict of interest. This study was funded by the General Directory of Scientific Research and Technology Development of the Ministry of High Education and Scientific Research.
IMPACT OF MOTHERS' NUTRITION KNOWLEDGE ON THEIR CHILDREN'S EATING PATTERNS

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Background and Aims
Healthy eating habits in childhood are important because they help prevent undernutrition, growth retardation, and acute child nutrition problems, in addition to preventing chronic, long-term health problems, such as obesity, coronary heart disease, type-2 diabetes, and stroke. The aim of this study was to assess the effect of nutrition education for mothers on their children's eating patterns.

Method
A quasi-experimental design utilizing pre- and postmeasurements of self-reported eating behaviors was conducted to evaluate the impact. There were three groups: preschool (26 children aged 3.8±1.1), school-age (36 children aged 9.1±1.8) and adolescent (46 adolescents aged 15.3±1.9). Mothers received 3 hours of nutrition education at an hour and one week intervals. Mediterranean Diet Quality Index (KIDMED) was used to assess the children’s eating behaviors. This index was performed at the beginning of education, and was repeated in the first and sixth months. Changes in KIDMED scores were the dependent variables. General linear model repeated measure analysis was used to assess intervention effects.

Results
The mean KIDMED scores (6.0±1.9, 6.5±1.8 and 5.5±2.5, respectively) in the first month were greater than at the beginning of education (7.2±1.4, 7.5±1.6 and 6.7±2.1, respectively) in all three groups (p=0.013, p<0.001 and p<0.001, respectively). However, there were no statistically significant changes between first and sixth months (7.1±1.7, 7.5±1.7 and 6.6±2.2, respectively) in groups (p=0.799, p<0.786 and p<0.746, respectively).

Conclusion
Hands-on nutrition education for mothers may be an effective strategy for promoting children’s healthy eating.
Background and Aims
The nutritional requirements of adolescence differ from those of childhood by virtue of the adolescent’s larger body size and the advent of sexual maturation. The aim of this study was to determine and evaluate 24-hours dietary recall (24HR) of high school students according to The Healthy Eating Index (HEI)-2010 in Turkey.

Method
A cross-sectional study was conducted on a total of 150 students (72 girls and 78 boys) aged 16 to 18 years. Subjects were randomly selected from healthy high school students living in Ankara where is the capital city of Turkey. Food consumption was measured using the 24HR method. Food consumption recall was evaluated by using HEI-2010.

Results
52% of the adolescents are boys and 48% are girls. When food consumption condition was evaluated according to HEI 2010, it was determined that 84.6% (n:127) had “poor diets” (≤ 50 points), 15.4% (n:23) had diets which needed improvements (51-80 points). Average score of total fruits (1.65 ± 2.03), whole fruit (1.81 ± 2.31), total vegetables (2.10 ± 1.46), dark green vegetables and legumes (1.61 ± 1.86), whole grains (0.33 ± 1.37) and dairy products (3.19 ± 2.39). The overall diet quality scores of Turkish adolescents fell short of recommendation.

Conclusion
The diet quality scores of adolescents would be improved by increasing the intake of vegetables, especially dark greens and beans; replacing refined grains with whole grains, substituting seafood for some meat and poultry; and decreasing the intake of sodium (salt) and empty calories from solid fats and added sugars.
Background and Aims
Omega-3 fats have been replaced in many modern diets by saturated and artificial fats and to some extent by omega-6 fats. The latter are also essential to health, but an appropriate balance is required, and relative deficiencies of omega-3 appear to underlie a wide range of physical and mental health conditions that pose increasing problems in developed countries. Our aim is to demonstrate a relationship between the state of fatty acid profile and behavioral problems that children exhibit.

Method
132 Spanish and German children participants in the NUHEAL study performed CBCL Test, and cheek cells were sampled at 8 years to obtain the fatty acid profile. Fatty acids (FA) in cheek cells were measured according Klingler et al. (2011). A non-parametric test (U Mann-Whitney Test) was performed using SPSS 20.0. The fatty acids included in the analyses were C18:3n-6 Gamma-linolenic acid (GLA), C18:3n-3 Alpha-linolenic acid (ALA), C18:2n-6 Linoleic acid (LA), C20:4n-6 Arachidonic acid (AA), C20:5n-3 Eicosapentaenoic acid (EPA), C22:5n-3 Docosapentaenoic acid (DPA) and C22:6n-3 Docosahexaenoic acid (DHA).

Results
There was significances between ALA and externalizing problems, ALA and Attention problems, LA and Attention problem, EPA and Plays and Sporting’s Competences, DPA and Plays and Sporting’s Competences, DHA and Plays and Sporting’s Competences.

Conclusion
Association between FA levels in cheek cells and behavior has been demonstrated.

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Background and Aims
Children target height (TH) is an issue often raised by doctors and family in the evaluation of children. TH can be estimated by calculating the average of both progenitors’ heights (APH) and +/- 6,5cm if son or daughter respectively. This formula has not been validated yet in Portuguese population (PP). The purpose of this study is to validate this formula in a PP’s sample and to suggest an equation to predict the children’s TH based on their parents’ height (PH).

Method
We selected the patients aged between 20 and 35 years old followed by 5 different general physicians, and registered their and their progenitors’ heights. Those who had conditions associated with short and tall statures were excluded. The paired-t-test, Pearson’s correlation coefficient and the linear regression were applied. We have considered as statistically significant p-values <0.05.

Results
There were selected 241 individuals (139 female, 102 male). The actual height (AH) diverged more than 10cm from the calculated TH in 17% of individuals. The paired-t-test showed statistically significant difference between the means of calculated TH and AH, the last one is on average 4,24cm higher than the first. A strong and statistically significant correlation ($\rho=0.741$) between calculated TH and AH was found. The following equations for TH prediction were obtained:
Female=$89.47+0.443*(APH)$
Male=$82.61+0.568*(APH)$

Conclusion
Despite of a linear correlation between calculated TH and AH was confirmed, the traditionally used TH’s formula tends to underestimate the final height of children. The proposed formulas estimate better the TH than the previous one in this sample.
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RISK FACTORS OF UNDERNUTRITION AMONG CHILDREN UNDER TWO YEARS OLD IN JAVA ISLAND INDONESIA
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Background and Aims
Under nutrition are still majoring problem in Indonesia. This study aimed to analyze risk factors of underweight, stunting and wasting of under two years old children in six provinces of Java Island, the most populous island in Indonesia.

Method
This research used secondary data from Basic Health Research Year 2013. The Health Research was cross sectional designed, done across the country involving more than 8000 under two years old children. This study analyze 1535 children of 12-23 months, consist of 369 child with low birth size i.e. birth weight < 2500 g and birth length < 48 cm, and 1166 child with normal birth size.

Results
The results showed positive significant correlation between father’s and mother’s education, father’s occupation and birth weight with all indicator of current nutritional status, namely Weight-for-age z value (WAZ), height-for-age z value (HAZ), and weight-for-height z value (WHZ); family size with indicator of WHZ; birth length with indicator of WAZ and HAZ; and pulmonary tuberculosis had negative significant correlation with indicator of WAZ (p<0.05). Low birth weight, short birth length and low father’s education increased the risk of underweight 1.5 until 2.32 times more than child with normal birth weight, birth length and high father’s education. Risk factor of stunting were short birth length, low mother’s education and father’s occupation with risk factor of 1.43, 1.42 and 1.29, respectively, while risk factor of wasting was low birth weight (OR=2.18).

Conclusion
Effort to decrease under nutrition prevalence should focus more on improving size at birth and family socio-economic condition.
THE IMPACT OF GLUCOCORTICOID THERAPY ON GROWTH IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS

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Background and Aims
Inflammation and glucocorticoid therapy (GC) are important determining factors of the growth impairment in children with juvenile idiopathic arthritis (JIA). The aim of this study was to assess the impact of the GC therapy on the physical development in children with JIA.

Method
This retrospective study included 201 children with AJI, the mean age 10.7±0.5 years. The mean duration of the disease was 4.59 ± 0.3 years. Glucocorticoid therapy was used in 25% cases. We studied anthropometric indices and their correlation with percentile parameters, ponderal index, nutritional index, body mass index (BMI).

Results
Data analyses of this study determined weight failure in 32.3% cases and height failure in 18.9%. In glucocorticoid-treated children were found statistically significant differences of the ponderal and nutritional index compared to children without GC therapy (p<0.05). Nutritional index was reduced in 43.3% of cases, and ponderal index was below normal in 36.3% children. BMI was evaluate below 17 in 62.6% cases. We found that the weight failure correlated with the level activity and the duration of the disease (r=-0.3).

Conclusion
The growth maintaining in children with JIA is a complex process which is influenced by various mechanisms, both the drug therapy and the disease progression itself. At this time, the most effective way to reduce growth impairment in children with JIA is to control chronic inflammation using available therapies, so as to reduce the dose GC and the duration of their administration.
AN UNUSUAL CAUSE OF GROWTH RETARDATION - GROWTH HORMONE DEFICIENCY ASSOCIATED WITH CYSTIC FIBROSIS

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Background and Aims
Children with cystic fibrosis (CF) suffer from multiple endocrine disorders. Poor linear growth is one of the most frequent problems. The Cystic Fibrosis Foundation Report estimates that 29% of CF children are below the 10th percentile for height. Growth retardation most often stems from severe respiratory impairment and malabsorption. Treatment of growth faltering has typically focused on improvement of nutritional intake. Multiple studies have shown positive effect of GH on weight gain and linear growth in chronically ill children, including pre-pubertal CF patients. Authors present a case of 7-years old girl with CF and growth hormone deficiency successfully treated with GH.

Method
The patient was diagnosed with cystic fibrosis at the age of 2 months (homozygote deltaF508). In the first 6 years, she was repeatedly hospitalized due to Pseudomonas aeruginosa pulmonary infection. During that time poor weight gain and growth faltering were observed (weight-for-age Z-score -1.79, height-for-age Z-score -1.86). Over-night gastrostomy feeding was started. Within 12 months significant weight gain occurred (weight-for-age Z-score 0.24), but height-for-age deteriorated further (-2.38 Z-score). Mid-parental target height is on 50th percentile, thus GH deficiency was suspected. The mean maximum stimulated GH level was 2.3 ng/ml (normal range>10 ng/ml). MRI showed small anterior pituitary gland (3 mm).

Results
GH treatment was initiated that resulted in improvement of height-for-age Z-score by +0.55 SD in one year.

Conclusion
Authors document an unusual association of cystic fibrosis and GH deficiency successfully treated with GH without adverse events.
Background and Aims
Children with autistic spectrum disorders (ASDs) tend to suffer gastrointestinal (GI) problems and it seems due to imbalance in the gut microbial population. Treating GI disorders in ASD with antibiotics or pro/prebiotics has been postulated to regulate microbiota and improve gut symptoms. The aim of this study was to understand the effects of a new GOS variant (Bimuno®, B-GOS 65% GOS content) on gut microbial ecology and metabolic end products of microbial fermentation.

Method
Faecal samples from autistic and healthy children (n=3) were used in an in vitro three-stage continuous system that simulated different physicochemical characteristics of the colon. Bacteriology was analyzed using FLOW-FISH analysis (fluorescence in situ hybridization combined with flow cytometry). Short chain fatty acids (SCFAs) were measured by HPLC.

Results
Results showed that the microbiota of ASD children contained a higher number of Clostridium spp., in particular clusters XIVa, XIVb and IX, and lower amount of bifidobacteria compared to healthy children. The B-GOS had positive effects on the gut microbiota significantly increasing bifidobacterial population in each chamber of the model in autistic and non-autistic children and lactobacilli in the final one of healthy children. In addition, it slightly increased Clostridium cluster XI and Roseburia spp. in chambers reflecting the transverse colon in both groups; and significantly decreased Atopobium spp. and Faecalibacterium prausnitzii in healthy children. Furthermore, the addition of B-GOS to the models significantly increased the production of SCFAs, acetate and butyrate.

Conclusion
This in vitro study has shown that B-GOS can elicit favorable in the gut microbiota of autistic children.
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SCHOOL NUTRITION POLICY DETERMINANTS: ARE YOUTH AND ADULTS’ PERCEPTIONS THE ANSWER? "EVIDENCE FROM LEBANON"
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Background and Aims
Schools are a popular setting for health promotion and education where youth can learn about the determinants of healthy lifestyles.

The aim of this study is to identify the determinants of the development of an eventual School Nutrition Policy in Lebanon by studying the perceptions of the school personnel, the parents and the youth.

Method
An exhaustive integrated conceptual framework based on social marketing approach and using several social and changing behaviors theories and models was developed to approach the subject at various levels of action. The target population of this study consists of 35 adults (school directors, responsible of school food services, parents and teachers) and 48 youth (children and adolescents) in 8 Lebanese schools (private/public and urban/semi-rural). Directed and semi-structured individual interviews were conducted with directors, responsible of food services and youth. Focus groups were conducted with parents and teachers. Data from this research have been submitted to a thematic qualitative analysis.

Results
Organizational variables (collaboration, coordination, partnership and advocacy) are identified by adults as the most determinants for the development of school nutrition policy. However, individual variables (perception of health risk susceptibility, age, autonomy and body image) are the most identified by youth. Additionally, characteristics of the Lebanese social environment, including various socioeconomic and socio-cultural factors (parents’ education, resources constraints, social structures diversity, political divisions and religion) influence the development of school nutrition policy.

Conclusion
It is important to integrate a comprehensive approach to understand the interaction between the individual, community, organizational and other determinants of school nutrition policies development.
Background and Aims
Our country is in a phase of nutritional transition and has not updated its growth charts. Due to this reason, the children’s nutritional status is assessed by international growth references. The aim of this study was to assess the agreement between the World Health Organization (WHO,2007) and the Center of Disease Control (CDC,2000) growth charts.

Method
This was an observational study of 314 symptomatic children (213 girls, mean age 9.5 years) requiring first esophagogastroduodenoscopy in our units during 2011-2013. All patients were evaluated for z-score of: weight/age (WAZ), stature/age (HAZ) and body mass index/age (BMI/A) in each of the two. Were used: EPI INFO 3.5.3 (CDC,2000), ANTHRO PLUS (WHO,2007), SPSS 18.0.

Results
The patients’nutritional status showed a significant Pearson correlation (> 0.5) between CDC and WHO criteria for all the three z- score indexes used, respectively: 0.962 for WAZ, 0.949 for BMI/A and 0.921 for HAZ.

Despite the high agreement observed between the two criteria, the z-score of BMI/A estimated by WHO were more efficient than CDC for the diagnosis of both ends of the spectrum of poor nutritional status: undernutrition (wasting 44 cases/14.01% and risk for underweight 49 cases/15.6%, versus underweight 84 cases/26.75%) and overnutrition, respectively: 31 (9.86%) versus 28 (8.92%).

Conclusion
The use of WHO references seems to be more efficient for the children’s nutritional screening and prompt interventions, because these enable the detection of a higher number of children at nutritional risk, in particular in developing countries, where malnutrition is a frequent comorbidity.
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NUTRITIONAL STATUS OF CHILEAN ADOLESCENTS AT THE END OF ELEMENTARY SCHOOL AND THEIR ASSOCIATION WITH THE UNIVERSITY SELECTION TEST (PSU) ACHIEVEMENT: A FOURTH-YEAR FOLLOW-UP STUDY

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Background and Aims
The objective of this study was to investigate the interrelationships between nutritional status (prenatal, postnatal and current nutrition) at the end of elementary school in 2009 on the 2013 PSU tests, for university admission fourth years later, when they should be graduating from high school.

Method
A representative sample of 671 school-age children who graduated from elementary school in the Metropolitan Region of Chile was randomly chosen according to the level of educational achievement of the educational establishment (high, medium and low), type of school (public and private) and gender. Prenatal nutrition was assessed through birth weight and birth length. Height-for-age Z-score (Z-H) and head circumference-for-age Z-score (Z-HC) served as indicators of postnatal nutrition and the body mass index Z-score (Z-BMI) was used as an index of current nutritional status. The 2013 PSU scores were provided by the Studies Center of the Ministry of Education of Chile, both language (L) and mathematics (M) tests. Data were processed by the Statistical Analysis System (SAS) software.

Results
PSU scores were positive and significantly associated only with those indicators of postnatal nutrition mainly Z-HC, the anthropometric indicator of nutritional background and brain development, in L and M tests (RR= 1.72 and RR= 2.24, respectively) and, Z-H only with M test (RR= 1.66). Prenatal nutritional parameters and Z-BMI were not associated with 2013 PSU scores.

Conclusion
Postnatal nutrition indicators, mainly Z-HC at the end of elementary school are good predictors of PSU outcomes fourth years later.
Grants FONDECYT 1100431 and 1150524
Background and Aims
The dietary habits of children have become increasingly irregular in recent years. The city of K introduced the “K Health Assessment” (KHA), which enabled elementary and junior high schools in the city to make dietary and physical assessments. The KHA program was then used to analyze the body mass index and dietary trends of school children, the results of which are reported here.

Method
1596 5th and 6th graders (815 boys, 781 girls) were asked to enter information relating to the contents of their meals, gender, age, height, body weight and level of physical activity using nutritional education software during the 2012 academic year. Body mass index (Rohrer index) and dietary trends with respect to meals actually consumed were then determined based on the data. Statistical processing was carried out using SPSS Ver. 23.0.

Results
Nutrients determined to be lacking from the diet consisted of calcium in 78% of the children, iron in 64% and dietary fiber in 73%. Calcium levels tended to be lower among overweight children and boys, while iron levels tended to be lower among overweight children and girls (P<0.05). Nutrients consisting of calcium, iron and dietary fiber all tended to be lower among overweight children (P<0.05).

Conclusion
Insufficient calcium, iron and dietary fiber intake levels were suggested to be attributable to low vegetable consumption. Utilization of the KHA program to enable school children to manage their own diet and physical status was determined to be effective in preventing lifestyle-related diseases in the future.
THE SPARRING TRINITY OF MALNUTRITION: STUNTING, WASTING AND UNDERWEIGHT

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Background and Aims
High levels of child malnutrition in India, notwithstanding implementation of the Integrated Child Development Scheme (ICDS) are a cause of concern. ICDS has traditionally used weight for age as a measure of child malnutrition. But off late, received literature has seen a spurt with researchers projecting stunting and wasting as indicators of consequence with a consequent push for tasking the ICDS structure for measuring the height of children below 3 years on a regular and routine basis.

Method
The analysis was based on comparing National Family Health Survey - 2 (NFHS 2) and National Family Health Survey -3 (NFHS 3) data.

Results
It shows strong linear relationship between underweight and stunting as well as wasting among young children. Further, the mortality Hazards Ratio is much lower for stunting compared to underweight, wasting and their combination. Further, the mortality Hazards Ratio is much lower for stunting compared to underweight, wasting and their combination.

Conclusion
Focus on reducing underweight is, therefore, an appropriate strategy at present and burdening ICDS structure with routine height measurement of children under 3 years, appears unwarranted. This task which requires a higher level of skill and training should be left to periodic surveys e.g. the NFHS. Identification of severe wasting can continue through current practice of measuring mid upper arm circumference (MUAC).
EVALUATION OF 6-10 YEAR-OLD SCHOOLCHILDREN’S LUNCH MENUS AND CONTENTS
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Background and Aims
This study was conducted to examine the menus given in primary schools and to evaluate with the aim of assessing the situation if these menus meet the required nutrient needs and energy of children at school age.

Method
Research sample is consisted 8 permitted private schools located Ankara, Elazığ, Konya, TURKEY. Random sampling method is used in the selection of schools. To reflect each season for study data, monthly menus are taken regarding to "January-April-October" months from schools. School meals are evaluated with BEBIS (Nutrition Information System) package software.

Results
When the average energy of the 8 school's 3-month-menus are evaluated; menus of six schools' energy content are higher than required lunch meal energy, and menus of two schools are determined it was recommended amount. Energy content of menus are approximately 1.5 times, protein content of menus are approximately 2.5-3.5 times more than recommended values. When energy and nutrition content was evaluated, it was detected that the value from carbohydrates was %37.1 and the value from fat was %48.1. It was found that carbohydrate rates in schools’ lunch menus must be lower than specified value and fat rates must be more than specified value. Pulp content was also determined high for all school menus. (9.5 gr).

Conclusion
One reason for the increasing school-age obesity in children is because of high-energy lunches in schools in Turkey and macronutrient distribution in lunch menus may not be in the required range.
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ENS (ENTERAL NUTRITION SUPPORT) IS NOT IMPLICITLY ABLE TO PREVENT MALNUTRITION IN EARLY CHILDHOOD IN SPITE OF EXCLUSIVE AND LONG-TERM ENTERAL FEEDING
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²

Background and Aims
Assessment of nutritional intake and growth status in a large cohort of young children receiving exclusive long-term enteral nutrition support (ENS)

Method
A retrospective survey of internationally referred patients was conducted at the Children Hospital of Graz, Austria. Growth features and the nutritional intake of all children (n=287) were evaluated. Over a period of 5 years (2009 -2013) all patients in the age group of 4-36 months were included into the study sample. The group was characterized by patients with highly diverse underlying medical conditions with unrelated and independent indications for ENS and had been on ENS for most of their lives. Nutritional/growth status was determined by using WHO growth standards.

Results
After comparing with WHO standards, the prevalence of malnutrition in the sample was surprisingly high (25%) and more specifically the prevalence of wasting was 18% and stunting was 31% which is defined as critically high in any population by WHO. Results revealed that 68% of the cohort was unintentionally receiving inadequate amounts of caloric supply/day; and this was significantly associated with growth/nutritional status (p< 0.05).

Conclusion
A majority of children receiving long-term ENS are not provided with adequate amounts of energy. Therefore, the choice of ENS for medically fragile children requires highly specialized and individually tailored tube management and aftercare programs. These should include regular evaluation of growth parameters and caloric intake as well as re-evaluation and if necessary, adaptations and a clearly defined exit strategy when tube weaning is a realistic option.
BACKGROUND AND AIMS
Given child obesity is influenced by household income and home food environment, this study aimed to examine the home food environment by household income level in Korean households with children.

METHOD
The subject was 27 households (10 high income households and 17 low income households). Home food environment was examined by food availability, taking photos of all food items stored in the household, and by food accessibility, using in-depth interview with questionnaires. The number of fresh foods between high and low income households was analyzed.

RESULTS
High income households had 27.2 items of vegetables, 9.5 items of fruits, 31.8 items of meat/fish/egg, and 3.7 items of milk products. Low income households had 23.1 items of vegetables, 7.7 items of fruits, 21.6 items of meat/fish/egg, and 4.1 items of milk products. Average of total food items was higher in high income households than low income households. As a result of in-depth interview, the place to buy foods was not different between high and low income households. Some low income households took foods from their parent’s home and had limitation to prepare meals because of outdoor conditions like hot weather and high floor of the house, and indoor conditions like high humidity, lack of ventilation, and small size of kitchen.

CONCLUSION
This study found that home food environment was different by household income level, showing limited food availability of fresh foods and food accessibility in low income households. Therefore, nutrition intervention programs to improve home food environment need to be considered, targeting low income households.
PREDICTIVE CAPACITY OF BODY MASS INDEX REFERENCE VALUES-LOCAL OR INTERNATIONAL-VERSUS A COMPREHENSIVE DIAGNOSIS IN VENEZUELAN CHILDREN AND ADOLESCENTS

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Background and Aims

Background and Aims: WHO new growth standards have motivated countries to analyze its application in public health, also at a clinical level. Comparison of BMI classification using both national and international references with a comprehensive clinical diagnosis is useful in order to reach a consensus regarding children and adolescent’s nutritional status.

Method

198 children and adolescents 5-17 years (95 boys, 103 girls) examined in a specialized clinic, excluding chronic illnesses. Height and weight were measured. Body mass Index (BMI) calculated and analyzed using National/International references: Estudio Nacional de Crecimiento y Desarrollo Humano (ENCDH), Estudio Transversal de Caracas (ETC), NCHS-WHO 1977, WHO 2007. BMI categories (normal, low, high) were contrasted with comprehensive diagnosis. Sensitivity Specificity and Predictive Values calculated (Kappa Cl 95%). 35 boys, 49 girls <10 years were classified with W-H charts (NCHS-WHO 1977), due to BMI values >10 years old. Five girls (2 prepuberal, 3 puberal <10 years > 135 cm) could not be classified at all.

Results

In boys Kappa was very good (0.8-0.9) and moderate in girls (0.4-0.75). Sensitivity was between 0.72-0.86 (boys) and 0.63-0.73 (girls) and specificity was higher (0.79-0.98 boys and 0.76-0.92 girls) False negatives were lower in national references (2-13%) than international references (21-24%). Predictive values were higher for national references.

Conclusion

In general, these results indicate a better efficiency for local references. The predictive value must be analyzed in larger samples and cut offs possibly redefined.
UNDERNUTRITION AMONG ADOLESCENT GIRLS LIVING IN 3 PROVINCES OF MOZAMBIQUE

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Background and Aims

Undernutrition among adolescents is of public health concern in developing countries as it compromises physical and cognitive development of individuals, affects negatively in the economic potential of societies and contributes to the perpetuation of poverty. The purpose of this study was to determine the prevalence of undernutrition among girls between 10 to 14 years of age using body mass index (BMI).

Method

A cross-sectional study was done in Nampula, Niassa and Cabo Delgado provinces, Mozambique. From April 2015 to June 2015, a total of 255 adolescent girls were interviewed and anthropometric measurements (height, weight) were taken. The BMI cutoff values used to classify undernutrition were: BMI<16 (severe undernutrition), 16≤BMI<17 (moderate undernutrition) and 17≤BMI<18.5 (mild undernutrition).

Results

The total prevalence of adolescent girls with undernutrition was: 35.7% severe undernutrition and 31.4% moderate undernutrition. High prevalence of severe undernutrition was observed in adolescent girls living in Nampula province 52.5% (42/80) followed by those living at Niassa 33.7% (33/98) and Cabo Delgado 20.8% (16/77) provinces. Moderate undernutrition prevalence was higher in Cabo Delgado province 44.2% (34/77) compared to Niassa 29.6% (29/98) and Nampula 21.3% (17/80). The prevalence of severe undernutrition was slightly higher in rural areas 38.5% (65/169) compared to urban areas 30.2% (26/86).

Conclusion

Adolescent girls between 10 to 14 years old living at rural areas have higher prevalence of severe undernutrition than those living at urban areas. Further studies are needed in order to understand which factors are related with high levels of undernutrition among adolescent girls living at those provinces.
Background and Aims
There is only a limited amount of information about total body skeletal muscle (SM) mass in children. Dual-energy X-ray absorptiometry (DXA) provides data of total and regional lean soft tissue mass in a short period of scan and analysis time (i.e. 5 min). Thus, the purpose of the present study was to investigate the validity of single DXA-derived prediction equation for total SM mass in Japanese prepubertal children.

Method
The total number of subjects was 145 healthy Japanese prepubertal children aged 6-12 years (89 boys and 56 girls). Contiguous MRI images with a 1-cm slice thickness were obtained from the first cervical vertebra to the ankle joints as reference data. The SM volume was calculated from the summation of digitized cross-sectional areas. The volume units were converted into mass by an assumed SM density (1.041g/cm^3). Appendicular lean soft tissue (ALST) mass was determined by using DXA to test the validity of the prediction model (Kim et al., 2006).

Results
The measured total body SM mass by MRI was 9.4 kg for boys and 8.0 kg for girls, and was significantly different from the predicted SM mass by DXA of 10.0 kg for boys and 8.7 kg for girls, respectively. Strong significant correlations were observed between total body SM mass by MRI and ALST mass by DXA for boys and girls.

Conclusion
These results suggest that the single DXA-derived prediction equation is limited availability in Japanese prepubertal children. Therefore, the specialized equation for estimating total SM mass in Japanese prepubertal children is needed.
Background and Aims
This study is to determine the actual state of the dietary habits of school children and their families in order to enable school lunch programs to function as a means of providing dietary education and utilize the foods served as teaching materials to obtain basic information for the effective deployment of dietary education.

Method
A survey of dietary habits was conducted targeted at 5th and 6th graders at the S Elementary School along with their parents (using the survey format of the Japan Sport Council). The correlation between the school lunch program and dietary habits at home was then analyzed on the basis of those results followed by extraction of health issues affecting the children.

Results
(1) 63.2% of the children indicated that they liked the school lunch program, 46.1% indicated that they ate everything served, and 64.2% indicated that they were hungry before being served lunch. (2) 86.5% of the children indicated that they eat breakfast every day, 60.2% indicated that they wake up by 6:30 AM, and 56.3% indicated that they go to bed by 10:30 PM. 34.1% indicated that they considered nutritional balance and 38.8% indicated that they chew slowly.

Conclusion
A correlation was observed between the lifestyles and dietary habits of children at home and their behavior with respect to the school lunch program. On the basis thereof, it was suggested that school lunch programs, implemented as an extension of the educational system, be utilized effectively in order to improve health issues affecting children.
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BEHAIORS AFFECTING BONE HEALTH AMONG ADOLESCENT FEMALES AND VITAMIN D STATUS
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Background and Aims
Prevention of osteoporosis begins in childhood and adolescence as 90 to 95% of an adult’s bone mineral being achieved by the end of adolescence. Several behavioural risk factors influence bone health and vitamin D status. Targeting modifiable behaviors have an important effect for the attainment of adequate peak bone mass and future fracture risk. The objectives of this study are to estimate the prevalence of the behaviors affecting bone health and vitamin D status among Saudi adolescent females.

Method
A cross-sectional analytic study was conducted on a randomly selected 412 adolescent school females students in Jeddah city. A predesigned questionnaire was used for data collection, Anthropometric measurement were measured and blood sample was also collected .Chi square and ANOVA were used to identify the association.

Results
The mean (SD) of age was 17.2 (1.2). Reported consumption of two or more serving of dairy products per day was 11.2%. About 70% drink soft drink regularly, 13.9% perform the recommended exercise per week and 10% expose to sun. The prevalence of vitamin D deficiency was 67.5%. There were no significant association between sociodemographic characteristics, behaviors, anthropometric measurements and vitamin D status. The mean iPTH was significantly higher among adolescents with vitamin D deficiency.

Conclusion
This study indicates that Saudi female adolescents at significant risk of developing osteoporosis based on the prevalence of risky behaviors include low consumption of dairy products, high consumption of soft drink, low exercise level, low sun exposure and high prevalence of vitamin D deficiency and insufficiency.
THE ASSOCIATION OF HOME ENVIRONMENT, FAMILY LIFESTYLE FACTORS AND MATERNAL WEIGHT STATUS ON THEIR CHILDREN’S BODY MASS INDEX (BMI)

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Background and Aims
The study aimed to observe association of maternal and environmental factors with their children’s BMI.

Method
Forty overweight and obese mother and their children from Klang Valley, Malaysia were included in the analysis. The respondents were assessed for baseline measurements of a larger study of obesogenic environment. Children’s and mother’s assessment of anthropometry, biochemical, dietary intake and physical activity level was carried out. Physical activity (PA) was assessed using International Physical Activity Questionnaire and Physical Activity Questionnaire-Child instrument meanwhile stress was evaluated using the Perceived Stress Scale (PSS) instrument. The International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE) Neighbourhood and Home environment questionnaire was utilized to determine internal and external home environment.

Results
Mean BMI of mother and child were 28.90 (6.70) and 20.85 (5.92), respectively. Mothers’ and children’s’ energy (r = 0.581) and BMI (r= 0.42) were significantly correlated. Similar trait of high density lipoprotein (HDL) (r=0.561, p=0.004) and body fat percentage (r=0.377, p=0.033) was seen in mother and child. Mother and child’s PA was not significantly associated. Multivariate analysis (R²=0.52, p=0.003) revealed that limited family PA ($\beta$= -0.50, p=0.009), high mother’s BMI ($\beta$=0.56, p=0.002) and stress ($\beta$= 0.45, p=0.01) plus high collective efficacy in the neighbourhood ($\beta$= 0.41, p=0.025) were significant predictors to child’s BMI.

Conclusion
Children BMI appear to have strong associations with family PA time, maternal BMI and stress levels. Future research is needed to help study these factors in depth to help prevent childhood obesity.
ASSESSMENT OF SODIUM AND POTASSIUM STATUS IN THE MOROCCAN CHILDREN AGED BETWEEN 6 TO 14 YEARS

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Background and Aims
The World Health Organization (WHO) 2013 recommendations outline the importance of prioritizing sodium intake reduction as a means to reduce blood pressure and decrease the risk of cardiovascular diseases, strokes and coronary heart diseases in adults. The WHO strongly recommends the consumption of less than 2g/day (5g of salt/day) of sodium in adults and revises down this consumption for children in terms of energy expenditure and age. This study takes place as part of the national action plan to fight against no communicable diseases (NCD). A large portion of the Moroccan population is affected by NCDs. In fact, 33% of Moroccans suffer from hypertension, and 13% are obese.

Method
This transversal study includes 200 children from Rabat, and Kénitra. The study includes two sections: a questionnaire concerning anthropometric measures, morbidity, socioeconomic factors and food consumption, and evaluation of sodium intake through analysis of urine samples, and by the 24 hours recall, and directly through 24 hours urine measurements by ICP-mass spectrometry. Moreover, urine excretion is evaluated by total creatinine.

Results
The preliminary results obtained on 100 children aged between 6 and 14 years, show a high consumption of salt. Results from dietary 24 recall showed that the average of salt consumption is 9.8g/day. Similarly, urine analysis showed that children consume an average 7.63 g/day of salt.

Conclusion
The sodium intake of children was Higher compared to the WHO recommended value (5g of salt/day). Thus, there’s need to elaborate national strategie at levels to reduce salt intake and limit the associated diseases.
Determinants of Nutritional Rehabilitation Success in Patients with Growth Faltering: Al-Adan Experience

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Background and Aims
The current study was conducted to assess the risk factors determining the outcome of the nutritional rehabilitation of patients with growth faltering following up in the Clinical Nutrition Pediatric Outpatient Clinic, Al-Adan hospital.

Method
This study was conducted on 122 Kuwaiti children suffering from faltering growth; 75.4% of those were underweight and 24.6% were wasted. Dietetic history, clinical examination and laboratory tests were requested for each patient. Caloric requirements were calculated and dietetic regimens were given in accordance to the patients’ own tolerance and preferences. The patients were followed for 6 months by assessing their anthropometric measurements and obtaining a dietary history. Success was determined when anthropometric measurements fall above the -2 z scores on the WHO growth charts.

Results
Statistically more underweight patients showed improvement after 1 and 3 months in comparison to more stunted children failing to respond after 6 months follow up. Patients cared for by mothers and family members showed statistically earlier improvement compared to those cared for by foreign care givers. Distinctly more patients, among those receiving one fourth to one third of their calorie needs as supplementary milk and those using new recipes showed early improvement and less of them were non-responders by 6 months yet both comparisons didn’t reach statistical significance.

Conclusion
Nutritional rehabilitation is easier for underweight patients and largely depends on the family participation. We recommend counselling the families explaining their role in the nutritional rehabilitation of such patients with special emphasis on a tailored dietary regimen fulfilling the nutritional needs including supplementary formulas.
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CORRELATION OF BOWEL MOVEMENT FREQUENCY AND SLEEP DURATION WITH NUMBER OF COMPLAINTS OF SUBJECTIVE SYMPTOMS AMONG HIGH SCHOOL STUDENTS
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Background and Aims
It is necessary to enhance the quality of life (QOL) of students by taking advantage of the increasingly diverse opportunities for health education. With this in mind, a study was conducted of living conditions that enabling students to lead enjoyable lives with few non-specific complaints from the perspectives of both biological rhythm and life rhythm.

Method
The survey parameters consisted of an "investigation of subjective symptoms", "bowel movement frequency" and "bedtimes and wakeup times, sleep latency and sleep duration".

The investigation of subjective symptoms consisted of 25 items announced by the Working Group for Occupational Fatigue in 200, and was composed of Group I (drowsiness), Group II (instability), Group III (apprehension), Group IV (listlessness) and Group V (lack of focus), with each group consisting of five items.

Results
The number of complaints of subjective symptoms tended to increase as the interval between bowel movements became longer, thereby indicating the importance of having bowel movements every morning. In looking at bedtime, many of the students went to bed between 11:00 PM and 1:00 AM for both boys and girls. The number of complaints of subjective symptoms according to bedtime was such that the number of complaints of subjective symptoms was lowest among boys who went to bed no later than 10:00 PM to 11:00 PM, and was lowest among girls who went to bed between 11:00 PM and 12:00 AM.

Conclusion
This indicated that it is necessary to shorten sleep latency in order to enhance the quality of sleep.
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PREVALENCE OF THINNESS AND OVERWEIGHT AMONG SWEDISH 7-9 YEAR OLD CHILDREN. HOW DOES THE USE OF DIFFERENT GROWTH REFERENCES AFFECT THE RESULTS?
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Background and Aims
The development of overweight and obesity as well as thinness (low BMI for age) in childhood can lead to health problems in adult life. Several studies on the prevalence of overweight and obesity have been published. The prevalence of thinness has not received the same attention. Comparing studies of childhood thinness and overweight prevalence is often difficult due to methodological differences, such as whether height and weight data are self-reported or measured using a standard protocol and calibrated measuring equipment.

The aim is to publish data on different degrees of thinness and overweight based on measured data on height and weight, using a common protocol, from a nationally representative sample of Swedish boys and girls aged 7-9y born 1999-2001 using four different growth references.

Method
Height and weight data of 4518 Swedish children 7–9y were collected in 2008. Prevalence of BMI categories were calculated using two international growth references, from WHO and IOTF, and two Swedish national growth references, from Werner and Karlberg.

Results
The four growth references differ substantially in defining the prevalence of thinness, overweight, obesity and severe obesity. A significant gender difference (p<0.001) in some of the BMI categories was found.

Conclusion
When studying or reporting data on prevalence of different degrees of thinness and overweight, it is important to understand the different child growth references. It is important to select references carefully in order to increase comparability with other studies and the possibilities to follow development over time, and take the different growth references strengths and limitations into consideration.
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THE PERCENTAGE OF CHILDREN MEETING US DIETARY RECOMMENDATIONS FOR NUTRIENTS OF PUBLIC HEALTH CONCERN VARIES WITH AGE: NHANES 2009-2012
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Background and Aims
The purpose of this study was to determine the percentage of children meeting recommendations for nutrients of public health concern identified by the Dietary Guidelines for Americans.

Method
The percentage of children meeting the dietary recommendations for fiber, vitamin D, calcium, potassium was determined using NHANES (2009-2012) data. Usual Intake (UI) was determined using the NCI method. Data were covariate adjusted and appropriate sample weights were used. To assess inadequate intake, the Estimated Average Requirement (EAR) cutpoint method was used; for nutrients without an EAR, % above Adequate Intake (AI) was determined.

Results
Children 2-3y (n=956), 4-8y (n=1,917), 9-13y (n=1,730), and 14-18y (n=1,508) had a UI for calcium of 1042±25.1mg (with 3.1±0.7% below the EAR), 1097±18.6 (21.7±1.6% below), 1087±18.2mg (56.8±2.0% below), and 1056±27.8mg (60.9±2.8% below), respectively. Children 2-3y, 4-8y, 9-13y, and 14-18y had a UI for Vitamin D of 7.6±0.2mcg (78.3±1.9% below EAR), 7.2 ±0.1mcg (81.8±1.0% below), 6.2±0.2mcg (88.66±1.3% below), and 5.3±0.2mcg (92.9±1% below). Children 2-3y, 4-8y, 9-13y, and 14-18y had a UI for fiber of 12.3±0.3g (9.2±1.4% above the AI), 14.3±0.2g (4.3±0.4% above), 14.8±0.3g (2.0±0.3% above), and 15.1±0.3g (1±0.2% above). Children 2-3y, 4-8y, 9-13y, and 14-18y had a UI for potassium of 2135±26.7mg (9.2±1% above the AI), 2250±25.1mg (2.2±0.2% above), 2263 ±29.7mg (0.4±0.1% above), and 2370±45mg (1±0.2% above).

Conclusion
The percentage of children meeting recommendations for nutrients of public health concern varies with age. Children need to consume foods that are higher in these nutrients, including fruit/vegetables, whole grains, and low-fat dairy.
ON-TREATMENT IGF-1 Z-SCORES IN PRE-PUBERTAL PATIENTS WITH GROWTH HORMONE DEFICIENCY

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Background and Aims
Laboratories report insulin-like growth factor-1 z-scores (IGF-1z) which can be used to monitor growth hormone (GH) therapy and allow comparisons across age and gender. Lack of guidelines regarding IGF-1z contributes to variable clinical practice in GH dosing. We describe the range in IGF-1z and GH dose adjustments in pre-pubertal GH deficient (GHD) patients treated with GH.

Method
Retrospective review of GH-treated patients age <9 years with GHD (ICD-9 codes 253.3 and 253), seen in endocrinology clinic in 2013-2014. Patient characteristics, pre-treatment anthropometrics, IGF-1z, and GH dosage (mg/kg/week) were extracted. Chi-squared test and t-test compared categorical and continuous variables, respectively, and ANOVA compared IGF-1z across dose management groups: increase, decrease, or no adjustment.

Results
Fifty-five patients were reviewed: 64% male, mean age 6.07 +/- 1.48 years at most recent IGF-1z. Of 139 IGF-1z obtained, 4/139 were <-2, 82/139 were -2 to +2, and 53/139 >+2. Mean GH dose was 0.28 +/- 0.09 mg/kg/week and did not differ significantly across these three groups (p=0.64). For patients with IGF-1z >+2, 13(24%) had dose increase, 30(57%) no dose adjustment, and 10(19%) had dose decrease. Mean GH dose was 0.25 +/- 0.12 mg/kg/week prior to dose increase and 0.30 +/- 0.12 in those without increase (p= 0.35).

Conclusion
IGF-1z was >+2 in over 1/3 of measurements in GH-treated GHD patients. Nevertheless, 56% had dose increase and lower mean dose/kg/week than those without dose increase. Weight-based GH dosing may lead to IGF-1z >+2. More data are needed to assess outcomes of IGF-1z, as effects of supra-physiological IGF-I levels are unknown.
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DETERMINING THE EATING BEHAVIORS OF ADOLESCENTS STUDYING AT PRIVATE AND PUBLIC SCHOOLS

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Background and Aims
This study was planned and conducted in order to determine the eating behaviors of high schoolers studying at private and public schools.

Method
In total, 699 volunteer 14-17 age adolescents studying at 2 public schools (n=397) and 2 private schools (n=302) participated to the study. Data was collected with a questionnaire form. In determining the eating behaviors, eating behavior scale which was developed by Ozdogan (2013) and contains 58 expressions was used. Eating behaviors of adolescents were grouped as “bad”, “average”, “good” and “very good” according to the points obtained from the scale.

Results
52.9% of the students who participated to the study was male and 47.1% of them was female. While the eating behavior point of the male students was 153.5±25.1, this was 151.8±27.3 in females. The relation between gender, age groups, the school at which they study and the classroom in which they stay and eating behavior points was not found as statically meaningful (p>0.05).

Conclusion
It was determined that the majority of the those who are at the range of “good” and “average” were the ones who are studying at public schools. For this reason, the importance of the nutrition should be emphasized by giving them nutrition trainings in certain days and hours by experts, they should be encouraged to make right choices and healthy nourishment should be provided to them with well-planned menus and these should be inspected. We are grateful to the school manager and students for their support and for letting us to conduct this study during their working/education time.
USE OF THE AROMATASE INHIBITOR ANASTRAZOLE IN MALE ADOLESCENTS WITH SHORT PREDICTED ADULT STATURE WITH AND WITHOUT ASSOCIATED GH THERAPY: FIRST YEAR DATA

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Background and Aims
Aromatase inhibitors block the conversion of androgens to estrogens, and can be used to delay bone maturation in males to increase the predicted adult height (PAH). We sought to determine whether Anastrazole therapy increases PAH in boys with and without associated GH therapy.

Method
28 boys (13.6 years), used oral Anastrazole 1 mg/day for 1 year. 18 received GH therapy (“GH” group) and 10 did not (“ØGH” group). PAH was calculated based on Bayley/Pinneau formula.

Results
The Basal PAH was statistically below the TH (–2.9cm, p= 0.008), and after one year of treatment with Anastrazole it was above the TH (+3.4cm, p= 0.008) and above the Basal PAH (+6.3cm, p<0.001). For the “GH” group the increase in PAH after 1 year was +3.6cm comparing to TH (p=0.01) and +6.3cm for Basal PAH (p<0.001). For the “ØGH” group, the increase in PAH after 1 year was +3.1cm comparing to TH (p=0.06) and +6.2cm for Basal PAH (p<0.002).

<table>
<thead>
<tr>
<th>Group</th>
<th>TH (cm)</th>
<th>Basal PAH (cm)</th>
<th>1 year PAH (cm)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>“ØGH”</td>
<td>173.7 ± 4.39</td>
<td>170.62 ± 3.9</td>
<td>176.8 ± 3.89</td>
<td>0.003</td>
</tr>
<tr>
<td>“GH”</td>
<td>171.48 ± 4.48</td>
<td>168.77 ± 4.1</td>
<td>175.11 ± 4.46</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total</td>
<td>172.28 ± 4.50</td>
<td>169.43 ± 4.06</td>
<td>175.71 ± 4.27</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Friedman test

Conclusion
One year use of anastrazole in boys with short PAH can improve PAH in “GH” and “ØGH” groups. The complete follow up until adulthood will determine if this increase in PAH will reflect in better final adult height.
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**239 EFFECT OF PREMATURITY ON PHYSICAL EXERCISE CAPACITY AND MOTOR SKILLS**

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**Background and Aims**

Effects of prematurity (gestation <37th weeks or birth mass <2500g) on anaerobic performance and agility have not yet been described. We therefore compared these parameters between premature and full-term/normal-birth-mass (FT/NBW) individuals throughout their schooling years.

**Method**

The study approved by the Slovenian Ethics Committee enrolled newborns into a long-term longitudinal study in 1987. Data on aerobic (600-meter running), anaerobic (60-meter running, standing broad jump, sit-ups, bent arm hang), and agility-motor performance (polygon backwards, standing reach touch, arm plate tapping) from 8 to 18 years of age were obtained yearly with SLOfit system to analyze differences between tested groups with t-test analysis.

**Results**

Body height was lower (p<0.05) in very premature (gestation <32 weeks or birth mass <1500g; males N=16, females N=10), as compared to their FT/NBW peers (males N=84, females N=62) up to the age of 17 (males) and 18 (females) years. FT/NBW individuals performed the majority of anaerobic and agility-motor tests better (p<0.05) than premature individuals (males N=67, females N=55). However, before puberty, the agility-motor tests were performed better (p<0.05) by premature than FT/NBW females. A 600-meter running was performed similar in all males, but very premature females were slower (p<0.05) than FT/NBW peers after 15 years of age. These results will be discussed in view of sexual maturation, for which data were also obtained.

**Conclusion**

Up to the age of 18 years, anaerobic performance as well as agility is generally hindered in premature individuals, as compared to FT/NBW individuals. For the agility, this is especially prominent after the onset of puberty.
Background and Aims
Stunting is a risk factor for poor child development and it’s been shown to increase childhood mortality from infectious diseases. Previous studies in Indonesia showed that over 70 years since 1940s, increase height 0.3-0.8cm at 5-year-old and 1.9-3.5cm at 15-year-old among girls and boys. Aims: To measure linear growth, stunting, bone mineral density (BMD) among 5-12-years-old Indonesian children.

Method
Weighted data of 2743 children 5-12-year-old of South-East Asian Nutrition Surveys (SEANUTS) 2011 randomly selected from 48 districts representative at national level were used. Enumerators measured height and assessed socioeconomic status (SES) by interviewer-administered questionnaires. Cut-off point of height-for-age (HAZ) was z-score <-3.0 (severe stunting) and <-2.0 (stunting). BMD was measured by dual-energy X-ray absorptiometry (DXA) in 100 children. Analysis was aimed to measure median height, prevalence of stunting, association between DXA and HAZ z-scores.

Results
Height of Indonesian boys and girls was shorter 7.0cm at 5-year-old, and 10.7cm (boys) to 13cm (girls) at 12-year-old compared to WHO standard. Overall prevalence of severe stunting and stunting was 5.3 and 26.0% respectively, higher in rural areas and children having lower SES. There was an association between HAZ and DXA z-score (r=0.370), thus the better linear growth the better BMD.

Conclusion
Linear growth is below WHO child growth, thus stunting is still a major nutritional problem in Indonesia. In order to achieve WHO target 2025, nutrition programs supported by health and other socioeconomic programs targeted for high risk population particularly for first 1000 days.

Acknowledgements: SEANUTS was funded by FrieslandCampina.
ASSOCIATION BETWEEN ANIMAL PROTEIN SOURCES CONSUMPTION AND STUNTING IN TODDLER: A PRELIMINARY STUDY IN JAKARTA

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**Background and Aims**
Fifteen out of 29 provinces in Indonesia have stunting prevalence above 40%. The aim of this study was to investigate the association between animal protein sources intake pattern and stunting in Indonesian toddlers.

**Method**
A number of 172 subjects, consisting of 41 stunted (height-for-age z score <-2) and 131 normal toddlers, were recruited randomly out of five community health posts in Jakarta, Indonesia. The intake pattern of five commonly consumed animal protein sources, namely growing-up milk (GUM), chicken/beef liver, red meat, red meat products, and egg, was collected using modified NutripeQ questionnaire.

**Results**
Stunting was significantly higher in toddlers consuming less than 300 ml/day GUM compared to those consuming 300 ml/day or more (adjusted OR 2.88, 95% CI 1.36-6.11, p< 0.01). Multivariate logistic regression test adjusted for age, sex, and protein sources showed that GUM consumption was protective against stunting (OR 0.48, 95% CI 0.30-0.75, p <0.01), while red meat products was a risk factor for stunting (OR 1.85, 95% CI 1.04-3.31, p<0.05). No significant correlation was found for chicken/beef liver, red meat, and egg.

**Conclusion**
Daily GUM consumption of at least 300 ml/day may benefit to prevent stunting in toddlers. Consumption of red meat products (nuggets, sausage, meatballs) which majority had low protein content and quality replaced good quality protein sources thus made red meat products intake as a risk factor for stunting. Further study investigating various protein sources and other specific nutrients that promote linear growth is needed.
Background and Aims
The aim of this study was evaluate the nutritional status of low birth weight (LBW) children and associations with perinatal history and current maternal nutritional status.

Method
This cross-sectional study included 544 LBW children (5-10 years old) of a metropolitan area of São Paulo/Brazil. Neonatal data of liveborn infants declarations and the current weight and height of the mothers were collected. The z score height/age (HAZ) and the body mass index (BMIZ) were compared to those of non-LBW children from an anthropometric census in the same population.

Results
LBW children presented short stature (34/6.2%), overweight (67/12.3%) and obesity (47/8.6%). Current maternal overweight status/obesity was inversely associated with short stature (OR = 0.25; 95% CI = 0.09 – 0.70) and maternal short stature was associated with an increased likelihood of LBW children having short stature at school age (OR = 6.94; 95% CI = 2.34 – 20.6). The male gender (OR = 1.77; 95% CI = 1.06 – 2.95) and current maternal overweight/obesity (OR = 2.40; 95% CI = 1.44 – 4.01) were associated with overweight/obesity in children and current maternal overweight/obesity were associated with
overweight/obesity in children.

**Conclusion**

Most schoolchildren with LBW had recovered the stature and a significant portion already has overweight/obese. Overweight/obesity and short stature were independently associated with current maternal nutritional status and overweight/obesity was also associated with male gender. **Support:** São Paulo Research Foundation (FAPESP-Fundação de Apoio à Pesquisa do Estado de São Paulo).
Background and Aims
Low birth weight (LBW) is associated with cardiovascular diseases (CVD) risk factors in children. We aim to describe and compare the nutritional status, lipid profile and insulin resistance in low birth weight (LBW) and macrosomic children.

Method
Cross-sectional study with 720 children and adolescents (6.0 to 15 years) born at term. BMI, waist circumference, blood pressure (SBP/DBP), insulin resistance (fasting insulin, HOMA-IR) lipid profile, uric acid, cysteine and homocysteine were assessed. Statistics: ANOVA, significance level of 5%.

Results
372 (51.7%) subjects were male (mean age: 9.2 ± 2 years), 80 (11.1%) and 40 (5.6%) were born <2500 g (LBW) and >4000 g (macrosomic), respectively. Among the groups there was no statistical difference in BMI and Height/Age. LBW children presented higher SBP [ORadj = 1.07 (95% CI 1.05 to 1.10)] and homocysteine [ORadj = 1.19 (95% CI 1.05 to 1.35)] compared those with adequate birth weight.

Conclusion
LBW showed unfavorable outcomes. To be born over 4000 g was not associated with poorer nutritional status and or with CVD risk factors.
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STUNTED AT 10 YEARS. LINEAR GROWTH TRAJECTORIES AND STUNTING FROM BIRTH TO PRE-ADOLESCENCE IN A RURAL BANGLADESHI COHORT
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Background and Aims
Few studies in low-income settings analyze linear growth trajectories from foetal life to pre-adolescence. The aim of this study is to describe linear growth and stunting from birth to 10 years in rural Bangladesh and to analyze whether maternal and environmental determinants at conception are associated with linear growth throughout childhood and stunting at 10 years.

Method
Pregnant women participating in the MINIMat trial were identified in early pregnancy and a birth cohort (n=1663) was followed with 19 growth measurements from birth to 10 years. Analyses of baseline predictors and mean height-for-age Z-scores (HAZ) over time and stunting (HAZ<-2) at 10 years were modelled using GLMM and logistic regression analysis.

Results
HAZ decreased up to 2 years, followed by an increase up to 10 years, while the average height-for-age difference in cm (HAD) to the WHO reference median continued to increase up to 10 years. Maternal height, maternal educational level and season of conception were all independent predictors of HAZ from birth to pre-adolescence (p<0.001) and stunting at 10 years. The highest probability to be stunted at 10 years was for children born by short mothers (<147.5 cm) (ORadj 2.93, 95% CI: 2.06-4.20), mothers with no education (ORadj 1.74, 95% CI 1.17-2.81) or those conceived in the pre-monsoon season (ORadj 1.94, 95% CI 1.37-2.77).

Conclusion
Growth trajectories and prevalence of stunting in pre-adolescence showed strong intergenerational associations (short mothers), social differentials (maternal education levels) and environmental influence from fetal life (season of conception).
Background and Aims
Dengue Fever (DF) became a serious problem in tropical countries, especially Indonesia. Annually the outbreak of DF occurred in almost all provinces in Indonesia. DF is more common in infants and children. In some severe cases, DF may rapidly evolve into Dengue Shock Syndrome (DSS). This study aims to explore the association between nutritional status and hematological profile with the incidence of DSS among children.

Method
A cross-sectional study with a total sample of 92 children (≤14 years old) who diagnosed with DF in Wangaya General Hospital, which is a referral hospital for all DF cases in Denpasar City. Demographic data, nutritional status, final diagnosis, length-of-fever before hospitalized, and result from baseline complete blood count test were collected from medical record. Data were analyzed using univariate and bivariate analysis (chi-square test with cramer’s v).

Results
From all DF cases, 8.7% developed to DSS (2 infants and 6 children, <10 years old). Our study found a moderate correlation between nutritional status and DSS (r=0.39; p<0.001). There was a moderate correlation between thrombocyte count and DSS (r=0.492; p<0.001). A moderate correlation between hematocrit percentage and DSS (r=0.528; p<0.001) is also documented. Hemoglobin, leukocyte, and length-of-fever before hospitalized were not correlated with DSS (p>0.05).

Conclusion
Children with DF who are overweight tend to develop DSS. Low thrombocyte and high hematocrit count may also act as important predictors for the development of DSS. These findings are useful to predict the prognostic/risk factor of DSS thus precautions can be taken earlier to prevent further complications.
Background and Aims

Height evaluation is an integral part of cystic fibrosis (CF)-care. Height is compared to reference values of healthy children by converting it to z-scores height-for-age (HFA). However, HFA does not adjust for genetic potential, i.e. target height (TH). Therefore, the use of HFA could result into a misclassification of height: an underestimation in children with tall parents, and an overestimation in those with short parents. We assessed the agreement between HFA and HFA-adjusted-for-TH (HFA/TH) in the Dutch paediatric CF-population.

Method

Included were 474 children of Dutch origin with proven CF (230 girls, age 10.2 ± 4.7y). HFA and TH were determined, and HFA/TH was calculated by subtracting TH from HFA. The agreement between HFA and HFA/TH for the total group, and for HFA and HFA/TH classified into outcomes ≥0, <0 and ≥-1, <-1 and ≥-2, and ≤-2 were calculated by using a paired t-test and Cohen’s Kappa, respectively.

Results

HFA outcomes were on average -0.07 (95% CI: -0.02 – -0.12) lower than HFA/TH outcomes. We found a moderate agreement between the four height classes: outcomes ≥0, <0 and ≥-1, <-1 and ≥-2, and ≤-2 (Cohen’s Kappa: 0.45). In 21% of the measurements, HFA was categorised lower (underestimation), and in 15% higher (overestimation) than HFA/TH.

Conclusion

The agreement between HFA and HFA/TH was moderate. Without adjustment for TH, height measurements are both over- and underestimated. In clinical practise, patients might wrongfully being diagnosed as at risk or stunted, while this diagnosis might also be missed. This might result in an inadequate nutritional treatment.
Background and Aims
Childhood malnutrition contributes to developmental delays, increased morbidity and mortality. A systematic review was undertaken to examine the effectiveness of preschool feeding programmes in fostering the growth of children in developing countries.

Method
A systematic literature search was undertaken to identify published studies that related to the objective. Randomised intervention studies that reported on growth outcomes of children from 0-6 years of age were included. An initial search yielded 59 studies, of which 44 were excluded based on initial screening. Five more were omitted based on detailed data extraction. Ten studies met the inclusion criteria.

Results
A high level of heterogeneity with regard to sample characteristics, intervention and reporting of results was found. In the context of recovery from malnutrition, most studies reported a positive effect from feeding programmes. In studies that reported on weight gain, those that included supervised intake of food supplements resulted in higher rates of weight gain. Micronutrient fortification had a positive influence on rate of linear growth in studies that reported on linear growth. Intensive nutrition education aimed at mothers and caregivers contributed to the effectiveness of feeding programmes.

Conclusion
Limitations included high levels of heterogeneity and poor quality of reporting. In view of these limitations, no firm conclusion can be drawn. Additional research, aimed at determining the impact of supplementary feeding programmes in supporting the growth of disadvantaged children, is encouraged.
THE ASSOCIATION BETWEEN MILK, DAIRY CONSUMPTION AND HEIGHT IN CHILDREN

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Background and Aims
Dairy product consumption was found to augment linear growth in malnourished populations. Reports on the link between dairy intake and linear growth from developed countries are scarce. Aims: to compare dairy consumption between pre-pubertal healthy children (6-9 years) with height>10th percentile and children with height<50th percentile.

Method
Case-control study. Cases: 30 boys with height >10th percentile, controls: 30 boys with height>50th percentile. Outcome measures: Dietary consumption (by 3-day food diary), dairy consumption (by food frequency questionnaire). Questionnaires: Sleep patterns, quality of life, and physical activity. Energy and macronutrients were corrected for body surface area (BSA).

Results
The average dairy consumption of the cohort was 2.3±1.2 daily-portions, with no significant differences between groups. The absolute daily average energy, fat and carbohydrates intake was significantly lower in cases (P<0.05); after correcting for BSA, no significant differences were found between groups. Adjusted protein to BSA was significantly higher in cases (72.±19.1g/BSA vs. 60.6±15.7g/BSA, respectively, P<0.015). Micronutrients intake [(calcium, iron, vitamin A, zinc expressed as percentage from Recommended Dietary Allowances (RDA)] were not significantly different between groups. Regression analysis revealed that the cases had a lower intake of zinc as percentage from RDA [OR=1.086 (CI95% 1.032-1.142), P=0.002] and protein corrected for BSA was higher [OR=0.97 (CI95% 0.954-0.991), P=0.003].

Conclusion
Our findings suggest that dairy might not be a significant environmental variable influencing the variation in height in pre-pubertal children from affluent societies. Further research is needed to elucidate the effect of milk and dairy consumption on childhood growth and health status.
**Background and Aims**

This study aims to determine the anthropometric status of adolescents practicing sport in the city of Kenitra (Northwest Moroccan).

**Method**

A sample of 180 subjects were observed in 6 sports clubs in the city of Kenitra. Anthropometric measurements (weight and height) are performed according to the standard norm of the World Health Organization. We determined anthropometric indices: height for age and body mass index (BMI) by Z score calculated using growth references WHO 2007 for 5-19 years.

**Results**

The mean age was 17.44 ± 1.5 years. The stature, underweight and overweight are respectively, 2.8%, 2.8% and 0%.

**Conclusion**

These subjects have normal height and weight condition. A comprehensive study on food habits of these adolescents seems important to understand these results.
EFFECT OF MILK AND DAIRY PRODUCTS ON BODY MASS INDEX

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Background and Aims
The intake of dairy products has been shown to have beneficial effects on body weight and body fat. The aim of this study was to assess the relationship between consumption of dairy products and body mass index (BMI) and to assess the effect of nutrition awareness on the consumption of dairy products.

Method
A randomized controlled trial of 120 females from the Girls College at Riyadh city, aged 23-49 years were enrolled in a 2 months study. The Subjects were randomly assigned to an experimental group and a control group. The study group participated in a nutrition awareness program which promotes consumption of dairy products. Dietary data were collected by means of food frequency questionnaire for 1 y and two 24-h dietary recalls. Height and weight were measured and BMI was calculated at baseline and at 8 weeks.

Results
The study group showed significant increase (P ≤0.01) in mean milk intake from 2.03 servings/week at baseline to 7.9 servings/week and a significant (P≤0.01) increase in mean yogurt consumption from 0.9 serving/week at baseline to 5.5 servings/week at the end of study. There was no significant changes in dairy products consumption in the control group. The Study group showed significant reduction in mean BMI (0.9 kg/m²) (P≤0.001) compared to baseline. The control group showed no significant changes in BMI. The reduction in BMI among the study group was accompanied by significant increase (P≤0.01) in consumption of dairy products.

Conclusion
The results suggest an inverse relationship between the increase in dairy consumption and BMI.
DO FAMILY EATING HABITS AFFECT BREASTFEEDING AND INFANTS’ GROWTH?

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Background and Aims
Breastfed babies are less likely to become obese later in life, with duration of breastfeeding exerting a dose-response effect. In Slovenia, obesity in children is a growing problem. We observed in typical Slovenian infant population sample the pattern of growth in breast fed and formula-fed infants.

Method
In prospective study we included 118 healthy infants and their parents from a typical Slovenian municipality. Data were collected within infants’ systematic reviews and analysed by SPSS software, ver. 22.0.

Results
We included 58 boys, 60 girls; born at mean GS=39,34±1,02 weeks with mean BW=3461,56±452,51g and BL=51,61±2,33cm. On average mother was 31,1±4,3 years old, giving first birth (1,79±1,05). Mean education of mother was equal to father’s (finished secondary school). Breastfeeding was started in all newborns at maternity ward but dropped to 91,5% at 1 month; 80,6% at 3; 69,5% at 6; 59,5% at 9; 32,5% at 12 months. Parents knew diet pyramid in 100% and reported their eating habits as healthy in 68,5%. They ate 2 daily meals in 5,2%; 3 in 10,5%; 4 in 47,3%; >4 in 37%. In 94,8% infants had >4 meals every day. Every day meals included vegetables, fruits, and cereals; slightly less often diary products; meat every second or third day. Parents drank water in 73,6% when thirsty; in 26,4% combined with tea. Their children drank water in 63,2% when thirsty; with juice in 5,2%; with tea in 10,5%; something else (e.g.: milk) in 21,1%.

Conclusion
Breastfeeding adherence in our group can be due to specific life style and eating habits.
Obesity

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EFFECTS OF SUPPLEMENTATION WITH WATER-SOLUBLE FIBER AND CONCENTRATION OF UME JUICE (PRUNUS MUME) ON BLOOD PRESSURE AND LIPID PROFILES IN OVERWEIGHT INDIVIDUALS
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Background and Aims
Studies have claimed an association between supplementation with soluble dietary fiber and a cholesterol-lowering effect. Also, fruit-juice Concentrate of Ume ((Prunus Mume) has recently been shown to improve human blood fluidity and blood pressure. The purpose of this study was to determine the effect of supplementation with a combination of water-soluble fiber and concentrate of Ume Juice on blood pressure and lipid profiles in overweight individuals.

Method
We conducted a randomized, single-blind, placebo-controlled study to determined the effects of supplementation with a combination of fiber mixture (including resistant maltodextrin, Gum Arabic, psyllium husk powder, oat fiber and inulin) and concentrate of Ume Juice. Forty overweight (BMI>24) individuals with mild-to-moderate hypercholesterol were randomly assigned to supplement group (received 10g water-soluble dietary fiber, 1 g concentrate of Ume juice/day) or placebo group for 12 weeks.

Results
Supplement group had significant reduction in systolic pressure and diastolic pressure. (Figure.1) Furthermore, all lipid biomarkers of improved with increases in high-density lipoprotein cholesterol and reduction in total cholesterol, low low-density lipoprotein cholesterol ( Figure.2 ). No adverse events and gastrointestinal complaints were reported in either group.

Conclusion
Supplementation with water-soluble fiber and concentrate of Ume Juice for 12 weeks is well-tolerated and improves blood pressure and lipid profiles in overweight individuals.
Background and Aims
The Canadian Health Measures Survey show overweight and obesity rate for children ranges from 19.8% and 11.7% respectively. Some studies have estimated that children with disabilities are approximately at 38% higher risk of being overweight and obese. Therefore, we wanted compare the prevalence of overweight and obesity among children with disabilities in our outpatient clinic to determine the true extent of these estimates.

Method
Data from the Child Development Program (CDP) at Holland Bloorview’s, Nutrition Clinic were used to calculate the prevalence estimates in children with disabilities aged 0 to 10 years old (n=259). Using World Health Organization’s body mass index-for-age cutoff for overweight at 97th -99.9th percentile for age 2-5 years old and 85th-97th percentile for age 5-19 years old and obese at greater than 99.9th percentile for age 2-5 years and 97-99.9th percentile for obese and greater than 99.9th percentile for age 5-19 years old.

Results
The prevalence of overweight and obesity in the Nutrition clinic were 5.4% and 13.5% respectively. Therefore, it shows that there are differences to prevalence of overweight and obesity among children with disabilities as compare to children without disabilities in our Nutrition clinic.

Conclusion
This review provided us with prevalence rate of overweight and obesity of children with disabilities in our Nutrition clinic that are different from literature estimate. This strengthen the call for a larger multi-centre evaluation of the evidence base examining of overweight and obesity rate in children with disabilities.
Obesity

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BENEFICIAL EFFECTS OF A TRADITIONAL THAI HERBAL REMEDY, TRI-SU-RA-PHON, TEA CONSUMPTION ON HEALTHY OVERWEIGHT VOLUNTEERS

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Background and Aims
Plant-based remedies produce significant amount of phyto-antioxidants and represent a potential source for the development of antioxidant-rich beverages or food. ‘Tri-Su-Ra-Pon’ a polyherbal formulation described in Thai Pharmaceutical Textbook as a rejuvenator was found to possess promising antioxidant effects. The remedy was composed of Cinnamomum bejolghota, Aquilaria malaccensis, and Cinnamomum porrectum in 1:1:1 ratio. Present study was undertaken to evaluate the effect of Tri-Su-Ra-Phon tea consumption in healthy overweight volunteers.

Method
The participants (n=70) who met inclusion criteria were divided into two equivalent groups, in an 8-week single-blinded, placebo-controlled and randomized clinical trial.

Results
At the end of 4th week, the participants who consumed Tri-Su-Ra-Phon tea showed significantly decreased in triglyceride level (p<0.05). The levels of low-density lipoprotein (p<0.05) and total cholesterol (p<0.05) of these participants were remarkably decreased after 8-week treatment. Additionally, the level of high-density lipoprotein (p<0.05) of the participants were significantly increased (p<0.05) after the 8-week treatment, while there is no significantly differences were observed in the levels of liver enzymes.

Conclusion
Based on this information, it could be concluded that Tri-Su-Ra-Phon has great potential to be used in the development of functional beverages that are currently in demand for health benefits.
Obesity

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EFFECT OF OBESITY ON SELF ESTEEM IN A SAMPLE OF EGYPTIAN ELEMENTARY STUDENTS
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Background and Aims
Childhood overweight and obesity has become a global epidemic affecting children of all ages, and backgrounds. Limited research is available on the emotional effect of obesity on children. The aim of this study was to detect the association between obesity and self-esteem and find out its effect on school performance.

Method
A cross-sectional study of primary schools located in urban areas of Cairo carried out in 2013-2014. It included 1270 school children aged 6-15 years. Their weight, height and BMI were calculated. Out of the 1270 child 505 obese children (BMI > 95th centile) were enrolled and 101 normal (BMI between 5th and 85th centile) were included as a control group. Self-esteem was measured using Rosenberg self-esteem score. School records for absenteeism and performance were checked.

Results
Obese children had lower self-esteem with a mean Rosenberg total score of (14.17±3.72) compared to (19.87±1.83) in normal children (P<0.001). Girls had significantly lower scores than boys (P<0.001) 72.9% of obese children had good school performance compared to (86.1%) of normal (p<0.001) 23.8% of obese children had more than 2 days of school absenteeism in one term compared to (3%) of normal (18%) of obese had no days of absenteeism compared to (69.3%) of normal (P<0.001).

Conclusion
There was a statistically significant negative association between child’s BMI and self-esteem especially in girls; it also had shown statistically significant association between BMI, school absenteeism and school performance.
Obesity

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EVALUATION OF BODY IMAGE IN OBESE CHILDREN AND THEIR PARENTS
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Background and Aims
The prevalence of childhood obesity, is increasing rapidly all over the world. Accurate
detection or identification of childhood obesity by parents is one of the cornerstones of
treatment. This study was conducted with the purpose of evaluation body image in obese
children and their parents.

Method
The study was carried out at the in İstanbul Faculty of Medicine Hospital, from June 2010 to
November 2010 and between the age of 7-17 years, 128 obese (BMI ≥95 percentile) with
children and their parents. Children’s body weight and height measurements were taken,
BMI values were calculated. 7 figures body image scale developed by Adkins and Stivers
was used for the evaluation of body image. Statistical analyses were performed by using
SPSS 18.0 package.

Results
In body image identification, 43.8% of the children defined themselves as overweighted and
20.7% defined themselves as obese. More than half of the parents (53.7%) identified their
children as overweighted and 20.7% of the parents identified their children as obese. When
we evaluated the desired body shaped, we found that 89.3% of the children wanted to
have normal body weight whereas 10.7% wanted to be thin. Almost all of the parents (95%)
wanted their children to have normal body weight, only 5% wanted their children to be thin.

Conclusion
It was seen that 64.5% of the children and 77.7% of the parents were correctly perceiving
the status of overweight and obesity. Increasing awareness of obesity, especially among
parents, will play an important role in both prevention and treatment of obesity.
Background and Aims
Sedentary lifestyle, specifically eating habit and physical activity, are determining factors of obese adolescents. It has been associated with substantial health consequences in the future. This study aimed to evaluate eating habit and physical activity among obese junior high school students in Denpasar District, Bali Province.

Method
A descriptive cross-sectional study was conducted involving 163 respondents. Samples were taken from junior high school students with obesity by cluster random sampling. Data on demographics, anthropometric status, eating habit, physical activity, and family history were collected using questionnaires. Data were then analyzed descriptively.

Results
From 163 junior high school students with obesity (males 60.1%, females 39.9%), the average of Body Mass Index (BMI) is 29.97±3.31. The proportion of samples who had history of obesity in their family is 77.3%. 82.2% of the samples consumed fast food more than once a week and 54% watch television more than 2 hours per day. 55.2% use personal electronic devices less than three hours per day and 57.7% do physical activity more than once a week.

Conclusion
The proportion of sedentary lifestyle among obese adolescents in Denpasar is high. Its indicate the need of further prospective research to evaluate the impact of cardiometabolic syndrome in adolescents’ future health.
Obesity

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FACTORs ASSOCIATED WITH LOSING HEAVT IN GIRLS BETWEEN 7 AND 16-18 YEARS - LONGITUDINAL STUDY
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Background and Aims
This study analyze which factor are related to decrease in the BMI category between 7 and 16–18 years of age on the basis of continuous studies.

Method
Data were collected from 1008 girls aged 16–18 y. Body weight and height were measured and BMI was calculated. Information on height and body weight in earlier periods of life was retrieved from medical records. The date on socio-economic status and age at menarche were collected.

Results
At the age of 7 y. the prevalence of underweight was 10.63%, overweight - 11.02%, and obesity - 2.38%. At the age of 16–18 y., 12.61% of subjects were underweight, 3.38% overweight, with only 0.60% obese subjects. A drop in the BMI category was linked to the incidence of overweight and obesity at the age of 9 y. and 14 y. and a taller stature at the age of 7 and 9 years. High SES was connected with a change in the category from "correct weight" at the age of 7 y. to "underweight" at 16–18 y., whereas the SES did not have a significant effect on the change of the category "overweight & obesity" at 7 y. to "correct weight" at 16–18 y. Results of logistic regression did not reveal any effect of the rate of adolescence on shifts in the BMI category.

Conclusion
The results of this study confirm the hypothesis that the scale of BMI changes in childhood and early adulthood depends to a large extent on BMI in childhood.
Obesity

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ADIPONECTIN IS ASSOCIATED WITH NONALCOHOLIC FATTY LIVER DISEASE IN OBESE TAIWANESE CHILDREN

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²

Background and Aims
Concurrent with the rise of the incidence in obesity, nonalcoholic fatty liver disease (NAFLD) is increasingly prevalent in children. Adiponectin is a major regulator of glucose and lipid homeostasis. Decreased adiponectin levels may be linked to NAFLD. We aimed to test the hypothesis that adiponectin would influence the risk of NAFLD in obese children independent of its insulin sensitizer properties.

Method
This study was a cross-sectional study of the risk factors for NAFLD in obese children. A total of 821 obese subjects aged 6-18 years were recruited. Liver ultrasonography was used to diagnose NAFLD. We measured anthropometric, serum biochemical variables, serum adiponectin levels, and biomarkers for insulin resistance. We evaluated the independent influence of the adiponectin level on NAFLD after controlling for the effect of insulin resistance measured by HOMA-IR.

Results
185 (22.5%) had NAFLD. Obese children with NAFLD had significantly higher HOMA-IR and lower adiponectin levels than obese children without NAFLD. In multivariate logistic regression analysis, NAFLD was significantly associated with age, gender, body mass index, HOMA-IR, and adiponectin. For every 1μg/mL increase in serum adiponectin level, there was a decreased risk of having NAFLD with an odds ratio of 0.851 (95% confidence interval, 0.083 to 0.902, P <0.001).

Conclusion
Higher serum adiponectin level is associated with a decreased risk for NAFLD independent of the effects of age, gender, BMI, and insulin resistance in our population of obese Taiwanese children.
Obesity

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INTRODUCTION OF COMPLEMENTARY FOODS AND OVERWEIGHT IN CHILDREN AGED 4 TO 11 YEARS OLD: COHORT SCAALA

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2Institute of Collective Health. Federal University of Bahia- Salvador- Bahia- Brazil,
Department of infectious diseases and nutritional, Salvador, Brazil

Background and Aims
Overweight childhood have high worldwide prevalence and has been suggested that conditions during early childhood, as the timing of introducing solid or liquid foods, may have a role in the future development of this health problem. Aims: To describe the relationship of the introduction complementary foods with overweight in children aged 4-11 years.

Method
Cross-sectional descriptive study (baseline SCAALA cohort) conducted with 603 children between 4-11 years recruited between 1997 and 2004 in Salvador-Bahia, Brazil. Parents reported on infant feeding practices for children until two years old. A bivariate analysis was performed to investigate the variables of interest using the chi-square test and Fisher’s exact test.

Results
A total of 15% of the children had overweight or obesity. Overweight or obese children in preschool and school age were more frequent to receive tea or water introduction (p 0.020) and food sources of protein (p 0.161) before age 4 months.

Conclusion
The premature introduction of tea or water and protein foods were related to higher BMI in this population. Obesity prevention is a priority health strategy that has to start in childhood with the infant feeding practices.
Obesity

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TYPE OF MILK FEEDING IN INFANCY AND ADIPOSITY IN TODDLER AGE

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Background and Aims

High protein intake is highly likely a risk factor for later obesity. Infant formulas and cow milk provide more protein than breast milk. This observational study analyzed differences in type of milk feeding during infancy in normal weight (15th-75th percentile) and overweight toddlers (weight >75th percentile) in two urban settings in Croatia.

Method

The research was conducted via questionnaire, in nurseries in the cities of Zagreb and Čakovec. The study included 246 toddlers between 13 and 48 months of age. Data were processed by means of descriptive and nonparametric statistics using the χ² test and the Mann-Whitney U test.

Results

The normal weight group included 130 toddlers aged 25.91 +/-6.65 months. Their weight was 12.15 +/-1.45 kg (range 15.1-75 percentile, median 52.8). The overweight group consisted of 116 children aged 26.02 +/-7.52 months. Their weight was 14.39 +/-2.06 kg (range 75.1-100 percentile, median 89.85). Compared to toddlers with normal weight, the overweight children were exclusively breastfed significantly shorter (χ²=10.562, p<0.05); they were more frequently fed cow’s milk instead of formula on cessation of breastfeeding (χ²=4.287, p<0.05); and cow’s milk was included in complementary feeding before 12 months of age more often (χ²=7.157, p=0.01).

Conclusion

In this study we detected an alarming percentage of overweight toddlers (47.2%). Shorter breastfeeding and early introduction of cow milk were related to overweight. Early differences in macronutrient supply depending on type of milk-feeding may have long-term effects on substrate metabolism and contribute to adiposity later in life.
Obesity

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OBESITY IN CHILDHOOD AND ADOLESCENCE

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Background and Aims
The material and method is about school age pupils examined in Africa, Ukraine and United States from 2014-2015 pupils were examined for obesity using geographical, food and socio-economic methods for research

Method

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Ukraine</th>
<th>Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate/weather season</td>
<td>Winter</td>
<td>Winter</td>
<td>Weather conducive for outdoor activities</td>
</tr>
<tr>
<td>Affordability of food (process food)</td>
<td>easy to afford (pizzas, candies etc)</td>
<td>88%</td>
<td>35%</td>
</tr>
<tr>
<td>Money availability</td>
<td>More chances to get all their snacks 92%</td>
<td>75%</td>
<td>32%</td>
</tr>
<tr>
<td>walking to school</td>
<td>10%</td>
<td>45%</td>
<td>82%</td>
</tr>
<tr>
<td>Assets to internet</td>
<td>95%</td>
<td>89%</td>
<td>28%</td>
</tr>
<tr>
<td>Daycare by grandparents</td>
<td>38%</td>
<td>85%</td>
<td>15%</td>
</tr>
<tr>
<td>Computer Games</td>
<td>90%</td>
<td>55%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Results
Geographical seasons can affect children physical games activities, process food are more available in developed world and money can be spent on it, as the study case place in obesity in school age children with consequences of Type 1 diabetes, obstructive sleep apnea, bullying in schools, lower self esteem and depression

Conclusion
Control of obesity in school age children can be controlled by changing society, food choices, increase physical activities, family eating habits, eat lots of fruit and vegetables, drinking water, exercise to improve posture, boot self-esteem and confident, enhance social skills, reduce consumption of process food
Obesity

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EDDY - A PREVENTION PROJECT AGAINST THE DEVELOPMENT OF OBESITY AND CARDIOVASCULAR RISK FACTORS  
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Background and Aims  
Obesity correlates strongly with diseases of the cardiovascular system, which are responsible for about 43% of all deaths in Austria. Because of the fact that approximately 23% of the adolescents in Vienna are overweight or obese, it is necessary to find concepts to combat obesity and prevent its origin.

Method  
The EDDY project is an interventional cohort study with duration of two years. The cohort is scaled in an intervention group and a control group consisting of 147 students. The intervention group received a comprehensive, age-appropriate 20-hours nutrition training and a five-hours physiological training as well as a 20 hours sport and exercise intervention. Before and after intervention and at two follow-ups, subjects were physically measured (BIA, height) and blood samples were taken to determine the metabolic status. In addition, knowledge of nutritional issues and eating habits as well as psychological parameters were measured with adequate questionnaires.

Results  
Nutrition knowledge improved in 10 of 12 categories surveyed. In addition the consumption of junk food, sweets and salty snacks was reduced significantly after intervention. The body fat percentage of the subjects in the intervention group was reduced in a nonsignificant extend after intervention, as well as the number of children with elevated LDL and total cholesterol values.

Conclusion  
The data indicate that an intervention (based on both on nutrition knowledge and on stimulating daily physical activities) is able to improve the nutrition habits and possibly the health status.
Obesity

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ORO-CECAL TRANSIT TIME IN THAI OBESE CHILDREN
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Background and Aims
Changes of gastrointestinal motility may contribute to pathogenesis of obesity. Not many studies are reported in the literature regarding the oro-cecal transit time (OCTT) in obese patients and the results are controversial. The present study aimed to determine the OCTT in obese children and to compare findings with those measured in non-obese children.

Method
OCTT was studied in 22 obese and 22 non-obese children, aged 6-15 years old. OCTT was measured by hydrogen breath test after administering of 10 g of lactulose in 100 ml solution, and collecting exhaled breath sample every 10 minutes for 150 minutes. OCTT was defined as the interval from the baseline time to the first sustained increase in breath hydrogen concentration by at least 3 ppm. Children with a breath hydrogen concentration less than 10 ppm above the baseline values in 90 minutes sample or in any later samples were defined as hydrogen non-producers.

Results
Of all participants, 5 (11%) children were non hydrogen producers and were excluded from analysis. Mean OCTT in obese children (n=21) was significantly faster than in non-obese children (n=18) (70.0 versus 81.1 min, respectively; p-value=0.005). OCTT was significantly associated with body mass index (BMI) in the inverse manner (r=-0.51; p-value=0.001).

Conclusion
OCTT in obese children was faster than in non-obese children and was moderately inversely correlated with the BMI, suggesting a link between rapid gastrointestinal motility and obesity.
Background and Aims
The prevalence among obese adolescents has increased remarkably in Indonesia. Striae and acanthosis nigricans are skin manifestation that exist in adolescents who have rapidly obese. These signs are easy to recognise visually. This study was aimed at to proof that striae and acanthosis nigricans as the predictor in central obesity among adolescents in Denpasar District, Bali Province.

Method
A cross-sectional study with a total sample of 431 adolescents (aged 12—14 years) was conducted. Sample was taken from 10 junior high school in Denpasar District and selected by teachers from each school. Data on waist circumference, central obesity status; striae and acanthosis nigricans were collected. Data were analyzed using univariate and bivariate analysis (independent sample t-test and chi-square test with cramer’s v).

Results
There are 23.4% adolescents with central obesity based on waist circumference from a total 431 adolescents. The prevalence of striae and acanthosis nigricans among adolescents is 25.5% and 7.2% respectively. This study revealed a strong correlation between striae and central obesity (r=0.593; p=<0.001). But, there was no correlation between achantosis nigricans and central obesity (p>0.05).

Conclusion
Striae is a significant predictor for central obesity among adolescents. Adolescents may use the sign of striae for central obesity’s caution. This study needs further research with more samples to proof the correlation between acanthosis nigricans and central obesity. Finding from this study need further research to explore how obesity followed by skin manifestation like striae and skin manifestation.
Obesity

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THE RETROSPECTIVE STUDY OF WOMEN’S PRE-PREGNANCY BODY WEIGHT INFLUENCE ON GROWTH OF THEIR 1-YEAR OLD INFANTS EXCLUSIVELY BREASTFED DURING 4 MONTHS

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2Krasnoyarsk state medical university named by professor V.F. Voyno-Yasenetskii of Ministry of Health, Department of polyclinic pediatrics, Krasnoyarsk, Russia

Background and Aims
High weight gain in infancy – risk factor of later obesity – has been observed not only in formula fed but also in breast-fed (BF) infants. The reason of this is not clear. The aim was to evaluate growth during the first year of life and the frequency of high weight gain in BF infants of mothers who were overweight (OW, body mass index (BMI) > 24.9 kg/m²) or had normal body weight (NBW, BMI 18.5-24.9 kg/m²) at pre-pregnancy.

Method
We questioned 313 women with infants being BF at least 12 months and exclusively BF for 4 months, with the birth weight >2500 g and birth length >47 cm. Among mothers involved, 70.9% were NBW and 21.8% were OW.

Results
High weight gain (>1000 g/month) was observed in 50% of infants of OW and in 46% of infants of NBW mothers. Monthly weight gain of infants did not differ significantly between 2 groups. Infants of OW mothers tended to have birth weight (p=0.067) and body weight during the first year of life higher (p<0.05 at 1, 3 and 12 months of age) than infants of NBW mothers and had 3 times more often weight-for-length Z-scores > +2. We observed a positive correlation between mothers' BMI and infants' weight gain at 12 months of age (r = 0.227, p = 0.015).

Conclusion
The exclusive 4-months breast feeding did not compensate for the high growth rate at intrauterine period in infants of OW mothers so it is necessary to intervene at pre-pregnancy and pregnancy periods.
Obesity

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GROWTH AND NUTRITIONAL STATUS OF PRESCHOOL CHILDREN IN THE REPUBLIC OF MACEDONIA
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Background and Aims
If performed continuously, measurements of height and weight may indicate the patterns of growth in children of certain age. The aim of the study was to present and compare the trends of growth and nutritional status of preschool children, aged 4-5, in Macedonia.

Method
On average, 1320 children aged 4-5 were annually measured for height and weight in the period 2014-2015. The sample of children was representative and included children from all region of the country. The nutritional status and growth assessment is done according to WHO Child Growth Standards. Overweight is defined as weight-for-height z-score more than or equal to 2 SD and less than 3 SD. Obesity is defined as weight-for-height z-score more than or equal to 3SD.

Results
There is low prevalence of stunted and wasted cases among children of this age (2 year average=1.2% stunted and 1.5% wasted). On average, 10.2% of children are overweight or obese and 3.4% obese. Both overweight and obesity are more prevalent among boys. Data shows that the figures about prevalence of overweight and obesity among primary school children in Macedonia are steady.

Conclusion
Although more extensive data exists, average data for 2 years is presented due to the fact that the standardized methodology about nutritional status measurement for this population has been introduced in 2014. Introduction and implementation of public health nutrition policies should be further evaluated through regular nutritional status measurements.
Obesity

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THE EFFECT OF SHORT-TERM REDUCTION IN HIGH-FAT, HIGH-SALT DIET INTAKE ON OBESITY AND HYPERTENSION

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3, Liverpool,

Background and Aims
Obesity is a major risk factor for type 2 diabetes mellitus and cardiovascular disease. Chronic consumption of a high-fat-, high-salt-diet increases risks of both diabetes and hypertension reducing life expectancy by at least 20-25 years.

Method
Forty-six Asian (28 female, 22 male), adult (56+7 years old), obese (BMI 30+3), hypertensive (SBP 142+3) patients were studies for 9 months, following their referral to our unit. All patients were on maximum tolerated doses of their anti-hypertensive medications for at least three months which included combinations of diuretics, ACEI, ARB blockers, beta-blockers or calcium channel antagonists. The participants were given a strict dietary advice to reduce their fat intake by 50% and limit salt-intake to less than 4 g/day. The subjects were followed up on a bi-weekly basis to assess physical and laboratory (renal function, lipid profile) values as well as to discuss their dietary intake journals.

Results
All participants remained in the study for whole duration. There was trend in body weight and BP reduction from week 2, reaching statistically significance from week 10. At the end of the study, total body weight was 8%+2, with 60% of patients losing >14% of their body weight. The systolic blood pressure changes was 5.4+1.7 mmHg with 40% of patients having mean SBP reduction of >9.5 mmHg. There was significant reductions in lipid profile total cholesterol (-30+3%), LDL (-50+6%), HDL (+20+8%), triglycerides (-35+6%) and free fatty acids 42+5%). There was significant reduction in FPG (37%) and HbA1c by 0.61+0.05%.

Conclusion
This study underlines the importance of adequate education and non-pharmacological intervention in reducing obesity and hypertension and potentially diabetes.
Background and Aims
Appropriate gestational weight gain is linked to improved pregnancy outcomes. Thus, this study investigated maternal and nutritional determinants of maternal gestational weight gain in Northern Ghana.

Method
The study was a facility-based cross-sectional survey conducted in two districts in the Northern region of Ghana. The current study included 419 mother-infant pairs who delivered at term (37–42 weeks). Mother’s height, pre-pregnancy weight and weight changes were generated from the antenatal records. Questionnaires were administered to establish socio-economic and demographic information of respondents and their usual intake of the various food groups. Factors associated with gestational weight gain were examined using multiple and univariate regressions.

Results
The study revealed that 49.64% could not gain adequate weight according to the Institute of Medicine recommendations, 42.96% had adequate weight gain and 7.4% had excessive weight gain. Also, for every unit increase in cereal consumption score there was a 411g corresponding increase of the mothers weight (p=0.048) while an increase in soft drink consumption score leads to a 521g decrease in the mothers weight (p=0.009). Similarly, a unit increase in dietary diversity score resulted in a 563g-weight gain (p=<0.0001) while a unit increase in pre-pregnancy BMI resulted in a 190g reduction in weight gain (p=<0.0001). Women from low socio-economic households gained 940g less than those from middle socio-economic households (p=0.039).

Conclusion
The results show that dietary habits and pre-pregnancy BMI influence weight gain during pregnancy. Emphasis should be placed on counseling and assisting pregnant women to practice optimal nutrition in order to gain weight within the recommended ranges.
Other

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EVALUATED OF MOTHER’S DIET ON COW’S PROTEIN INTOLERANCE OF INFANT IN TEHRAN

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³Children’s Medical Center of Imam khomeini Hospital, Nutrition Office, Tehran, Iran

Background and Aims
The cow’s protein intolerance prevalence is increasing in infant of developed and developing countries. The cow’s protein intolerance is classified as a food allergy in infant with severe symptoms. The studies show that the kind of mother’s diet is very effective on the disorder in infants. In fact, hydrolysis of cow’s protein is very difficult for the digestive system of infants. The aim of study is to evaluate of the symptoms of cow’s protein intolerance in infant with breast feeding and suggested the best solution to treat of disorder.

Method
The study was a cross-sectional study. Sampling method was purposeful sampling. 20 breastfeeding mothers and their infants with cow’s protein intolerance were selected. The mother’s diet, infants’ general condition and supplementary feeding were evaluated.

Results
The findings show cow’s dairy products, cow’s meat and the foods with cow’s dairy products such as biscuits, cake, and ice-cream in mother’s diet cause to severe digestive problems in infants. The clear symptom to detect of cow’s protein intolerance is blood in infant’s stool. The researchers find that full cut of cow’s protein in mother’s diet may improve the infant’s conditions. Some sheep’s products can also create some intolerance protein in infants, but the reason is related to mix of sheep products and cow’s products.

Conclusion
It is concluded that the protein of mother’s diet has to change from cow’s protein to other protein resources like sheep, goat and soy proteins. Moreover, some soy protein based formulas may promote the protein tolerance in some infants.
 Other  

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**EFFECTS OF BETA GLUCANS ON BLOOD GLUCOSE LEVEL**

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**Background and Aims**

β-glucans are glucose polymers that are found in the cell walls of bacteria, fungi, yeasts, algae, lichens and plants such as oats and barley.

The aim of this paper was assessment of the relationship β-glucans and human health.

**Method**

Necessary literature review have been done.

**Results**

β-glucan is present in natural yeast, mushrooms, oats and barley. The commercial β-glucan extract is usually produced from yeast such as baker’s yeast or *Saccharomyces cerevisiae*. β-glucans contained in oat and barley vary in terms of their molecular masses, viscosities and solubility. This altered viscosity may be attenuated glucose and insulin response because nutrients become trapped and emptying from the stomach is delayed.

In colon, soluble fibers such as β-glucans form short chain fatty acids as a result of anaerobic fermentation. This short chain butyric acid increases expression of insulin-sensitive glucose transporter (GLUT 4) by activating propionic acid peroxisome proliferator receptor (PPAR).

Glucagon-like peptide 1 reduced gastric emptying rates, inhibited glucagon secretion and reduced hepatic glucose output in animals and human beings. Glucagon-like peptide 1 may reduce the amount of insulin required by individuals with impaired glucose metabolism when consuming a high-fiber diet.

Fiber supplements in daily diet providig doses of 10 to 29 g/day may have some benefit in terms of glycemic control.

**Conclusion**

The foods which contain high level of β-glucan such as oat (2-20g/100g), barley (3-8g/100g), bread or cereals should be included in the foods consumed every day. I believe that it will be beneficial to make modifications and develop tariffs on product basis for patients.
Other

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EDUCATING FUTURE CLINICIANS IN EARLY LIFE NUTRITION: COMPETENCIES AND TRAINING APPROACHES

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Background and Aims
Medical student education in early life nutrition varies largely between U.K. undergraduate medical schools despite attempts to standardise and improve the knowledge and skills of future physicians. Students in numerous reports have stated that they feel their nutrition knowledge is inadequate for clinical practice. We aim to evaluate the required knowledge and skills in undergraduate early life nutrition from a literature review and present an educational case study of an elective community-orientated nutrition course and its impact on medical students’ confidence in early life nutrition.

Method
We combine a literature review with the inaugural results of a 10-item survey that will be handed to 15 undergraduate students at the end of the course using a 5 point likert scale of their confidence in several domains of nutrition knowledge and skills. This will be supported by a qualitative focus group.

Results
In the literature, several themes emerged for required competencies in nutrition: nutrition in normal childhood growth and health, nutrition and public health, the impact of nutrition on disease and the impact of disease on nutrition. Anecdotally, the students are enthused and engaged by the course although the inaugural results of the medical students’ survey will be formally presented here.

Conclusion
Medical education in early life nutrition needs to be systematic and we suggest the domains of knowledge that are required along with a community-orientated approach to engage medical students.
AN UPDATED REVIEW OF WORLD WIDE LEVELS OF DOCOSAHEXAENOIC AND ARACHIDONIC ACID IN HUMAN BREAST MILK BY REGION

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2Xi’an Jiaotong University, Department of Epidemiology and Health Statistics, Xi’an, China
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Background and Aims
The concentrations of docosahexaenoic acid (DHA) and arachidonic acid (AA) in breast milk have been extensively studied due to their fundamental roles in neural and visual development. We aimed to evaluate the DHA and AA levels in human breast milk worldwide by country, region, and socioeconomic status.

Method
We systematically searched and identified eligible literature in PubMed from January 1980 to July 2015. Data of breast milk docosahexaenoic acid and arachidonic acid levels from women who had given birth to term infants were included.

Results
Seventy-eight studies from 41 countries were included with 4163 breast milk samples of 3746 individuals. Worldwide mean levels of docosahexaenoic acid and arachidonic acid in breast milk were 0.37 ± 0.11 % and 0.55 ± 0.14 % of total fatty acids, respectively. The breast milk docosahexaenoic acid levels from women with accessibility to marine foods were significantly higher than those from women without accessibility (0.37 ± 0.20 % vs. 0.27 ± 0.16 %, p<0.05). Data from the Asian region showed the highest docosahexaenoic acid concentration but much lower arachidonic acid concentration in breast milk compared to all other regions, independent of accessibility to marine foods. Comparison was made among Canada, Poland and Japan – three typical countries (each with sample size of more than 100 women) from different regions but all with high income and similar accessibility to fish/marine foods.

Conclusion
This review provides an update on worldwide variation in breast milk docosahexaenoic acid and arachidonic acid levels and underlines the need for future population- or region-specific investigations.
Other

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HEALTH RISKS IN MEAT AND EDIBLE OFFAL OF CHICKEN DUE TO HEAVY METALS RESIDUES AT NEW VALLEY, EGYPT

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Background and Aims
Metals present in the chicken meat as a result of many of human activities. The heavy metal of concern as it exert harmful effects on health such as Arsenic (Ar), cadmium (Ca), copper (Cu), iron (Fe), lead (Pb) and mercury (Hg) are toxic due to the their accumulative effect.

Method
Therefore, a total of 400 chicken meat breast, thigh, liver and gizzard samples (100 of each) were randomly collected from chicken butchers at New Valley governorate, Egypt to estimate their metals residual concentration levels.

Results
The mean concentration levels of arsenic in breast, thigh, liver and gizzard samples were 0.36, 0.49, 0.77 and 0.85μg/g respectively. For cadmium, the mean concentration levels were 0.03, 0.04, 0.05 and 0.02μg/g respectively. The mean concentration levels for copper were 0.15, 0.26, 1.16 and 0.35μg/g respectively. The mean concentration levels for iron were 6.77, 7.49, 9.36 and 5.85μg/g respectively. The mean concentration levels for lead were 0.250, 0.26, 0.31 and 0.30μg/g respectively. The mean concentration levels for mercury residues were 0.19, 0.20, 0.34 and 0.28μg/g respectively.

Conclusion
Although the obtained results were revealed the that chicken meat and their offal had a considerable concentration levels of Ar, Ca, Cu, Fe, Pb and Hg but all samples were laid within the permissible limits set by the Egyptian standard. More attention should be taken in concern to the daily intake levels of such metals towards the chicken meat and their offal at area under study.
CURRENT UPDATE ON REGIONAL DIFFERENCES IN DOCOSAHEXAENOIC AND ARACHIDONIC ACID IN HUMAN BREAST MILK IN DIFFERENT STAGES OF LACTATION

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Background and Aims
Docosahexanoic acid (DHA, 22: 6n-3) and arachidonic acid (AA, 20: 4n-6) are essential nutrients required for early stage brain, immune system and metabolic development, and link to childhood body composition.

To compare the DHA and AA levels in breast milk of term infants worldwide and in different lactation stages, and investigate maternal dietary factors associations.

Method
We searched PubMed with keywords “breast milk”, “docosahexaenoic” or “arachidonic”, “term infant”, “no maternal supplement”. The lipid quantification method was not considered in the screening.

Results
Of 181 publications retrieved, 34 observation studies were included here, of which 11 were published after 2010. High DHA (>0.9%wt/wt) in breast milk were found in studies from Japanese, Korean and Taiwanese mothers. Meanwhile, studies among Sudanese, Brazilians living far from coastal area, Israeli Jewish, Turkish, north Pakistani, rural north Chinese mothers all showed low DHA (<0.3%wt/wt) in breast milk. AA levels were comparable among different populations. The average levels of DHA and AA (% total fat) in breast milk decreased from colostrum/transitional milk to mature milk as reported in studies of Italian, French, Swedish, sub-Saharan East African and Sudanese mothers. Marine fish/seafood consumption was positively correlated with breast milk DHA levels.

Conclusion
Around the world, breast milk DHA and AA content decrease over lactation stages. The variations of DHA in different regions are likely to be influenced by maternal dietary patterns, geography and genetic polymorphisms. The AA levels remain constant among different regions. This review summarizes the latest literature understanding of the human milk DHA and AA levels for term infants.
AWARENESS OF LACTATIONAL AMENORRHEA METHOD AS AN APPROACH TO BIRTH CONTROL IN BULGARIA- A PILOT STUDY

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\textsuperscript{2}, Sofia,
\textsuperscript{3}, Dupnica,
\textsuperscript{4}, Stara Zagora,
\textsuperscript{5}, Silistra,
\textsuperscript{6}, Varna,

Background and Aims
Lactation among exclusively breastfeeding women associates with longer periods of anovulation, amenorrhea and protection against pregnancy. The method of birth control, known as Lactational Amenorrhea Method (LAM), is part of the World Health Organization’s list of accepted and effective methods of family planning.

This pilot study aims to assess the awareness of the lactational amenorrhea method for family planning among Bulgarian women.

Method
The study was conducted at public maternity hospital settings and nurseries in three different cities in Bulgaria during the period February March 2015. A total of 302 questionnaires were administered. Descriptive statistics assessed participants’ level of understanding of the LAM method. Pearson’s chi-square, correlations, and regression model were used to analyze the associations and relationships between levels of education, occupancy, age and exclusive breastfeeding practices.

Results
Most participants [50%, 152 women] have given birth once and 70% of them in a natural way. The average age of women was 32 [SD=7.6] and 49% of them were aware of LAM as birth control method. Factors that influenced most exclusive breastfeeding practices as LAM were age, marital status, residency, and infants’ age.

Conclusion
Our study showed that Lactational Amenorrhea Method (LAM) as birth control is unknown and rarely used method of contraception in Bulgaria. Additional research is needed to understand how educational and ethnic backgrounds in Bulgaria affect short- and long-term breastfeeding behavior.
Other

277 MALNUTRITION IN THE CIRRHOTIC IN-PATIENT: AN AUDIT OF PREVALENCE, PROTEIN-ENERGY REQUIREMENT AND THE IMPACT OF CLINICAL NUTRITION
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1St James’s Hospital, Gastroenterology/Hepatology, Dublin, Ireland

Background and Aims
Cirrhosis is frequently complicated by protein-energy malnutrition (1), associated with high morbidity and mortality. Clinical nutrition input is essential in the management of these patients. The 2006 ESPEN (European Society for Clinical Nutrition and Metabolism) Guidelines on Enteral and Parenteral Nutrition in Cirrhosis recommend clinical nutritionists use simple bedside tools to identify patients at risk of undernutrition (2). The guidelines recommend an energy intake of 35-40 kcal/kgBW/day, and a protein intake of 1.2-1.5g/kgBW/day. Supplemental enteral nutrition should be used where patients cannot meet their nutritional requirements orally. Parenteral nutrition is recommended in moderately or severely malnourished patients who cannot otherwise meet requirements (3).

Aims
To audit against the following standards: all patients with cirrhosis should be assessed for risk of undernutrition. Recommended protein-energy intake and use of supplemental nutrition should reflect ESPEN guidelines.

Method
All patients with cirrhosis admitted from 31/10/15 to 31/12/15 under the Gastroenterology/Hepatology teams were included. Data was obtained from patients’ charts and the electronic patient record.

Results
18 patients were identified (15 male, 3 female, mean age 59). All were assessed for malnutrition. Mean follow-up was 16 days. On admission, 72% and 94% of patients were not meeting calorie and protein requirements respectively. 83% required supplemental enteral nutrition. At discharge, 56% and 44% of patients were not meeting calorie and protein requirements respectively.

Conclusion
Most subjects were not meeting nutritional requirements on admission. Use of supplemental nutrition in these patients reflects ESPEN guidelines. Protein-energy intake improved after nutritional consultation. However many patients were still not meeting nutritional requirements on discharge.
Background and Aims
Human immune-deficiency virus (HIV) infection has detrimental effects on body composition and growth. This study describes the anthropometric status of HIV infected mothers and their breastfed children to investigate the effect of anthropometric status on Mother-to-Child Transmission (MTCT) of HIV.

Method
A cross sectional, descriptive study was performed on 100 mother-child pairs in the Northern Cape Province, South Africa. Anthropometry of mothers and children were measured and related to socio economic status, HIV infection stage, PMTCT care, child feeding practices and MTCT transmission of HIV.

Results
According to weight-for-height z-scores, 7% of the children were moderately malnourished and none were severely malnourished. Mid-upper arm circumference (MUAC) identified three children with severe acute malnutrition (SAM) and height-for-age classified 29% of children as stunted. Six mothers were underweight, while 74 mothers were overweight or obese based on Body Mass Index (BMI). Mother CD4 cell count, household income, marital status, employment status and education level showed no significant effect on her own or the child’s weight status. Mothers with lower CD4 cell counts (p= 0.03), more advanced HIV stage (95% CI: [23.5% ; 87.1%]) and underweight BMI (95% CI: [0.3% ; 74.2%]) had HIV infected children. HIV infected children were more likely to have a lower weight-for-age z-score (95% CI: [13.0% ; 86.9%]).

Conclusion
Maternal health and anthropometry affect the HIV infection status of children, which affects the growth of children. Measures to improve maternal health are important to improve child health and reduce mortality.
Background and Aims
There is an enormous need for calcium in both animal feed and human food – calcium in the proper quality, quantity and form. To meet this need, an egg producer could have an annex plant that produces "eggshell flour," a product whose basic component, egg shells, is a virtually boundless material that accumulates as waste. Thus produced, egg shell flour could be dispensed in various quantities to various food producers and feed producers.

Method
The experiments were designed to determine the microbiological condition of egg shells. Following the customary handling, shells were broken into bits and heat treated. Samples were diluted with cluster decimation and the total viable cell count and Enterobacteriaceae count was determined. Also, the samples were tested in 25g amounts for the presence of Salmonella as well as Listeria monocytogenes.

Results
According to the results, egg shell flour does not damage certain products’ sensory characteristics and usability, and it poses no risks to food safety, either. After heat treatment, the samples displayed no signs of the pathogen Enterobacteriaceae, while the viable cell count remained under 10 CFU/g in every case.

Conclusion
This means egg shell flour may be used as a basic ingredient in both the food and feed industries, due in part to its low microbial risk. Naturally, further tests are required to determine shelf life as well as which packaging should be used for storage and merchandising.
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IMPACT OF INSTITUTIONAL UPBRINGING ON THE GROWTH OF CHILDREN
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Background and Aims
To define the impact of institutional upbringing on height and weight of children.

Method
72 children (45 boys, 27 girls) aged from 1 to 6 years from different orphanages in Georgia were assessed. Height and weight of all subjects were measured and BMI, height SDS (standard deviation score) and weight SDS were calculated. Data were compared to normal values.

Results
Table 1. Height SDS

<table>
<thead>
<tr>
<th></th>
<th>boys 1-2</th>
<th>boys 3-6</th>
<th>girls 1-2</th>
<th>girls 3-6</th>
<th>total 1-2</th>
<th>total 3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>16</td>
<td>29</td>
<td>7</td>
<td>20</td>
<td>23</td>
<td>49</td>
</tr>
<tr>
<td>mean</td>
<td>-1,38</td>
<td>-1,72</td>
<td>-1,67</td>
<td>-0,94</td>
<td>-1,47</td>
<td>-1,4</td>
</tr>
<tr>
<td>median</td>
<td>-1,49</td>
<td>-1,74</td>
<td>-2,03</td>
<td>-0,88</td>
<td>-1,63</td>
<td>-1,5</td>
</tr>
<tr>
<td>SD</td>
<td>0,59</td>
<td>0,88</td>
<td>1,38</td>
<td>1,16</td>
<td>0,86</td>
<td>1,07</td>
</tr>
<tr>
<td>min; max</td>
<td>-2,13; -0,1</td>
<td>-3,34; -0,1</td>
<td>-3,58; 0,55</td>
<td>-3,25; 1,71</td>
<td>-3,58; 0,55</td>
<td>-3,34; 1,71</td>
</tr>
</tbody>
</table>

Table 2. Weight SDS

<table>
<thead>
<tr>
<th></th>
<th>boys 1-2</th>
<th>boys 3-6</th>
<th>girls 1-2</th>
<th>girls 3-6</th>
<th>total 1-2</th>
<th>total 3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>-1,34</td>
<td>-1,23</td>
<td>-1,12</td>
<td>-0,65</td>
<td>-1,27</td>
<td>-0,99</td>
</tr>
<tr>
<td>median</td>
<td>-1,35</td>
<td>-1,23</td>
<td>-0,47</td>
<td>-0,82</td>
<td>-1,29</td>
<td>-0,96</td>
</tr>
<tr>
<td>SD</td>
<td>1,42</td>
<td>1,19</td>
<td>1,36</td>
<td>0,83</td>
<td>1,38</td>
<td>1,08</td>
</tr>
<tr>
<td>min; max</td>
<td>-3,51; 0,84</td>
<td>-3,56; 1,77</td>
<td>-3,82; -0,04</td>
<td>-1,73; 0,98</td>
<td>-3,82; 0,84</td>
<td>-3,56; 1,08</td>
</tr>
</tbody>
</table>

Table 3. BMI

<table>
<thead>
<tr>
<th></th>
<th>boys 1-2</th>
<th>boys 3-6</th>
<th>girls 1-2</th>
<th>girls 3-6</th>
<th>total 1-2</th>
<th>total 3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>-0,71</td>
<td>-1,13</td>
<td>0,08</td>
<td>-0,11</td>
<td>-0,47</td>
<td>-0,71</td>
</tr>
<tr>
<td>median</td>
<td>-1,05</td>
<td>-1,04</td>
<td>0,19</td>
<td>-0,37</td>
<td>-0,77</td>
<td>-0,74</td>
</tr>
<tr>
<td>SD</td>
<td>1,79</td>
<td>1,3</td>
<td>1,55</td>
<td>1,12</td>
<td>1,74</td>
<td>1,32</td>
</tr>
<tr>
<td>min; max</td>
<td>-3.56; 2.14</td>
<td>-3.56; 1.71</td>
<td>-2.31; 1.91</td>
<td>-1.79; 2.04</td>
<td>-3.56; 1.74</td>
<td>-3.24; 2.04</td>
</tr>
</tbody>
</table>

Significant changes have been seen along almost all findings. Differences between two age groups for total and by gender were not revealed.

**Conclusion**

Our data confirm that institution upbringing has a negative impact on the growth of children of 1-6 years of age.
Background and Aims

Acute Malnutrition is one of the commonest causes of morbidity and mortality in young children in African countries. After the social crisis in Ivory Coast, therapeutic formulas F75 and F100 recommended in malnourished patients nutrition were over in the pediatric ward. The previous protocols based on a mixture of palm tree oil, sugar and milk (M1) and these three components plus maize (M2) were used to feed the patients. This study aimed to reassessing the efficacy of these regimens in the improvement of malnutrition outcome.

Method

One hundred four (104) children: 53 males and 51 females aged from 6 to 59 months diagnosed as having malnutrition and admitted in the pediatric ward during 2014 were included in this retrospective study. It focused on epidemiological, clinical features and the anthropometric parameters evaluation and the weight gained analysis in terms of good outcome and the improvement of other indicators after M1 and M2 regimens.

Results

Malnutrition incidence was 8% (104/5709) with an average of 9 patients a month. The rate of toddlers aged from 6 to 24 months represented 75%. Marasmus was 73%, Kwashiorkor 10% and the associated Kwashiorkor-Marasmus type 15%. Eighty percent (80%) had good prognosis and outcome, 15% of parents abandoned the treatment and their children discharged and 5% deceased. Most deaths were in toddlers (65%).

Conclusion

The M1 and M2 meals gave good results and remain alternatives of F75 and F100 formulas in malnourished children. The best way and means to prevent acute malnutrition in infancy is mothers’ education in nutrition.
Background and Aims
Growth failure is not uncommon in children with Crohn’s disease (CD). However, the rate of short stature at final height is not well characterized. Our aim was to determine the prevalence of growth failure at diagnosis and short stature at adulthood in patients with pediatric onset CD.

Method
We performed a retrospective analysis of the Schneider Pediatric Inflammatory Bowel Disease (SPID) cohort. Height Z-scores of 459 children (ages 2-18 years) at diagnosis of CD and of 319 patients who reached the age of 20 years during follow-up were retrieved and compared to a cohort (n=58,228) representing the general population attending primary care clinics and matched for age and gender (control group). Growth failure at diagnosis and short stature at adulthood was defined as height Z-score for age ≤ -2.

Results
Mean height Z-score at diagnosis of CD was -0.53±1.14 compared with -0.04±1.08 in the control group (P<0.001). Prevalence of childhood growth failure was 9.2% (42/459) and 3.4% (1964/57349) in CD patient and in controls, respectively (P<0.001). Mean final adult height Z-score in the SPID cohort was -0.36±1.07 with adulthood short stature prevalence of 6% (19/319) compared with -0.27±0.98 and 4.4% (39/879) in the controls (p=0.188 and 0.279 respectively).

Conclusion
Despite the substantial prevalence of growth failure reported among children with CD, our data suggest that most of these patients attain normal height as adults. These findings could be attributed to early diagnosis and appropriate management of CD.
Background and Aims
Iodine deficiency during pregnancy is related to maternal hormonal disorders, obstetric risk of adverse outcomes, and loss of fetal development and IQ of children born. Urinary iodine (UI) excretion is a good marker of recent dietary iodine intake. The objective was to estimate if the iodized salt consumption is able to provide the required amount of iodine to pregnant women.

Method
Sixty-nine pregnant women who frequented public hospitals in the city of Rio de Janeiro, Brazil, were included. Spots of UI (method ICP-MS) of three non-consecutive days (including one weekend day) in first trimester (<14 weeks) were classified according to WHO standard (insufficient iodine intake <150μg/L mean). Iodine contained in the salt used in their houses were also analyzed (iodate form). Pearson’s coefficients were calculated (p<0.05; SPSS 17.0).

Results
Mean gestational age was 9.2±1.6 weeks; age 26.9±4.8 yrs; weight 70.9±16.3 kg; height 1.61±0.07 m; BMI 27.4±5.3 kg/m². None of them reported to use iodine supplementation. All participant used iodized salt, but insufficient iodine intake was found in 24.7% of the patients (mean UI 225.6±96.8 μg/L). Between the 37 salt samples analyzed, 2 (5.4%) were not iodized according to the country’s standards. UI was directly correlated to BMI (r=.353, p=.006), but not with iodine in the salt.

Conclusion
¼ of pregnant women were insufficient in iodine intake. Preliminary data suggest that Brazilian pregnant women should be screened for potential insufficient iodine intake.

Acknowledgements: Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).
Background and Aims
Nutritional impairment is one consequence of pediatric food allergies. The study aimed to evaluate the nutritional status of children with this pathology.

Method
We conducted a prospective study including patients with food allergies diagnosed in the Pediatric Gastroenterology Department of Grigore Alexandrescu Hospital between June 2014 and September 2015. All underwent clinical evaluation, exclusion diet and challenge test. Weight and height for age and weight for height were calculated.

Results
Our study included 78 patients with food allergies. For 94%, the diagnosis was cow’s milk proteins allergy, 45% of them non Ig-E mediated. The other incriminated allergens were: peanut, wheat, egg (4 patients with combined food allergies). Median age at the onset of symptoms was 3 months and at diagnosis 8 months. The most frequent presenting symptoms were: loose mucous stools (57.7%), bloody stools (34.6%) and food refusal (34.6%). 49% of children with food allergies already had nutritional impairment at diagnosis: mild malnutrition in 30.9%, moderate in 16.9%, severe in 1.4%. Malnutrition was observed in 38.7%, 69.2%, 51.8% of patients aged <6 months, 6-12 months and 12-36 months respectively. Only one patient aged 2 had severe malnutrition. Over the age of 6 months, 45% presented with impaired nutritional status and this finding inversely correlated with age.

Conclusion
Nutritional status impairment was observed in half of the food allergy patients. We found nutritional impairment to be a considerable concern after 6 months, the issue tending to decrease with age.
285 CHEMICAL COMPOSITION AND SENSORY QUALITIES OF WHEAT-SORGHUM DATE COOKIES
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², Ilorin,

Background and Aims
Cookies are consumed on a large scale in developing countries such as Nigeria where macro- and micro nutrient malnutrition are prevalent. The aim is to produce cookies high in nutrients using indigenous food materials.

Method
In this experimental study, functional properties, proximate and selected mineral composition of six formulated composite flours (A-F) from sorghum (SF), wheat flour (WF) and date palm flour (DPF) were determined using standard procedures. Samples A-D were blended using the following ratio (SF: WF: DPF; 80:20:25, 60:40:25, 40:60:25 and 20:80:25) respectively. Sample E (control) contained 100% WF sweetened with sugar while F is 100% WF and DPF. Sensory attributes were evaluated using nine point hedonic scale and data obtained were analyzed using Duncan multiple test at p<0.05.

Results
Loose bulk density ranges from 0.48-0.56g/mL, packed bulk density =0.69-0.74g/mL, water absorption capacity =1.00-1.60g/g and oil absorption capacity =1.18-1.64g/g. Proximate analysis was as follows: moisture =4.32%-5.91%, ash = 1.81%-2.45%, fat =18.94%-20.52%, protein =8.68%-17.97%, fibre =2.72%-3.42% carbohydrate =52.65%-64.71%. Mineral compositions are as follows: calcium =6.31-8.10mg/100g, iron =0.08-1.00g and potassium =1.56-1.75mg/100g. Moisture content of the formulated cookies samples were within acceptable range. Ash, protein and calcium contents of the formulated samples were significantly higher than in control. Sample A had the highest iron content while B had the highest potassium value. However, control had the highest fat and carbohydrate content. Through sensory evaluation, samples B, C and D were similarly acceptable with the control.

Conclusion
Enriching wheat flour with sorghum and date palm flour in cookies production improves its nutritional value.
REGRESSION MODELS FOR LINKING PATTERNS OF GROWTH TO A LATER OUTCOME: INFANT GROWTH AND CHILDHOOD OVERWEIGHT
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1University of Bristol, School of Clinical Sciences, Bristol, United Kingdom
2Institute of Public Health, Division of Epidemiology, Oslo, Norway
3Høyskolen Diakonova, Department of Nursing, Oslo, Norway
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Background and Aims
Regression models are commonly used to link serial measures of anthropometric size or change in size to a later outcome. The motivation is often to understand whether there are detrimental growth patterns and/or sensitive periods when growth has a stronger effect on an outcome. The most common model parameterisation is the conditional growth model, however, there are other parameterisations that enable one to target different questions about the effect of growth. Our objective was to formulate several parameterisations, classify each by their underlying growth pattern contrast, and to discuss their utility.

Method
We describe five sets of parameterisations that target five different growth pattern contrasts. These consist of incorporating different combinations of size and change in size into a regression model. We illustrate these models with the example of linking infant growth (6 serial measures) in weight-for-height-for-age z-scores to later childhood overweight at 8y using complete cases from the Norwegian Childhood Growth study (n=900).

Results
We provide an explicit interpretation of each type of parameterisation, referring to them as: (a) Conditional growth, (b) Being bigger v being smaller, (c) Becoming bigger & staying bigger, (d) Growing faster v being bigger, and (e) Becoming & staying bigger v being bigger. We also discuss several important substantive and statistical issues to consider such as how to make comparisons across growth periods fair.

Conclusion
Studies interested in detrimental growth patterns may gain extra insight from reporting several sets of growth pattern contrasts, and hence an approach that incorporates several sets of model parameterisations.
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ASSESSMENT OF NUTRITIONAL KNOWLEDGE OF ATHLETES IN KENITRA CITY, MOROCCO
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Background and Aims
The main goal of this study is to evaluate the nutritional knowledge level and consumption of breakfast and snacks by athletics people attending sports clubs in the city of Kenitra, Morocco

Method
The survey was conducted in February 2014. The sample consists of 236 subjects, 148 men (63%) and 88 women (37%). The assessment of their height and weight status is performed according to body mass index (BMI). Nutrition knowledge and consumption of breakfast and snacks were evaluated by the nutritional knowledge score (NKS), and in a general questionnaire.

Results
The mean age was (27.23 ± 7.15) years, ranging from 12 and 57 years; their average BMI is normal (18.50<23.65<24.99), but their nutritional knowledge score (NKS), is relatively low (2.12/5 ± 1.08). The significant difference (NKS) between groups with a nutritional education (3.75 / 5 ± 1.03) and without nutrition education (1.90 / 5 ± 1.09) (p <0.0001) ensures its validity. 56% of subjects taking the neglected breakfast, and 65% for snacks. For the subjects who haven’t took their breakfast, BMI tends to overweight (BMI>25) and (NKS) is low (1.85/5).

Conclusion
These athletes have a normal BMI (18.50<23.65<24.99), but their (NKS) (2.12/5), their consumption rate of breakfast (44%) and snacks (35%), is relatively low, thus the negligence of breakfast tends their BMI to overweight (BMI>25), a nutritional awareness to them seems important for optimal sports performance. In addition the (NKS) can predict the level of nutrition education, studies are needed to develop it.
Background and Aims
The Baby Friendly Hospital Initiative (BFHI) is a global child growth and survival strategy launched by WHO/UNICEF in 1991 to protect, promote and support breastfeeding. A designated facility was reassessed to evaluate compliance to the ten steps to successful breastfeeding, the code of marketing breast milk substitutes, mother-friendly care and HIV and infant feeding.

Method
Using the WHO/UNICEF tool for external reassessment, 30 clinical staff, 20 pregnant women, 30 postpartum mothers and 10 mothers with babies in intensive-care (10) were randomly recruited and interviewed by a trained assessor in a municipal-level baby-friendly designated hospital in Ghana. Data was analyzed using WHO/UNICEF BFHI reassessment computer tool. Rates of compliance were classified as low (0-49%), moderate (50-89%) and high (90-100%).

Results
Overall, implementation of the BFHI was rated as low (38%). Compliance to the 10-steps to successful breastfeeding was low (42%). Step nine was fully implemented while step one was totally unimplemented. Compliance to the code was moderate (55%). Two of the four codes were fully implemented whereas the other two were implemented to varying degrees. Compliance to the ten HIV and infant feeding guidelines was low (33%) with guideline four fully implemented. Compliance to mother-friendly care was also low (24%) with guidelines one and five being the least and most adhered.

Conclusion
Pre and in-service training of reproductive health staff is recommended. Routine reassessment of designated facilities with appropriate sanctioning may improve compliance. Tailored education of mothers on the initiative should commence early at prenatal visits and sustained throughout perinatal and postnatal periods.
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NEONATAL HYPERLIPIDEMIA

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Background and Aims
Neonatal hyperlipidemia is a rare disease occurring in genetically related families and it affects about 1 out of 1 000 000 people, mostly due to genetic dyslipidemia. Patients with this disorder rarely present during the neonatal period. During infancy this patients have increased risk of pancreatitis and they present with hepatosplenomegaly, lipemia retinalis and eruptive xanthomas. Recurrent pancreatitis ultimately leads to pancreatic insufficiency, which is the major threat of this disease.

Method
Here we present a case of two weeks old newborn infant who presented to our neonatal ward with milky serum detected on routine blood checkup for febrile illness. This newborn infant is the first child coming from a family from Turkish ethnicity and with consanguinity.

Results
Given the potential risk of an extracorporeal technique such as plasmapheresis is such a small infant, the lack of evidence for exchange transfusion as a method of treatment, we decided to treat the baby administering a special low fat formula high in medium chain triglycerides.

Conclusion
This turned out to be effective in keeping fasting plasma triglycerides level in approximately normal range.
**Background and Aims**
To study growth at 2 years corrected age (CA) in premature infants and its relation with early postnatal nutrition.

**Method**
Observational study including all premature infants (birth weight <1500g) born from January to August 2011 in two hospitals.

Protein and total calories intake in the first 28 days of life was compared with the recommendations (ESPHGAN 2009) and the average percentage of requirements achieved in each child was calculated.

Weight, height and cephalic perimeter (CP) at 2 years CA were obtained by reviewing medical history. Percentiles were calculated using the OMS standards.

**Results**
Thirty-one infants were included. Weight and height of 26 children and CP of 20 children were obtained at 20±3 months CA (mean±SD).

<table>
<thead>
<tr>
<th></th>
<th>Percentile</th>
<th>Children (%)</th>
<th>Protein (%)</th>
<th>Energy (%)</th>
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<tbody>
<tr>
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<td>30.8</td>
<td>79.6</td>
<td>84.2</td>
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<td>98.1</td>
<td>99.9</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt;10</td>
<td>46.2</td>
<td>85.0</td>
<td>83.7</td>
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<td></td>
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<td>83.3</td>
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<td>&gt;90</td>
<td>11.5</td>
<td>79.7</td>
<td>95.0</td>
</tr>
<tr>
<td>CP</td>
<td>&lt;10</td>
<td>10</td>
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<tr>
<td></td>
<td>&gt;90</td>
<td>20</td>
<td>83.9</td>
<td>94.6</td>
</tr>
</tbody>
</table>

**Conclusion**
The majority of children had height and CP adequate to their age (percentile 10-90), but <50% children had adequate weight. Children with height<P10 had received lowest protein.
and energy intake. Infants with weight > P-90 had received a higher energy intake but low protein/energy ratio. In this study, we observed that an adequate protein and energy intake, keeping a correct protein/energy ratio was related to better growth parameters. We found no relation between lowest protein intake and weight and PC<P10, probably because of the small sample size.
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TRENDS IN NUTRITIONAL OUTCOMES OF EXTREME TO VERY PRETERM INFANTS-AN AUSTRALIAN REGIONAL COHORT
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Background and Aims
Since late 2010, collaborative quality initiatives among neonatal intensive care units (NICUs) in New South Wales (NSW) and the Australian Capital Territory (ACT) resulted in many new parenteral and enteral implementations including consensus standardised parenteral nutrition and early enteral nutrition. Aim was to compare the discharge growth outcomes of preterm infants before and after the implementation of new parenteral and enteral practices.

Method
A regional retrospective before-after implementation study involving preterm infants born less than 32 weeks gestation and admitted to any NICU across NSW and ACT. Cohort was divided into Epoch 1 (2007-2010, pre-implementation) and Epoch 2 (2011-2013, post-implementation) groups. Data source was the prospectively collected centrally located NICUS Data Collection. Primary outcome was discharge weight percentile.

Results
At discharge, median weight (2500 g vs. 2340 g; p<0.001), head circumference (HC) (33.0 cm vs. 32.5 cm; p=0.001) and length (46 cm vs. 45.5 cm; p=0.002) were significantly higher in Epoch 2. The median discharge percentiles for weight (12.0 vs. 7.0; p<0.001), HC (22.0 vs. 16.0; p = 0.034) and length (16.0 vs. 7.0; p= 0.028) were also significantly higher in Epoch 2. Infants in Epoch 2 regained birth weight significantly faster (11 days vs. 12 days; p<0.001). Epoch 2 showed trends to reduced incidence of discharge weight and HC below 10th percentile (39.1% vs. 41.3% and 20.9% vs. 22.7%, respectively).

Conclusion
A significant improvement in discharge growth of preterm infants has been observed since the implementation of new parenteral and enteral nutrition practices within the network.
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292 THE USE OF INFANT FORMULA IN THE FIRST FEW DAYS AFTER BIRTH - DATA FROM A PROSPECTIVE, DANISH BIRTH COHORT
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Background and Aims
The avoidance of intake other than breastmilk is the sixth of the ten steps to successful breastfeeding, founded by the WHO/UNICEF Baby Friendly Hospital Initiative in 1991[1]. Acceptable medical reasons for the use of breastmilk substitutes are few[2]. As part of the Odense Child Cohort a study on breastfeeding was performed[3], in the present aiming to give information on the fulfillment of step six in a Danish birth cohort.


Method
Weekly text message/small message service (SMS) questions were used to obtain prospective, real-time data on breastfeeding, the use of infant formula and complementary feeding. The SMS data were combined with hospital records.

Results
In total, 499 term, singleton infants were born from April to October 2012. Of these, 95.0 % (474/499) were breastfed immediately after birth, 63.3 % (300/474) without supplementation. A total of 31.2 % (148/474) were supplemented with infant formula. Acceptable medical reason for the supplementation was present in 26.4% (39/148) of the cases, primarily due to risk of hypoglycemia.

Conclusion
This study showed little fulfillment of the sixth step to successful breastfeeding with 31.2% (148/474) infants being supplemented with infant formula in the first week after birth, of these 26.4% (39/148) medically indicated.
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BREAST FEEDING PRACTICES IN TERTIARY HOSPITAL IN WEST GREECE
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Background and Aims
Breast milk importance for newborn growth and good health status is well established. The purpose of this study is to assess and summarize the current status of breast-feeding practice in West Greece.

Method
Data were gathered with a questionnaire from 5th January 2015 till 5th May 2015. Questionnaires were filled in by mothers, on day of discharge from the post-natal ward. We assessed 180 questionnaires (response rate: 72%) with respect to initiation, exclusivity and duration of breast feeding. We focused on infants born >35 weeks of gestation. We performed a statistical analysis of the results.

Results
The majority of mothers (48.9%) had their first child and 47.2% had a vaginal delivery. From those babies born by C.S. the 58.7% was a delivery by appointment. Most mothers had a university degree (45.7%) while 35.5% of the sample was unemployed. Exclusively breast fed newborns represent 27.1% of the sample. The rate of formula fed newborns was 14.4%, while 58.6% were partial breast fed. The lack of standard methods in initiation of breast feeding was reported, and the 73.3% of newborns had their first meal given by midwives and 78.9% of newborns had formula milk as first meal (statistically significant in breast-feeding initiation). Support from clinicians was positively associated with breast-feeding initiation.

Conclusion
Breast feeding rates were low (as there is no Baby Friendly Hospital in the area). National policies are hampered by the lack of action in the maternity and post natal wards. Booklets, leaflets, posters for breast feeding promotion should be distributed to mothers.
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NUTRITIONAL SUPPORT OF PRETERM INFANTS WITH INTRAUTERINE GROWTH RESTRICTION

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Background and Aims
The aim of this study was to prospectively review the feeding characteristics of preterm infants with IUGR born at 33-36 weeks’ gestation.

Method
Group 1 included 55 infants with weight at birth below the 10th percentile (IUGR). Group 2 consisted of 81 infants with birth weight appropriate for gestation age. The body composition was measured by air displacement plethysmography at around 34 weeks of post-conceptional age.

Results
The initial intake of fluid and nutrients on the 1st day wasn’t different in the groups. By the 7th day protein (3.5 ± 0.7 g/kg), carbohydrates (13.1 ± 2.6 g/kg) and energy (110.4 ± 17.9 kcal/kg) in group 1 were larger than in group 2. In group 2 protein was 3.2 ± 0.6 g/kg, of carbohydrate - 11.9 ± 2.2 g/kg, and of energy - 103.4 ± 15.0 kcal/kg. Weight gain in group 1 was faster (8.8 ± 3.1 days) than in group 2 (10.3 ± 3.3 days). Percentage of fat mass in infants with IUGR was significantly lower (6.3 ± 5.5% in the age of 34-35 weeks and 11.0 ± 2.4% at 38-39 weeks) than that of infants in group 2 (8.6 ± 4.1% in the age of 34-35 weeks and 15.9 ± 4.9% at 38-39 weeks). Frequency of postnatal growth faltering at the time of discharge in group 1 was 53.7% vs 9.8% in group 2.

Conclusion
Optimized nutritional support to this group of infants is necessary to enhance improve their growth and development.
INFRARED ANALYZERS FOR BREAST MILK ANALYSIS: FAT LEVELS CAN INFLUENCE THE ACCURACY OF PROTEIN MEASUREMENTS

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Background and Aims
Currently, there is a growing interest in lacto-engineering in the NICU, using infrared milk analyzers (MA) to rapidly measure the macronutrient content in breast milk before processing and feeding it to preterm infants. However, there is an overlap in the spectra information of different macronutrients, so there is a potential that they impact the robustness of the measurement. In this study, we investigate whether the measurement of protein is dependent on the levels of fat present while using a MA.

Method
Breast milk samples (n=25) were measured for fat and protein content before and after being completely defatted by centrifugation, using chemical reference methods and near-infrared MA (Unity SpectraStar) with two different calibration curves provided by the manufacturer (released 2009 and 2015).

Results
While the protein content remained unchanged, as measured by elemental analysis, measurements by MA show a difference in protein levels, dependent on the fat content (Figure 1). This difference is less pronounced when measured using the more recent calibration curve.
Conclusion
MA measurement of protein is dependent on the measurement of fat, and this dependency varies according to the manufacturer's calibration of the device. MA users must be cautious of their devices' measurements, especially if they are changing the matrix of breast milk using more advanced lacto-engineering, such defattening milk for infants with chilothesis.
EFFECTIVENESS OF THE POST-DISCHARGE NUTRITION INTERVENTION FOR VERY LOW BIRTH WEIGHT PRETERM INFANTS

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Background and Aims
In the past decade, survival of preterm infants has significantly improved due to advancement in medical interventions for Neonatal Intensive Care Unit (NICU). Nevertheless, growth restriction is commonly found in very low birth weight (VLBW) preterm babies after discharge. The current study aimed to evaluate the effectiveness of the post-discharge nutrition intervention to optimize growth and development for Thai preterm infants.

Method
The quasi-experimental study was undertaken in Buddhasothorn Hospital, Chachoengsao, Thailand. The intervention was the post-discharge nutrition protocol together with assessment criteria of infants’ growth and biochemical markers. The intervention group included 20 VLBW preterm infants with birth weight 750-1,499 g and born in NICU from February to September 2014. The infants whose poor weight gain post-discharge was found received fortified milk until 6 months corrected age. Infants’ growth and development were assessed monthly at follow-up clinic visit. The 20 preterm infants with similar characteristics who born 1-2 years before commencement of the study and received the conventional nutrition service were used as the historical comparison group.

Results
The intervention group had greater body weight (P=0.009), length (P=0.032), head circumference (P=0.014) and shorter time to catch-up weight (P=0.031) than the comparison group. There were no significant differences in weight gain velocity and development between two groups.

Conclusion
The nutrition intervention resulted in greater infants’ growth and shorter time to catch-up weight in VLBW preterm babies, but did not affect infant’s development by 6 months corrected age. Long term study of these infants’ outcomes would be suggested.
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BONE DEVELOPMENT IN PRETERM INFANTS
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Background and Aims
There is limited information regarding bone development of preterm infants in the early
postnatal period. Ultrasonography was used to assess bone status of preterm infants during
the first postnatal weeks at the Neonatal Intensive Care Unit.

Method
A four-year retrospective cohort study was conducted in preterm infants receiving standard
neonatal care. Bone density was measured as bone speed of sound using quantitative
ultrasonography in 286 preterm infants (24 - 32 weeks gestational age) who were admitted to
the neonatal intensive care unit of the VU University Medical Center between 2007 and 2012.
Data analyses included independent samples t-tests and generalized estimating equations.

Results
Bone density declined significantly during the first postnatal weeks (β=-4.50 95% CI -5.33- -
3.66, p<0.001). Bone density declined more rapidly in very preterm infants compared to
extremely preterm infants (β=-2.84 95% CI -3.99- -1.70, p<0.001). Bone density during
hospitalisation showed correlation with growth (change in SDS) regarding weight, length and
head circumference. No differences in bone density were found between genders,
ethnicities, levels of protein intake or being born appropriate and being born small for
gestational age.

FIG 1. Growth and metacarpal bone speed of sound during hospital stay in preterm
infants
Conclusion
Bone density of preterm infants declined during hospitalisation. This suggests that sufficient bone accretion cannot be achieved by the present standard neonatal care. Future studies are needed to clarify which nutritional and/or other interventions are needed to ameliorate bone density of preterm infants during the early postnatal period.
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PRENATAL AND POSTNATAL FACTORS ASSOCIATED WITH HEAD GROWTH RESTRICTION IN PRETERM INFANTS
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2University Hospital of Pisa, Medical Genetics Lab, Pisa, Italy

Background and Aims
Poor postnatal head growth is a common condition in very low birth weight infants (VLBW) and may be associated with impaired neurodevelopment outcome. Nutritional and epigenetic factors may influence growth and development during prenatal and postnatal life.

Method
We analyzed prenatal and postnatal risk factors associated to head circumference (HC) growth restriction at discharge in 75 VLBW infants, according Bertino anthropometric charts, born ≤ 32 gestational. HC restriction was defined as HC <10 centile compared to expected intrauterine growth, at a postmestrual age (PA) of 36-42 weeks. We also analyzed, in 10 preterm newborns, changes in methylation levels, between birth and discharge, on two imprinting control regions on 11p15, IC1 and IC2 through MS-MLPA.

Results
Among prenatal factors, being small for gestational age (SGA) (OR 4.86 - p=0.014), poor weight at 36 weeks PA z-score (OR 0.15 - p=0.001) and high TSH at discharge (OR 1.33 - p=0.031) were risk factors. Newborns with HC restriction (n=20) had significantly lower protein intake compared to those who did not develop HC restriction (n=55) (p=0.009). Epigenetic analysis showed negative correlations between HC z-score at discharge and methylation levels at IC1 (Coef -0.04 [95% CI -0.06 – -0.01] *p=0.005) and between protein intake and methylation at IC1 at discharge (Coef -0.13 [95% CI -0.22 – -0.04] *p=0.01).

Conclusion
In conclusion in order to decrease the frequency of HC restriction an adequate nutrition is fundamental. Moreover intriguing result are emerging about the role of pre- and postnatal nutritional factor on epigenetic modification and these observation deserve further studies.
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A SIX MONTH REVIEW OF MILK FEEDING PRACTICES IN EXTREME PRETERM AND EXTREMELY LOW BIRTH WEIGHT NEONATES IN THE ROYAL JUBILEE MATERNITY HOSPITAL BELFAST
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²Royal Jubilee Maternity Hospital Belfast

Background and Aims
The Royal Jubilee Maternity Hospital (RJHM) is Northern Ireland’s tertiary centre for extremely preterm and extremely low birth weight neonates. Neonates weighing 1500g or under, neonates under 27 weeks gestation, severely growth restricted neonates or suffering hypoxic insults are fed using a high risk protocol promoting early feeding with human breast milk. We aim that 100% of high risk (HR) neonates are fed maternal or donor milk from initial commencement to achievement of full feeds. By day 28 and discharge 100% of HR babies should be fed maternal milk. This July-December 2014 review will evaluate how reality compares to aims.

Method
A search was performed on neonatal electronic record “Badgernet” to identify eligible HR babies born between 1/7/14 -31/12/14. Data collection utilised a proforma.

Results
34 neonates were eligible. 97% of first feeds were breast milk (maternal milk 44%, Donor milk 38%, maternal and donor milk 15%, formula 3%). 91% established full feeds of which 90% received breast milk. By day 28 15% of babies were totally/partially formula fed. By discharge formula feeding had increased again (maternal milk and formula 15%, formula 54%).

Conclusion

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97% of babies receive breastmilk at first feed (97%) but this steadily declines over time. By full feeds 91% receive breastmilk dropping to 72% by day 28. The biggest decrease is day 28 to discharge. Only 31% of babies go home solely on mother’s milk. Strategies are therefore being developed to encourage breastfeeding beyond establishment of full feeds including milk expression training and information packs for mothers.
ANALYSIS OF TRANSFUSION PRACTICES IN THE SERVICE OF MEDICINE AND NEONATAL RESUSCITATION
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Background and Aims
Blood transfusion is a common practice in neonatal practice but not without risk as well as immunological and infectious plan.

The purpose is to determine the prevalence of transfusion, the number of transfusion episodes, the age at first transfusion and the main indications and risks for transfusion to critically evaluate our transfusion practice.

Method
It is a prospective and analytical exhaustive study conducted at the National Reference Center for Neonatology and Nutrition Children’s Hospital of Rabat between July 1, 2011 and July 31, 2014.

Results
7000 infants were admitted during this period, 300 were transfused one or more times a prevalence of 4.2%; 13% of newborns have a gestational age less than 32 weeks. The birth weight was between 890g and 4050g. The total number of transfusions by newborn, ranged between 1 and 4 transfusions with an average of 2.5 ± 1.2. It was essentially red blood cells transfusions (66%). 75% of cases were transfused in the first week of life. The main indication was anemia associated with infectious haemolysis. The hypoproteinemia with hypoalbuminemia had indicated the contribution of fresh frozen plasma. Platelet transfusion was required in a case of thrombocytopenia less than 4000 / mm³ with hemorrhagic syndrome. No newborn had submitted post-transfusion complications.

Conclusion
In our context, the use of erythrocyte transfusions especially is still very common in the population of preterm infants which prompts us to adopt certain strategies to prevent anemia of prematurity including streamlining of blood samples, the use of micro-methods and optimization of transfusion indications.
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301 EXCLUSIVE BREASTFEEDING IN RABAT AND OUTSKIRTS, MOROCCO: RISK FACTORS FOR NON-COMPLIANCE
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Background and Aims
Exclusive breastfeeding (EB) till six months of age is a simple and worldwide-accepted WHO recommendation that reduces morbidity and mortality in infants. The Aim of study is to explore factors leading to non-compliance of EB in Morocco.

Method
During October 2014, mothers attending an urban paediatric hospital in Rabat or a rural clinic in Benslimane with children older than 6 months were approached.

Oral informed consent was provided and an interview on mother and child nutrition done. Logistic regression was used to determine independent risk factors for non-compliance of EB.

Results
A total of 235 women were recruited, 183 (78%) from the urban hospital. 163 (69%) referred having exclusively breastfed their children. Among those who did not, 67% referred lack of breast milk, 18% referred hospital admission during neonatal period as the reason for non-compliance, and 15% incompatibilities with their economic activity. Household monthly revenue was higher in the group of non-compliant (470 euros vs. 380 euros, p = 0.067). In the multivariate analysis, having delivered in a public hospital was independently associated with EB (OR 2.5, 95%CI 1.2-5.0). Counselling to encourage EB was not associated with EB compliance.

Conclusion
Efforts should be done to design more appropriate strategies to encourage EB among mothers in Rabat and outskirts, especially in the private sector, and to avoid interfering with EB in case of admission during neonatal period.
ESTABLISHMENT OF GROWTH CURVES FOR FULL TERM NEWBORNS: A MOROCCAN STUDY
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1Mohamed V University - Faculty of Medicine and Pharmacy of Rabat, Neonatology, Rabat, Morocco

Background and Aims
Neonatal anthropometric data is an important reflection of the growth and fetal development. The aim of study is knowing the anthropometric standards of Moroccan newborns according to sex, gestational age, parity, age and corpulence of women.

Method
It’s a prospective and cross-sectional study. We gathered the information forward newborns alive, healthy, Moroccan parents, from normal pregnancies, born in Rabat Souissi’s maternity between January 2008 and December 2013.

The data were analyzed by SPSS 13.0, t Student’s test was used for comparison of averages and ANOVA for comparing more than two averages. A value of "p" less than 0.05 is considered statistically significant.

Results
5000 births were recruited. The ratio was balanced. Anthropometric standards identified according to gestational age and gender were lower than the Frenchs (AUDIP OG) and Tunisians. With our curves, it was determined the new thresholds SGA and macrosomia. Factors influencing fetal growth, it was verified, in addition to sex and gestational age of the newborn, age, parity and maternal body mass index (BMI), that have proven determinants of fetal growth in our context.

Conclusion
The curves of birth weight, height and head circumference of Moroccan newborns recruited have determines a news thresholds for hypotrophy and macrosomia.
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303 MEDIUM-TERM OUTCOME IN A COHORT OF NEWBORNS WITH LOW BIRTH WEIGHT
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Background and Aims
Low birth weight is an important indicator of public health due to strong association between birth weight on the one hand, and mortality and morbidity infant other.

The objective is to analyze the factors involved in the growth, height and weight in a cohort of newborn low birth weight at 6 months.

Method
It’s a prospective and analytic cohort study over 6 months. We recruited all patients with low weight whatever their feeding mode. To the output of the service a health card was given to them with their growth curve. They are then reviewed each month until the age of 6 months. at each consultation are taken anthropometric measurements

Results
Two hundred and fifty-five newborns of low birth weight were included. The mean birth weight was 1691.49 grams + / - 372.5. The average size was 53.27 cm + / - 8.2 and the average cranial perimeter of 39.47 cm + / - 4.4.The preterm infants have achieved faster normal growth corridors to the age of 6 months compared to those with delayed intrauterine growth. The prevalence of exclusive breastfeeding are low in both groups and join the national data. The majority of our newborns come from a disadvantaged background. Morbidities are dominated by infection and anemia.

Conclusion
Anthropometric parameters are better than those of the third world countries. The management of infants with delayed intrauterine growth is harder. We need to accelerate the growth rate by a better nutritional care.
Background and Aims
ELBW infants frequently develop parenteral nutrition associated cholestasis (PNAC). “Aggressive” nutrition is increasingly used in ELBW infants. We implemented a regimen of aggressive nutrition for ELBW infants at our unit and aimed to analyze the effects of “aggressive” nutrition on PNAC and growth.

Method
ELBW infants of two time periods were nourished using an “aggressive” (n=85) or “reluctant” (n=77) parenteral and enteral nutritional regimen. We retrospectively compared the ELBW infants of the two periods for the primary outcome PNAC (conjugated bilirubin > 1.5 mg/dl (25 mmol/l)) that was analyzed corrected for confounding variables (NEC, sepsis, birth weight (+Z-score difference birth to discharge), time on parenteral nutrition and male sex). The most important secondary outcome was growth until discharge.

Results
PNAC was significantly lower using “aggressive” compared to “reluctant “nutrition (27.1% vs. 45.5%; aOR 0.275; P < 0.01). Weight gain, head and longitudinal growth were significantly increased leading to a marked reduction of postnatal growth failure (ΔZ-ScorePE < -1) for weight gain (35 % vs. 85 %), head circumference (45% vs. 77 %) and body length (65% vs. 85%) (P < 0.01). Growth became less disproportionate according to BMI percentiles using “aggressive” nutrition.

Conclusion
Implementation of “aggressive” feedings was associated with a significant decrease of PNAC in ELBW infants while growth was improved.
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POSTNATAL WEIGHT LOSS OF HEALTHY PRETERM INFANTS AND CROSSING OF PERCENTILES ON GROWTH CHARTS DURING POSTNATAL ADAPTATION

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Background and Aims
During postnatal adaptation, preterm infants undergo preterm contraction of extracellular water spaces (PreCES) with postnatal weight loss (PWL) and adjustment to a new percentile. We hypothesized that infants with lower birth weights will cross more percentiles during PreCES due to lower fat mass and higher total body water.

We aimed to analyze PWL and change in percentiles during PreCES in healthy preterm infants in relation to gestational age and intra-uterine growth.

Method
International, multi-center study at five NICUs. Daily weights until day of life (DoL) 21 for infants (A): 30-36 weeks GA and (B): 24-29 weeks, admitted from 2008-2012 with undisturbed postnatal adaptation were analyzed. Exclusion criteria: (A) and (B): maternal diabetes/substance use, nosocomial sepsis (until DoL 21); (A): nCPAP>3 days, not on full enteral feeds by DoL 10, (B): mechanical ventilation on DoL>3, FiO2≥0.3 within first 21 DoL, NEC>stage 2, IVH>2, PVL.

Results
n=1188, PWL was higher in more immature infants. On average, maximum weight loss was 7% (A) and 11% (B) on DoL 5. While relative PWL was similar, infants born at higher BW percentiles crossed more percentiles compared to those born at lower percentiles. Top figure: weight loss for GA. Bottom figure: percentiles crossed during PWL for infants born at
Conclusion
This study provides an estimate for physiological PWL in preterm infants after undisturbed PreCES. “Paradoxically”, crossing more percentiles during PWL for infants with higher BW could be explained by skewed percentile distributions of reference growth charts, which do not take into account PreCES.
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PARENTAL CHARACTERISTICS, SERIAL PRENATAL 3-D ULTRASOUND MEASUREMENTS AND PREDICTION OF NEONATAL BODY COMPOSITION
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Background and Aims
Environmental exposures during conception and pregnancy potentially affect offspring phenotype. In this study we aim to investigate the influence of parental health and lifestyle on fetal and neonatal growth and development. Particularly, we intend to identify associations between obstetrical complications and neonatal body composition, and the association between neonatal body composition and brain development.

Method
We performed a prospective, observational cohort study embedded in the Rotterdam Periconceptional Cohort (Predict study), a hospital-based prospective open birth cohort study. With questionnaires in first and second trimester and around delivery, data were obtained on parental lifestyle, health, obstetrical complications and neonatal outcome. Prenatal 3D-ultrasounds were performed at 7, 9, 11, 22, 26 and 32 weeks of gestation. Postnatally, at 42 weeks postmenstrual age, cranial ultrasound and body composition measurement, using air-displacement plethysmography, were performed.

Results
In total, 227 singleton pregnancies are included in the study. Postnatally, we performed a cranial ultrasound in 152 infants (72%) and body composition measurement in 85 infants (40%). In 29 infants obstetrical or neonatal outcome was altered; six infants were born preterm, five had intra-uterine growth retardation (IUGR), eight were both preterm and had IUGR and ten infants were born with a congenital heart disease. Data collection has been finalized, statistical analyses are still in progress.

Conclusion
The influence of parental health and lifestyle on fetal and neonatal growth and development is not yet fully determined. With this study, associations between parental characteristics, longitudinal prenatal 3D-ultrasound measurements and neonatal body composition and brain development will be elucidated.
Early Parenteral Nutrition Prevents Growth Failure in Infants with Very Low Birth Weight

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Background and Aims
Adequate parenteral nutrition improved growth outcomes in preterm infants.

Method
We prospectively studied 134 preterm infants with very low birth weight (mean gestational age 29.7±1.6 weeks, mean birthweight 1113.9 ± 272.3 g) and divided them in three groups according to different protein intake. During the first week of life all infants received parenteral nutrition together with some trophic enteral feeding. In group 1 (n=51; born 2013-2014) protein and energy intake was high, with mean daily protein intake of 3.84 g/kg/day and energy intake of 65 kcal/kg/day during three days of life compared to 2.48 g/kg/day and 42 kcal/kg/day in group 2 (n=47; 2010-2012 year of birth) and to 1.17 g/kg/day and 31 kcal/kg/day in group 3 (n=36; born 2006-2008). The main indicators were terms when the infants gained the weight of 1800 g and their postconceptional age by that moment.

Results
Mean daily weight gain was significantly higher in group 1 than in groups 2 and 3 (21.2, 16.2 and 13.2 g/kg/day, respectively, p<0.05). Infants in group 1 reached the weight of 1800 g at day 34.7±5.6; in group 2 – at day 39.8±4.4; in group 3 - at day 56±8.3). Mean postconceptional age of the infants in the three groups was 34.4±2.1; 35.8±1.8 and 38.4±2.2 weeks, respectively.

Conclusion
The high protein and energy intake in the first week prevents postnatal failure in preterm infants.
DEVELOPMENT OF EVENT-RELATED BRAIN POTENTIALS IN A PIG MODEL OF PRETERM BIRTH AND NUTRITION SUPPORT

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CLINICAL PROFILE AND OUTCOME OF NEONATES ADMITTED TO NEONATAL INTENSIVE CARE UNIT (NICU) AT A TERTIARY CARE CENTRE IN EASTERN NEPAL

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Background and Aims

Neonatal period is the most susceptible period of life due to different causes, which in most cases are preventable. Every year millions of neonates are born and a large proportion of them are admitted to the neonatal intensive care unit (NICU) for various indications. One of the Millennium Development Goals is to reduce under five mortality by two thirds by 2015. Therefore, this study was conducted to identify the clinical profile, pattern of diseases and common causes of mortality and morbidity in neonates admitted to NICU.

Materials and Methods

A retrospective study was conducted at level III Neonatal NICU of a tertiary -care teaching hospital from January, 2012 to December, 2012.

Results

Total of 361 neonates were admitted in NICU. Eighty six neonates (23.8%) were admitted due to prematurity and 73 (20.2%) with birth asphyxia. Among birth asphyxia, 40(54.8%) were in HIE III, 27.4% and 17.8% in HIE II and HIE I, respectively. One hundred eighteen (32.6%) cases were diagnosed as sepsis. The overall mortality was 20.2% during hospital stay.

Conclusion

Sepsis, prematurity and birth asphyxia were major causes for admission in NICU. All these etiologies are preventable up to some extent and, if detected earlier, can be effectively treated in order to reduce morbidity and mortality.
Background and Aims
New standards (IGNS) for newborn size have been launched by the Intergrowth-21 consortium, based on measures from over 20,000 newborns, representing all world regions. Our aim was to compare newborn weight, length and head circumference (HC) in different ethnic groups, using these standards, in a multi-ethnic population in Norway.

Method
The sample consists of live-born, singleton infants with valid birth data in the three largest ethnic groups (358 Europeans, 189 South Asians and 156 Middle East/N-Africans), drawn from a population-based cohort study of 823 healthy pregnant women living in Oslo, Norway. Mean z-score (95% CI) and the proportion above and below the 90th and 10th percentile, were calculated using the calculator available on the Intergrowth home-page.

Results
Ethnic Europeans (mean z-score by Norwegian birth weight References: +0.01 SD) had a mean birth weight, length and HC z-score according to the IGNS of +0.57 (0.47, 0.68), +0.35 (0.23, 0.47) and +0.87 (0.76, 0.98). The respective numbers for ethnic South Asians were -0.07 (-0.21, 0.07), +0.08 (-0.08, 0.24) and +0.36 (0.21, 0.50), and for Middle East/N-Africans +0.36 (0.18, 0.53), +0.14 (-0.06, 0.07) and +0.75 (0.57, 0.92). Among Europeans, 24% and 4% had a birth weight above the 90th or below the 10th percentile. The respective numbers for South Asians were 9% for both.

Conclusion
Newborn size in ethnic Europeans, in particular HC, was shifted to the right (towards larger measures), compared with the new Intergrowth Newborn Size Standards. Ethnic South Asians had a similar weight and length distribution as the standards.
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GROWTH IN CHILDREN BORN PREMATURELY AFTER SEVERE AND EARLY ONSET HYPERTENSIVE DISORDERS OF PREGNANCY FROM 0-12 YEAR
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Background and Aims
Early onset hypertensive disorders of pregnancy are strongly associated with placental insufficiency and consequently fetal growth restriction. We aimed to investigate growth of children born after these disorders, longitudinally from 0-12 years.

Method
Study subjects were born from mothers participating in the Preeclampsia Eclampsia Trial Amsterdam. Birth weight ratio (BWR) was used as measure of fetal growth restriction, and was defined as birth weight/expected birthweight P50 (customized growth charts). Complete catch up growth was defined as height SDS within target range (+/-1.6SD). At age 4.5 135 of 174 PETRA survivors were measured.

Results
Anthropometry at age 12 was done in 83 of 135 children, seen at 4.5 years' follow up (with another 17 scheduled). Gestational age (GA) range was 27-37 weeks (mean 32). Mean BWR was at p2.3. Mean target height was -0.3 SDS.
Height SDS: -1.4 at 3 months, -0.6 at 1 and 4 years, -0.4 at 12 years. At age 12, 95% had complete catch up growth, with 3 children on growth hormone.
BMI SDS: -0.4 at 3 months, -1.1 at 1 year, -0.96 at 4 years, -0.04 at age 12. BMI >+1SDS was 2% at age 4 and 17% at age 12.
Measures at age 12 were not associated with GA nor BWR.

Conclusion
In this longitudinal sample of children born growth restricted at wide GA range, most children had complete catch up growth for height. Although there was a 15% increase in children with BMI >1SDS from 4 to 12 years, this is still lower than in the Dutch reference population.
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BODY COMPOSITION IN MATURE SMALL, APPROPRIATE AND LARGE FOR GESTATIONAL AGE NEWBORNS
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Background and Aims
Nutritional needs of newborns who are appropriate for gestational age (AGA), small (SGA) and large for gestational (LGA) age are different. Measurement of body composition by bioelectrical impedance may be of help in evaluating newborn’s nutritional needs. The aim of our study was to compare body water compartments and percentage of fat mass between AGA, SGA and LGA term newborns.

Method
Bioscan 920-II, Maltron International Ltd was used to measure bioelectrical impedance. The measurements were performed in newborns while sleeping in supine position, with extended arms and legs, one hour after the feeding. Two electrode pads were put on the back of the hand and two on the back of the foot, at least one centimetre apart.

Results
37 neonates with gestational age between 37 and 41 weeks were grouped according to birth weight: 17 newborns were AGA, 9 SGA and 11 LGA. In the AGA group mean excess of body water was 0,18 l and mean fat mass 11 %. The children in SGA group had no excess of water, mean fat mass was 10,4 %. LGA newborns had mean 0,24 l excess water and 12,4 % of fat mass.

Conclusion
Our pilot study demonstrated that body composition (water and fat mass) in AGA, SGA and LGA newborns is different; although further studies in large groups are needed. In our opinion measurement of body compartments with bioelectrical impedance may be of help in evaluating nutritional needs and fluid management in newborns.
Neonatal & Prematurity

GROWTH, ADIPOSITY, INSULIN RESISTANCE AND IRON STATUS IN EXTREMELY PREMATURE APPROPRIATE VERSUS SMALL FOR GESTATIONAL AGE INFANTS FED AN EXCLUSIVE HUMAN MILK-BASED DIET

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Background and Aims
Rapid catch-up growth in early childhood growth of premature infants is linked to metabolic disorders. We compared post-discharge growth, body composition, metabolic outcomes and iron status in appropriate for gestational age (AGA) with small for gestational age (SGA) (weight <10\%ile) premature infants fed an exclusive human milk (HM)-based diet in a neonatal intensive care unit.

Method
Premature children (birth weight ≤ 1250 g) fed an exclusive HM-based diet were enrolled. At 12-15 months corrected gestational age (CGA) (visit 1), anthropometric measurements, serum glucose, serum insulin, Hb and ferritin were obtained. At 18-22 months CGA (visit 2), body composition was measured by dual-energy X-ray absorptiometry.

Results
Fifty-one children participated (33 AGA and 18 SGA). Weight gain was significantly different between groups: gain in the AGA group was greater from discharge to visit 1 (p=0.016) while gain in SGA group was greater from visits 1 to 2 (p=0.04). Body composition was similar between groups. Insulin levels (5.04±3.72 vs.17.26±15.06 uU/mL, p=0.001) and HOMA-IR (1.12±0.88 vs.4.30±4.12, p=0.001) were lower in the SGA group. However, trunk FM in the SGA group correlated to insulin levels (r=0.893, p=0.042). Head circumference and iron intake correlated with Hb in the SGA children at visit 1 (r=0.564, p=0.018 and r=0.548, p=0.034, respectively).

Conclusion
An exclusive HM-based diet supports adequate in-hospital growth of premature infants and causes no increased adiposity or insulin resistance in SGA infants. The amount of iron intake may crucially affect iron status and adequate growth in these children.
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A BETTER NUTRITIONAL STATUS AMONG THE ALGERIAN PRESCHOOL CHILDREN (A CROSS SECTIONAL STUDY)

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Background and Aims
In Algeria, the lack of nutrition education and poverty make more frequent the various forms of malnutrition. A cross sectional study was conducted among a population of 368 healthy preschool children aged between 6 months and 5 years in the municipality of El Idrissia (poor Area in center of Algeria) in order to assess these forms of malnutrition

Method
The Anthropometric data were collected and converted into Z scores, using the software Anthropo Plus WHO

Results
Despite relatively low frequencies than the national data, the analysis of the different Z score curves showed that stunting (ZHAZ<-2SD), obesity (ZWAZ>+2SD) and underweight (WAZ<-2SD) are very frequent with 19.29%, 7.34% and 4.34% respectively

Conclusion
Given the negative consequences that can result from the various forms of malnutrition, it is urgent to take much more actions of sensibilisation, in order to improve the nutritional status in children especially in disadvantaged regions of Algeria
ASSOCIATIONS BETWEEN BREASTFEEDING, TIME SPENT OUTDOORS AND CHILDREN’S HEALTH

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Background and Aims
Epidemiologic studies have been suggested that breastfeeding is protective against becoming asthmatic and poor children health. The objective of this study was to determine whether breastfeeding and its duration, and time spent outdoors are associated with a reduced risk of wheezing and asthma among children.

Method
This nested case-control study included 1,489 children of 4–6 year’s age residing in Kaunas, Lithuania, who were recruited in 2007-2009 to the KANC newborns cohort study. Responses to the questionnaire completed by parents were used to ascertain children with wheezing and physician-diagnosed asthma. Association between breastfeeding, time spent outdoors, and children’s wheezing, asthma and poor health was estimated by multivariable regression, controlling for covariate.

Results
Physician-diagnosed asthma and wheezing was recorded in 11.3% and 19.6% children of non-breastfeeding mothers and in 7.3% and 15.3% of breastfeeding mothers. Breastfeeding 7 months and longer was associated with reducing wheezing and asthma risk (OR 0.76; 95% CI 0.57–1.01 and 0.79; 95% CI 0.54–1.17, accordingly). After adjusting for potential confounders the breastfeeding positive effect on asthma risk was higher in children who have spent outdoors 2 hours per day and longer than who’s spent outdoors less 2 hours per day.

Conclusion
A shorter duration of breastfeeding and shorter time spent outdoor may be a predictor of adverse child health outcomes of early childhood.

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Conflict of Interest Disclosure: I have no potential conflict of interest to disclose.
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GROWTH CURVES AND LIFESTYLE DURING THE FIRST YEAR OF LIFE IN A TYPICAL SLOVENIAN INFANT POPULATION SAMPLE
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Background and Aims
Birth weight and infant feeding history affects the risk of metabolic syndrome later in adulthood. We assessed Slovenian infant population sample with the planned further follow-up.

Method
In prospective study we included all babies, born in 2014, from typical Slovenian municipality of 15,393 inhabitants; half rural/half urban. We included 118 infants from total 132; all data were recorded by a single paediatritian simultaneously with infants’ systematic reviews. Data were analysed by SPSS software, ver. 22.0.

Results
We included 58 girls and 60 boys born at mean GS=39,34±1,02 weeks with mean BW=3461,56±452,51g and BL=51,61±2,33cm; boys’ BW=3499,58±460,43g and BL=51,63±2,67cm; girls’ BW=3419,48±447,91g and BL=51,59±1,97cm; mean age of mothers 31,1±4,3 years. Data did not statistically significantly differ from national data. Mothers reported their 2nd pregnancy (2,23±1,37); but their first birth (1,79±1,05). Mean education of mother was comparable to father’s, with finished secondary school (5±1,03 vs. 5± 1,16). Correlation at the 0.01 level (2-tailed) was shown for birth weight, pregnancy and birth order (0,028 for pregnancy and 0,009 for birth order). Our group was stratified according to SES: 0% into lowest economy; 5,3% working; 68,4% lower middle; 21% higher middle; 5,3% wealthy, high class. All parents reported knowledge of healthy lifestyle and all knew the diet pyramid. In 68,5% they reported healthy eating habits while 31,5% wished these were better. During the pregnancy the parents changed their eating habits in 47,3%; lifestyle was not changed during the pregnancy in 73,6%.

Conclusion
Our group is representative of typical Slovenian population and can serve as a basis for further studies.
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SAUDI PEDIATRIC NUTRITIONAL SURVEILLANCE FOURTEEN YEARS’ EXPERIENCE

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Background and Aims

Nutritional surveillance program (NSP) helps to understand the nutritional health status of the individual, and in the development and selection of the appropriate policies processes to control and prevent malnutrition. The aims of the NSP in Kingdom of Saudi Arabia (KSA) to provide anthropometric and feeding data of infant and children from birth to 5 years. It is part of ongoing nutritional surveillance.

Method

The data presented in this paper is part of the ongoing NSP in primary health centers (PHCs), subjects aged from birth till 60 months old, recruited from four regions Kingdom of Saudi Arabia. Data compared with WHO 2006 Growth Reference standard for both sexes.

Results

The total number of the subjects was 5046. The mean birth weight was 3010 grams, boys had high birth weight compared to girls and the difference was significant. The low birth weight among the infant (9.1%), stunted growth was 9.9%, 4.3% were moderately underweight and 0.9% were severely underweight. Data showed that 4.3% and 1.8% were moderately or severely wasted respectively, 7.4% of the boys were overweight and 2.2% were obese whereas 6.3% of girls were overweight and 1.4% were obese.

Conclusion

The Saudi pediatrics nutritional surveillance illustrated that, the Saudi children within the acceptable or low prevalence of stunting, underweight and wasting. The rate of obesity and overweight dropped significantly, where as the stunted children in this study was less than what was reported from the same Saudi pediatrics nutritional surveillance fourteen years back.
PARAOXONASE ACTIVITY IN CHILDREN WITH IRON DEFFICIENT ANEMIA

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Background and Aims
Iron deficient anemia is a condition associated with increased oxidative stress due to decreased oxygenation capacity of the peripheral tissue.

Paraoxonase 1 (PON1) is an enzyme synthesised primarily in the liver and secreted in plasma associated with HDL particles. Paraoxonase is protecting HDL and LDL against oxidation and its activity is influenced by genetic polymorphism, nutritional factors and pharmacological agents.

Method
19 children with iron deficient anemia and 20 controls were selected for the study (ages between 1-7 years). Iron level, hemoglobin content, red blood cells volume and number, transferrin saturation and ferritin concentration were measured on all blood samples and used to diagnose anemia. Paraoxonase activity toward paraoxone (basal PON and salt stimulated PON NaCl), phenylacetate (arylesterase activity -PON fa) and dihydrocoumarine (lactonase- PON DHC) activity were also determined.

Results
No statistical significance was found between paraoxonase activity toward all substrates in children with iron deficient anemia compared with the controls.

Conclusion
Our results are suggesting no influence of low iron level in blood on paraoxonase activity in children.
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319 IMPACT OF EARLY INFANT GROWTH, TYPE OF FEEDING AND MATERNAL FACTORS ON TOTAL BODY FATMASS AND VISCERAL FAT AT 3 AND 6 MONTHS OF AGE
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Background and Aims
Accelerated gain in fatmass and particularly in visceral fat in the first months of life might be major risk factors for adult diseases, because fatmass tracks into adulthood. Infant growth, type of feeding and maternal variables might influence the gain in weight, fatmass and visceral fat in early life.

Method
In 300 healthy term infants, we investigated longitudinal changes in fatmass percentage(FM%), measured by Peapod at 1, 3 and 6 months of age in combination with changes in abdominal visceral and subcutaneous fat, measured by ultrasound, at 3 and 6 months, and their associations with infant growth, type of feeding and maternal variables.

Results
Higher gain in weight and FM% in the first 3 months of life was associated with higher FM% at 3 and 6 months of age, whereas size at birth was not associated with FM% at 3 and 6 months. A higher gain in weight and FM% between 1 and 3 months was associated with more visceral fat at 3 months and a higher gain in FM% between 3 and 6 months with more visceral fat at 6 months. Exclusive breastfeeding (EBF) duration was associated with more subcutaneous fat, but not more visceral fat. Maternal characteristics did not associate with infant’s fatmass and visceral fat at 3 and 6 months.

Conclusion
Higher gain in weight SDS and FM% in the first postnatal months leads not only to a higher FM%, but also to more visceral fat at 6 months of age. Exclusively breastfed infants develop more subcutaneous fat.
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FEEDING PRACTICES IN INFANTS
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Background and Aims
One of the most urgent tasks of the current pediatrics is to ensure a good development by optimization of infants alimentation.

To study the feeding practices in infants according to WHO/UNICEF recommendations and local guidelines (Republic of Moldova).

Method
The study group consisted of 96 children aged between 0-12 months (mean age 5.6 months). 83% of surveyed mothers were from urban areas and 17% – rural. The knowledge of mothers were studied by interviewing.

Results
Only 36% of children were exclusively breastfed in the first 6 months of life. This results are similar to UNICEF study conducted in Moldova in 2012. Exclusive breastfeeding lasted on average four months and not six months as recommended.

The most common source of information about the importance of breastfeeding is family doctor – 62%, pediatrician – 19%, "mother school" – 9%, not informed – 6% mothers.

The main benefit of breastfeeding was indicated: "convenience" – 60%, economic aspect – 10%, contraception wasn’t a priority for mothers (5%).

Over two thirds (64%) of children younger than 6 months receive other kind of food than breastmilk, early administration of complement is groundless in 50% of these cases.

Diversification of infants foods is made with products from drugstores (60%), food from the family meal (37%), cow milk – in 3% cases.

Conclusion
Our study confirmed that after more than 20 years since the launch of the „Global Strategy for Infant and Young Child Feeding“ (WHO/UNICEF), feeding practices in Republic Moldova do not always reflect current policy of promoting breastfeeding.
Infancy

USE OF MID-UPPER ARM CIRCUMFERENCE AND SKINFOLD MEASUREMENTS TO EVALUATE MUSCLE AND FAT STORES IN INFANTS WITH CONGENITAL HEART DISEASE

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Background and Aims

Infants with congenital heart disease (CHD) often demonstrate poor growth and altered body composition. Using mid-upper arm circumference and skinfold anthropometric measurements we describe growth over the first year of life in infants with CHD compared to healthy infants.

Method

Triceps (TRI) and subscapular (SC) skinfold measurements together with mid-upper arm circumference (MUAC) were obtained in 3-month increments through 12 months of age. Infants with CHD were categorized as single ventricle (SV) or two ventricle (2V) physiology and compared to healthy infants. All measurements were converted to World Health Organization (WHO) z-scores.

Results

Of 120 infants enrolled, 69 (58%) had CHD, of these 31 (45%) with SV physiology. Compared to healthy infants, MUAC z-score in all infants with CHD were statistically lower regardless of physiology at 3 (p=0.002) and 6 (p=0.04) months, but not at 9 (p=0.06) or 12 (p=0.9) months. In infants with SV physiology SC z-scores were lower at 3 (p=0.02) and 9 months (p=0.02), not at 6-months (0.22); MUAC was lower only at 3 months (p=0.00); and TRI lower at 9 months (p=0.02). Infants with 2V physiology showed no difference in SC or TRI across intervals, with MUAC lower at 3 months (p=0.04), not at 6 (p=0.2), 9 (p=0.05) or 12 (p=0.7) months of age.

Conclusion

Overall, MUAC measurements were lower in infants with CHD from 3 - 6 months of age. These findings support the importance of comprehensive anthropometric assessment in infants with CHD at risk for altered body composition and growth failure.
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A COMPARISON OF CHILD GROWTH PATTERNS OF HIGH AND LOW ALTITUDE POPULATIONS IN NEPAL
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Background and Aims
The different environmental stressors in high and low altitude settings affect how children grow. Our aim was to compare growth patterns in children aged 0-34 months from two populations in the plains and mountains of Nepal.

Method
We analyzed cohort data of children from low (n=1354) and high (n=319) altitude populations in Nepal. Children were aged 0-24 months at baseline (June/July 2011) and were followed-up after 9 to 10 months (April/May 2012). We calculated internal length-for-age z-scores (LAZ) using the low altitude population as a reference and compared the high altitude population to this standard using unpaired t-test. Additionally, we used ordinary least squares regression adjusted for age, sex, and length at baseline to assess whether growth between time points differed in the two populations.

Results
Children from the high altitude population had a 0.32 (95% CI: 0.36, 0.28) SD lower LAZ at baseline than the low altitude population, corresponding to a 5.20 (95% CI: 5.94, 4.45) cm lower length. The regression showed that holding constant for their size at baseline, children in the high altitude population had grown 0.46 (95% CI: 0.69, 0.22) cm more over 9 months than their peers in the plains.

Conclusion
Growth patterns were different between the high and low altitude populations. While mean LAZ and mean length at baseline were higher in the low altitude population, children in the high altitude experienced stronger growth between 24 and 34 months of age. Overall, children in the high altitude showed a less healthy profile.
FACTORS THAT INFLUENCE SOUR TASTE DEVELOPMENT IN INFANTS DURING THE FIRST SIX MONTHS OF LIFE

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Background and Aims

Taste is a major determinant of children’s food preferences. Infants are born with an innate preference for sweet flavours while rejecting sour tastes. Improved fruit intake in older infants is related to acceptance of sour tastes and this can be influenced by exposure to fruits in utero and in early infancy. This study examined extreme sour taste acceptance in infants and explored whether this can be linked to infant feeding practices and maternal fruit consumption during pregnancy.

Method

Mothers (n=64) completed a 7-day food diary during the 3rd trimester of pregnancy and at 12 weeks post-partum. Levels of breastfeeding were also recorded at birth, 12 weeks and 6 months. Sour acceptance of infants (n=64) was investigated at 6 months by allowing infants ingest ad libitum drinks with increasing molar concentration (M) of citric acid (0.00M, 0.013M, 0.029M and 0.065M) for a measured time period (60 secs) using three methods of analysis; infant ingestion rates, the mothers’ perception score and the observer score via video recordings.

Results

In general, infants rejected extreme sour tastes at 6 months. However, a large variability within the group was observed, with some accepting these tastes. Fruit consumption by mothers during pregnancy and the length of exclusive breastfeeding were positively associated with acceptance of sour tastes at 6 months (p<0.05).

Conclusion

This study provides evidence of the relationship between early exposure to fruit and sour taste acceptance in infants. This should be highlighted to the importance of healthy food preference from infancy and beyond.
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DIETARY N6:N3 FATTY ACID RATIO DURING PREGNANCY IS INVERSELY ASSOCIATED WITH INFANT NEURODEVELOPMENT: MOTHERS AND CHILDREN’S ENVIRONMENTAL HEALTH (MOCEH) STUDY
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Background and Aims
This study investigated the associations between maternal long-chain polyunsaturated fatty acids (PUFA) intake during pregnancy and infant neurodevelopment at 6 month of age using data from 968 participants in the Mothers and Children’s Environmental Health (MOCEH), a multi-center prospective cohort study.

Method
Dietary intake during pregnancy was assessed by 24-hour recall method, and the mental (MDI) and psychomotor (PDI) development index scores were assessed using the Bayley Scales of Infant Development at 6 month of age.

Results
Multiple regression analysis after adjustment for participant characteristics showed that maternal dietary n6:n3 fatty acid ratios were negatively associated with the MDI (β=-0.1520, p=0.0422) and PDI (β=-0.1274, p=0.0363) at 6 months; these negative associations also existed when we included the maternal dietary intakes of folate, fish, and seaweed, serum folate level, and blood mercury level as well as participant characteristics as potential confounders (MDI, β=-0.2406, p=0.0200; PDI, β=-0.1665, p=0.0393).

Conclusion
These results suggest that the ratio between maternal dietary n6 and n3 PUFA intake may influence the infant’s brain development.

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MATERNAL CONSUMPTION OF FRUITS AND VEGETABLES/VITAMIN C DURING PREGNANCY IS ASSOCIATED WITH FETAL AND INFANT GROWTH UP TO 6 MONTHS
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Background and Aims
Vitamin C plays an important role in providing the antioxidant defense against increased oxidative stress during pregnancy. The aim of this study was to investigate whether maternal intake of vitamin C, which is abundant in fruits and vegetables, is associated with fetal and infant growth.

Method
The study participants were 1,138 Korean pregnant women at 12-28 weeks gestation with their infants recruited for the Mothers and Children’s Environmental Health study. Fruits and vegetables/vitamin C intake during pregnancy was assessed by 24 hour recall method. Fetal biometry was assessed by ultrasonography at late pregnancy, and the infant weight and length were measured at birth and at 6 months.

Results
Maternal intakes of fruits and vegetables (P <0.05) and vitamin C (P <0.05) were negatively correlated with urinary malondialdehyde (MDA; a biomarker of oxidative stress) levels at mid pregnancy. The multiple regression analysis after adjustment for covariates showed that maternal fruits and vegetables intake was positively associated with biparietal diameter of fetus and infants’ weight during birth to 6 months; maternal vitamin C intake was positively associated with abdominal circumference of fetus and infant birth length.

Conclusion
The results of this study suggest that higher intake of fruits and vegetables and vitamin C at mid-pregnancy is associated with increased fetal growth, and infant growth up to 6 months of age.

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ULNA AND TIBIA LENGTH MEASUREMENTS AS ALTERNATIVES FOR ESTIMATING HEIGHT IN HOSPITALIZED CHILDREN
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Background and Aims
Height is an important component in the nutritional assessment and management of hospitalized children. Various conditions and situations can interfere with measurements of standing height, thus ulna and tibia measurements have been proposed as alternatives in these situations. The study aimed to test the accuracy of these measurements in a sample of children being admitted under various specialties to a tertiary referral hospital.

Method
Standing height, ulna (n=700, 51.7% male, 10.5±1.9yr) and tibia (n=133, 51.9% male, 13.9±2yr) measurements were taken within 48hrs admission. Tibia and ulna measurements were taken using a non-stretchable tape and standing height using a fixed or portable stadiometer. Prediction equations were calculated and accuracy of the estimates tested using Bland-Altman analysis and Cohen’s kappa against standing height and height standard deviation scores (SDS) calculated using 1990 British reference data with abnormal cut-offs of <-2 or >2SDS.

Results
Ulna and tibia length measurements could explain a high percentage of variability on height in our sample (R²=87% and 86.6% respectively). Prediction equations adjusting for age and weight resulted in a non-significant mean bias (MB) of -0.01cm and -0.04cm respectively, with limits of agreement of ±8.5cm and ±8.7cm. Ulna and tibia estimates of height showed a high agreement (94% both, kappa=.43) to SDS classifications of abnormal scores.

Conclusion
Ulna and tibia measurements in paediatric patients could be an alternative to estimate height and diagnose abnormal SDS in those patients unable to stand or on whom a standing height is unfeasible, thus aiding in the nutritional assessment and management of these children.
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THE ASSOCIATION BETWEEN LEPTIN, ADIPONECTIN, IGF-I AND INSULIN AT 9 MONTHS AND GROWTH FROM 9 TO 36 MONTHS
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Background and Aims
Several hormones are involved in the regulation of appetite, growth and body composition during early childhood such as leptin, adiponectin, IGF-I and insulin but the effect may change with age. We investigated the relation between hormones at 9 month and growth up to 36 month.

Method
Subjects from the two prospective cohorts SKOT-I and SKOT-II with adiponectin measurement at 9 mo were included (n=406). SKOT-II infants were born to obese mothers (n= 132) and SKOT-I was a population based cohort without restriction on maternal BMI. Infants were examined at 9 and 36 month including anthropometric measurements and at 9 month also blood samples analyzed for insulin, IGF-I, adiponectin and leptin.

Results
SKOT-II infants had higher levels of insulin and adiponectin but lower levels of IGF-I compared to SKOT-I (all p≤0.007). In models adjusted for gender and baseline values at 9 month the following positive associations were found: insulin with weight, waist circumference, triceps skinfold (SF) and BMI; IGF-I with height, leptin with triceps SF; adiponectin with triceps and subscapularis SF at 36 months (all p≤0.05). The only negative association was between leptin and weight (p<0.001).

Conclusion
High insulin levels in infancy seem to be important for later weight gain and adiposity whereas IGF-I was only associated with linear growth. The role of adiponectin and leptin in infancy is less clear. Adiponectin was positively associated with later subcutaneous fat contrary to adults where an inverse association is observed and leptin’s association with weight and subcutaneous fat had opposite directions.
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FREE GLUTAMATE IN HUMAN MILK AND GROWTH DURING EARLY INFANCY
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Background and Aims
Free amino acids (FAA), especially glutamate, have been suggested to downregulate energy intake in early infancy and thereby down-regulate growth, based on infant formula studies. Glutamate, the most abundant FAA in human milk although with a large variation between mothers, increases dramatically during early infancy. This has led us to hypothesize that glutamate could play a role in the down-regulation of human milk intake per kg body weight during exclusive breastfeeding, and that the differences in glutamate content in breast milk could explain differences in infant growth. We investigated if the amount of glutamate in breast milk was negatively associated with growth in breastfed infant.

Method
Breastmilk samples collected 4 months after delivery from 78 mothers (Odense Child cohort) were analyzed for glutamate by reversed-phase HPLC. Maternal and infant anthropometry at birth and 4 months were recorded.

Results
Glutamate was positively correlated with mother’s pre-pregnancy weight ($r=0.31$, $p=0.005$) and height ($r=0.28$, $p=0.013$), but not BMI. There were no negative correlations between glutamate and infant weight or BMI.

Conclusion
The hypothesis that the content of free glutamate in human milk has appetite and growth regulating effects could not be confirmed. The observed positive associations between maternal pre-pregnancy weight and height and glutamate content have not been reported previously. Free glutamate has effects on intestinal and brain receptors and since there are large variations in the content between mothers, further studies examining maternal factors regulating the glutamate content in human milk and the potential effects of glutamate in the breastfed infants are needed.
Food Practice of Infants and Children Aged Up to 5 Years of Age: A Review of Nutritional Epidemiologic Data in Brazil

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Background and Aims
Nutrition in early life have an important role to provide optimal growth, development and health in later life. This study aimed to review food practice, food composition and nutritional status in Brazilian infants and children until 5 years old.

Method
A review of PubMed/Scielo/Lilacs, thesis, Government and Pediatric Societies from 2008 to 2013 was conducted.

Results
There were few and heterogeneous publications on this topic. Only three papers had large sample (>1000 children) and covered different regions of Brazil. Prevalence of exclusive breastfeeding increased from 3% to 39%. From infants with no breastfeeding, only 12% (< 6 months) and 7% (> 6 months) received infant-formula (often containing sugar and wrong dilution), while others had whole cow’s milk. The median age of complementary feeding introduction was 4.5 months. Between 6 months and 5 years old, was observed daily consumption of rice (77%), bean (66%), meat/chicken/fish (32%), vegetables (13%) and fruit (45%), soda (74%), chips (55%), sweets (71%) and fried foods (51%). Fiber intake was below of recommendation. An excessive carbohydrates and protein, and low calcium, iron and retinol intake was observed. Low socio-economic classes had higher dietary inadequacies. Stunting and wasting were reduced but overweight was identified in 7% of younger than 36 months. Twenty-five% had iron deficiency and 15-20% vitamin A deficiency.

Conclusion
Inadequate diet can explain nutritional disorders, especially anemia and overweight. Low rate of exclusive breastfeeding, excessive use of whole cow’s milk, protein and sodium are risk factors for development of non-communicable diseases in later life.
Iron deficiency anemia (IDA) occurs in infants with high frequency. Nutrition intervention nationwide has been in schedule. The study aimed to understand iron deficiency (ID) status and correlates in infancy and early childhood in rural minority areas of Yunnan, China.

Method
A total of 1226 children aged 6-23 months were recruited from four counties at different poverty levels by using multi-stage stratified cluster sampling method, the concentrations of hemoglobin, serum ferritin, mean corpuscular volume (MCV) were examined, and a caregiver questionnaire survey was conducted.

Results
The prevalence of ID was found to be 63.6%, of anemia 47.2%, and of IDA 34.5%. The percentage of children who were anemic was 13.6% although their iron status were normal. Male children had significantly higher prevalence (67.7%) of ID than female children (59.3%, \( \chi^2 = 10.767, P = 0.01 \)). The prevalence rate was top in children at 12-17 months of age (72.3%), and the lowest in 18-23 months old children (58.6%). The ID prevalence rates were significantly different across the four ethnic groups and the four counties. Multivariate logistic regression showed that no nutrition kits supplement was positively correlated with ID (OR = 2.528, 95%CI:1.833-3.487).

Conclusion
Iron deficiency in early childhood is common in rural minority areas of Yunnan, China. It suggests that it is necessary not only to supply nutrition knowledge and feeding guidance to parents, but to provide iron-fortified nutrition kits to children in those areas as well.

[Key words] Rural areas; minority; children; iron deficiency; China

The study supported by Yunnan 2011 Collaborative Innovation Plan
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DOES MATERNAL VITAMIN D INTAKE PREDICT SERUM 25-HYDROXYVITAMIN D CONCENTRATIONS OF EXCLUSIVELY BREAST FED INFANTS AGED 2 TO 3 MONTHS?

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Background and Aims
When exogenous maternal vitamin D intake is adequate, transfer of vitamin D in the breast milk sufficiently meets infant demands. We aimed to determine the effect of maternal vitamin D intake from food and supplements on serum 25(OH)D concentrations in their exclusively breastfed infants.

Method
In a sample of women enrolled from well child clinics in New Zealand (NZ) we measured vitamin D intake using an interviewer administered semi-quantitative food frequency questionnaire. Infant 25(OH)D concentration was measured using liquid chromatography–tandem mass spectrometry.

Results
63 breastfeeding women, 73% of whom were European, and their exclusively breastfed infants completed the study. Estimated median maternal dietary vitamin D intake was 158 IU/day from food and 268 IU/day from food and supplements combined. Vitamin D supplements were consumed by 30 (48%) mothers. Estimated median maternal dietary intake from neither foods (P=0.23) nor supplements (P=0.69) varied by season of enrolment. Mean (s.d) infant serum 25(OH)D concentration was 52 nmol/L (30), with 28% of infants being vitamin D deficient (25(OH)D <50 nmol/L). There was no association between mothers meeting the adequate intake for vitamin D and infant serum 25(OH)D <50 nmol/L (P=0.27).

Conclusion
Serum 25(OH)D concentrations in exclusively breastfed infants in NZ are independent of current maternal vitamin D intake from foods and supplements. In NZ, vitamin D supplementation during lactation is not routinely recommended, and food fortification is not mandatory. This lack of policy is likely to be causally related to the high prevalence of vitamin D deficiency in exclusively breastfed infants in NZ.
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THE ASSOCIATION OF MATERNAL PSYCHOLOGICAL STATE OF BREASTFEEDING MOTHERS WITH INFANT APPETITE AND GROWTH
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Background and Aims
Breastfeeding is a dynamic process which involves complex physiological signalling and behavioural negotiation between the mother and the infant. This signalling is one of the prominent inter-relational mother-infant factors in early life. The aim of this study is to investigate associations between maternal psychological state and infant appetite and growth.

Method
Primiparous pregnant women (n=88) were recruited at antenatal clinics in Malaysia and their perceptions toward breastfeeding (BF) were assessed by the IIFAS Questionnaire. After birth, 64 mothers who were exclusively BF were followed up during the home visits (HV) when the baby was 2-3, 6-8 and 12-14 weeks old (HV1—HV3) to assess their weight, length and head circumference. During all HVs, maternal stress, anxiety and depression were assessed by Perceived-Stress-Scale, Beck-Anxiety-Inventory and Edinburgh-Postnatal-Depression-Scale respectively, and infant appetite by Baby-Eating-Behaviour-Questionnaire.

Results
Maternal stress, anxiety and depression scores were significantly reduced from HV1 to HV3 with an average reduction of 3-points each (all p<0.001). Reported infant appetite did not significantly change between visits (HV1-HV3). There was no correlation between measures of maternal psychological state and infant growth or appetite scores. The mean IIFAS score was 67% ±6.3SD and there was a negative correlation with maternal anxiety (r=-0.3,p=0.014) and depression (r=-0.3,p=0.04) scores at HV3.

Conclusion
Measures of psychological distress significantly reduced over time in these primiparous breastfeeding mothers, but were not associated with infant appetite and growth. Mothers who were better informed about breastfeeding were less stressed, suggesting that better education of mothers about breastfeeding before they become pregnant or during pregnancy could be helpful.
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NUTRITIONAL STATUS OF CHILDREN UNDER 5 YEARS IN CHIAPAS, MEXICO

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Background and Aims
Chiapas has historically been one of the states with the highest rates of malnutrition in Mexico. Demographically it is comprised mostly of indigenous people, illiterate, living in rural areas and those living in poverty, characteristics that make it vulnerable to the population especially children

Method
Retrospective, descriptive and cross-sectional study. The data of 325 children under age 5, who represent 565,219 of Chiapas were analyzed with WHO-Anthro software. The data were taken from the ENSANUT 2012 SPSS database, having a probabilistic design and collected anthropometric data, weight, height, age, edema, head circumference

Results
The percentages in the categories of weight-for-age and weight-for-height, indicate levels of acute malnutrition, while they may be related to other factors such as diseases, require care to take action. The most alarming result is given in the category of height-for-age, which indicates levels of chronic malnutrition related problems that are affecting the population in the long term.

Conclusion
The effects of malnutrition in early childhood (0-8 years) can be devastating and long lasting. They can affect behavioral and cognitive development, educational achievement and reproductive health, thus weakening the future productivity at work. If the child is not well fed during the first years of life can have a profound effect on them health as well as their ability to learn, communicate, think analytically, effectively socialize and adapt to new environments and people. Good nutrition is the first line of defense against many childhood diseases that can leave traces in children for life. Hence the importance of this study
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THYMUS SIZE IN 8-13-MONTH-OLD DANISH INFANTS - ASSOCIATIONS WITH CURRENT BODY SIZE, BODY SIZE AT BIRTH, AND BREASTFEEDING STATUS

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Background and Aims

The thymus plays an important role in the immune system as the site for maturation and differentiation of T-lymphocytes. Previous studies have shown associations between thymus size and current body size, breastfeeding status, and infections during infancy. The aim was to examine associations between thymus size and anthropometric measurements, sex, age, breastfeeding status, gestational age, and mode of delivery in 8-13-month-old healthy Danish infants.

Method

Analyses were based on baseline data from 125 healthy infants enrolled in the ProbiComp study, a randomized controlled trial investigating the effect of probiotics on absence from daycare due to infections. Thymus size was assessed using sonographic measures, and the thymic index (TI) was used as a volume estimate. Current body weight and length were measured while birth data and information on infant feeding were reported by the parents.

Results

Mean age was 10.0 ±0.7 months. Median TI was 16.1(IQR 14.1;18.5) and was positively associated with current body weight (p=0.03), birthweight (p=0.013), and length at birth (p=0.003), when adjusted for age and sex. Weight gain adjusted for birthweight was not significant (p=0.19), while the association between birthweight and TI remained significant (p=0.01). When adjusted for age, boys had a larger TI (median 16.9(IQR 14.8;19.5)) than girls (median 15.2(IQR 13.2;16.9)) (p=0.004), also after additional adjustment for current body weight (p=0.03).

Conclusion

Thymus size was positively associated with body size at birth and current body weight in 8-13-month-old Danish infants, but not associated with age, current length, duration of exclusive breastfeeding, current breastfeeding status, delivery mode, or gestational age.
ASSOCIATION BETWEEN FEEDING TYPES AND HEALTH OUTCOMES IN SOUTH AND SOUTH EAST ASIA

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Background and Aims
The infant’s need for energy and nutrients starts to exceed what is provided by breast milk by around the age of six months, therefore complementary foods into the diet around this age becomes necessary. Introducing the right kind of food at the right moment is a crucial element to increase the chances of a healthy start on life. The aim of this study is to analyze hemoglobin concentrations, WAZ-score and HAZ-score as well as diarrhea prevalence and associate them to food intake of children age 6 to 23 months.

Method
We combined 13 nationally representative and standardized Demographic and Health Surveys (DHS) spanning the period 2006-2015 from 6 countries in the region. We ran multilevel regression models with country and year fixed-effects.

Results
Preliminary results show that in surveys where blood test were available we identify food categories such as “commercial fortified baby food”, “partial breastfeeding” and “infant formula” to have positive and statistical significant association with higher hemoglobin concentrations. “Partial breast feeding” and “commercial fortified baby food” have a significant association with lower diarrhea prevalence.

Conclusion
These findings highlight the importance of following dietary recommendations to improve health outcomes at early age. Further work is in progress to test different statistical specifications.
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RICE HYDROLYZED FORMULA & GALACTOSEMIA
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Background and Aims
Galactosemia is a rare, severe enzymatic deficiency contraindicating human, maternal milk and leading to prescribe a free/low lactose concentrated formula. But not all hydrolyzed formulas do have the same nutritional and clinical output...!!

Method
We report the case of a 6 month aged girl, diagnosed 3 months before as having a galactosemia and on extensively hydrolyzed (lactoserum) formula (EHF) in order to diminish her lactose daily charge. Unfortunately, she had a notable failure to thrive, gaining only 300 g in 3 months...

Results
The total lactose concentration in her EHF was considered too high according to her metabolic disorder, and a completely free of lactose formula was needed... In this context, a rice hydrolyzed formula (less expensive and available in our country) was ordered. A dramatic increase in the weight of the infant, as well as a stronger appetite and a better digestion comfort, estimated at 800 g within 2 months, led to maintain this "alternative" but efficient nutritional option.

Conclusion
Rice hydrolyzed formula seems to be an efficient, cheap second line option and should be considered for some peculiar genetic disorders like galactosemia.
Background and Aims

Background. Exclusive breastfeeding is the best nutrition for a child in 6 months of life. The World Health Organisation (WHO) recommends exclusive breastfeeding during the first 6 months of life for optimal growth, development and health. In Indonesia, although regulations and programs have been established by the government, however coverage of exclusive breastfeeding are still far out of national target of 80%.

Objective. The aim of the study is to determine prevalence of exclusive breastfeeding practice and the associated factors in mothers at primary Health care based in urban and rural area in Bandung, West Java, Indonesia.

Method

Methods. A cross sectional study was use to 200 children less than 12 months from two primary health center base in urban and rural area in Bandung. Data was collected by administered structure questionnaire.

Results

Results. Two hundreds infants consists of 85 (42.5%) girls, with 102 (51%) mother-infant pairs were from rural area, while 98 (49%) were from urban area. The prevalence of exclusive breastfeeding in infants were 82.54% at urban area, and 59.31% at rural area. Factor associated with exclusive breastfeeding was urban area, multiparous mother, non-working mother, education level, and salary income.

Conclusion

Conclusions. The prevalence of exclusive breastfeeding were higher at urban area rather than rural area. Intervention and further investigation have to be done about mother’s knowledge to infant feeding practice.

Keywords: exclusive breastfeeding, infants, rural-urban, west java
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338 USING CASE-BASED DISCUSSION TO IMPROVE GRANDMOTHERS’ KNOWLEDGE AND ATTITUDES TOWARDS EXCLUSIVE BREASTFEEDING IN IBADAN, NIGERIA

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Background and Aims
Grandmothers play an important role in influencing breastfeeding practices at the household and community levels. However, intervention programmes on exclusive breastfeeding have not adequately targeted grandmothers in Nigeria. This study therefore evaluated an intervention to improve knowledge and attitude of grandmothers towards exclusive breastfeeding in Ibadan.

Method
This quasi-experimental study involved 187 consenting grandmothers from three selected local government areas in Ibadan municipal. A semi-structured interviewer administered questionnaire was used to elicit pre- and post- intervention data on grandmothers’ socio-demographic characteristics, knowledge and attitude towards exclusive breastfeeding. As intervention, the case-based discussion method, in which a story with messages about exclusive breastfeeding was developed and discussed with the grandmothers.

Results
The mean age of grandmothers was 65.8± 5.5 years. Eighty seven percent indicated that they played a major role in the choice of infant feeding practice that their daughters or daughters-in-law adopted. About half (49.7%) of the grandmothers stated that they had advised the introduction of water (to infants) within the first month of birth. At baseline, 37.7% of the grandmothers had good knowledge of exclusive breastfeeding, while 71.7% had negative attitudes towards it. The prevailing attitude was that exclusive breastfeeding is not a feasible infant feeding practice. At post-intervention, the proportion of grandmothers who had good knowledge on exclusive breastfeeding significantly increased to 96.7%. On the other hand, those with negative attitudes towards exclusive breastfeeding significantly decreased to 3.2%.

Conclusion
The case-based discussion intervention improved grandmothers’ knowledge and dislodged unfavourable attitudes of grandmothers towards exclusive breastfeeding in the short term.
Infancy

DEVELOPMENT OF RECIPES FOR MODERATELY WASTED CHILDREN AGED 1 TO 2 YEARS IN WEST BENGAL, INDIA

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Background and Aims
National health and nutrition data of India revealed that 78.9% of children aged 6-35 months were anaemic (NFHS-3, 2005-06) and 20% are being wasted (UNICEF, 2015). The objective was to design culturally appropriate recipes for treatment of wasted children aged 1-2 years.

Method
In close cooperation with the NGO “Shining Eyes e.V.” improved recipes based on locally available foods were developed with assistance of the software Nutrisurvey for supplementary feeding programs in Santhal villages, Bolpur.

Results
The RNIs for children aged 1 to 2 years suffering from moderate acute malnutrition (Golden, 2009) as well as guidelines for a balanced diet (Michaelsen et al., 2009) were attempted by either best combinations of available foods like spinach, onion, carrots, sunflower oil, curcuma, cowmilk powder, chickpeas and lime (200g spinach balls) or by the design of 110g eggburgers (made of potatoes, egg, turmeric, pepper, sunflower oil) supplemented with micronutrient powder (TopNutri). As the majority of the targeted children are still being breastfed and receive complementary food, the recipes were designed as a supplementary meal to fill the gap of the habitual diet (Piroth, 2014; Dewey & Brown, 2003; Scherbaum, 2004).

For example, 25%, 15% and 40%/49% of the calcium RNIs are being covered by medium breastfeeding frequency, by habitual complementary foods and by 200g spinach balls or 110g eggburgers respectively.

Conclusion
This investigation demonstrated that micronutrient powder can be theoretically replaced by a bigger portion of best combinations of locally available foods. Supplementary feeding programs need to be supported by participatory nutrition education to increase the acceptance towards better combinations of locally available foods.
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BIRTH WEIGHT AND LATER NUTRITIONAL STATUS IN EARLY CHIDHOOD. THE CASE OF URUGUAY
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Background and Aims
There is a linkage between children nutritional status and performances during child and adult life. The aim of this study is to study nutritional performances during early childhood

Method
An evaluation of birth performances comparing with Intergrowth References was done and a probit model of growth retardation, overweight and obesity.

Data from the National Survey of Health, Nutrition and Development was analyzed. The sample was representative at national level, being of 3079 children (0 - 3 y.o.)

Data from pregnancy, anthropometry, health, feeding practices and feeding security variables were measured. Low birth weight was considered as < 2500 g, growth retardation as < 2 z, overweight > 2z, and obesity > 3z from WHO Standards.

Probit models were applied about mother’s and home socio economic characteristics, birth weight, child’s illnesses, prenatal care, prensant’s health, nutritional status, diet diversification and feeding insecurity.

Results
1. low birth weight: 7.2%, prematurity 10.7%, growth retardation 5% a, Overweight and obesity 10.7%
2. Comparison with Intergrowth:
   a. Birth weight: <P 10, 4.5%; > P90 19%
   b. Birth height: <P 10 11.5%; > P90 7.8%

1. Growth retardation was associated with:
   a. Low birth weight (0.11 (0.0479)**)
   b. Economic social status
   c. Male worse tan female (0.0003(0.0001)*)
   d. Maternal depresión (0.0410 (0.0145)***)


e. Smoking, alcohol and drugs
f. Breast feeding (-0.0700 (0.0336)**)

1. Overweignt was associated with:
   a. > 4000 of birth weight (.124 (0.0264)**)
   b. Maternal obesity (0.124 (0.0447)***)
   c. High social economic status ( 0.124 (0.0447)***)
   d. Maternal hipertension (0.122 (0.0472)***)

Conclusion
There is a linkage between children nutritional status and performances during child and adult life.
Infancy

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NUTRITIONAL STATUS OF 6-12 MONTH OLD INFANTS IN A SUBURBAN SETTING IN SRI LANKA
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Background and Aims
Infant nutritional problems remain as one of the major public health problems in Sri Lanka. Therefore this research was conducted to determine nutritional status of infants at the age of 6-12 months in a suburban area in Sri Lanka.

Method
A cross-sectional study was conducted among infants attending to Maternal and Child Health clinics and data were collected using a pre-tested interviewer administered questionnaire, measuring anthropometric measurements and Child Health Development Records. Dietary nutrients intake from complementary feeding was obtained through a 24-hour dietary recall. Anthropometric data was analyzed using WHO Anthroplus software and nutritional status classified as underweight, stunting and wasting according to Z-scores less than 2SD. Dietary nutrient intake was compared with Recommended Dietary Allowances (RDA).

Results
The study sample consisted of 64 infants, age ranged from 6 to 12 months with the mean age of 9.33(± 2.40). While the mean birth weight of the sample was 2.93(±0.45) kg, 7.81% had low (<2500g) and 6.25% had over (>3800g) birth-weight. Under-weight, stunting and wasting percentages of the sample were 15.6, 25 and 10.9 respectively. Nutrient intake from complementary foods revealed that mean daily intake of the energy was 501.56 kcal which was below the RDA of 676 – 743kcal for infant of 6-12 months old. Similarly mean intake of iron, calcium, vitamin A, vitamin C from complementary foods were below the RDAs.

Conclusion
The half of the study sample had nutritional problems. Therefore, it is important to plan nutrition interventions to improve infant nutritional status.
Infancy

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INFLUENCE OF FEEDING PATTERNS ON THE INFANT'S EARLY SOMATIC GROWTH
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Background and Aims
According to Moldova's National Public Health Centre, the number of breastfed children decreased by about 20.5% from 2012 to 2014.

The aim of this study is to assess the influence of feeding patterns on the infant's early somatic growth according to the degree of adaptation of milk formula.

Method
The study was conducted on 485 infants with different types of feeding, including 243 infants younger than 6 months. 61.87% of infants were on breastfeeding and 58.01% infants – on bottle-feeding. In the group of bottle-fed children adapted formulas were used in 164 cases and partially adapted formulas – in 55 cases.

We used a questionnaire for the caregivers; anthropometric measurements were performed to assess the degree of physical development (centile method).

Results
Our study showed only 42.6% of children on breastfeeding for 6 months and more, according to WHO recommendations. In the group of breastfed children 74.82% infants had eutrophic physical development, 13.53% cases – had malnutrition of I degree, 11.65% of cases – had overweight. In the group of children fed with adapted formula, eutrophic physical development had 77.43% of children, 14.02% – malnutrition I degree, and 8.55% – had overweight. Children who were fed with partially adapted formulas 58.18% infants had eutrophic physical development, 16.36% – malnutrition I degree, and 25.46% – overweight.

Conclusion
The physical development was within the normal parameters in most infants from our study, but the rate of deviations from the average, particularly to overweight, was higher in children fed with partially adapted milk formula.
Infancy

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NUTRITIONAL AND ANTIBIOTIC INTERVENTION DURING LACTATION ATTENUATES DEVELOPMENT OF OFFSPRING MEASURED BY NOVEL DEVELOPMENTAL SCORE FOR MICE, THE “MOUSE-D-SCORE”

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Background and Aims

Hallmarks of early-life development can be monitored using the “D-score”, a composite measure of multiple developmental items (S van Buuren, Stat Methods Med Res. 2014). Here we present the “mouse-D-score” to monitor mice during the first three weeks of their life, and study the effects of (nutritional) interventions during pregnancy and lactation on the offspring.

Method

In a first study we developed the mouse-D-score algorithm, using ten litters of heterozygously bred ApoE*3Leiden (E3L) mice. The pups were studied for their development using thirteen items of development. In a second study, the effects of interventions during lactation were analysed using the mouse-D-score. Fifteen litters of six homozygously bred LDLr-/-Leiden mice were used and randomized in three groups. The mothers of the first groups received regular chow, the mothers in the second groups received an antibiotic treatment via drinking water between day 3 and 8, and the mothers of the third group received chow supplemented with butyrate.

Results

In the first study, we observed that the development of male mice was significantly faster than in female mice. The development of WT was faster than the development of E3L mice. Both antibiotic treatment and nutritional intervention by butyrate resulted in transiently decreased development rate compared to chow control.

Conclusion

Using the mouse D-score in different mouse lines we have shown that female mice show a different development rate than male mice, that genotype influences development rate and that this development can be modified by nutritional interventions on the mothers.
Infancy

VERY HIGH WEIGHT GAIN IN EXCLUSIVELY BREASTFED INFANTS; WHAT ARE THE CAUSES AND CONSEQUENCES?

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Background and Aims
A high weight gain during early infancy is associated with later obesity, but it is not known how breastfeeding influence this association. We present two cases referred to us because of excessive weight gain during exclusive breastfeeding.

Method
Weight and length, breastmilk intake (weighing) and macronutrient content (mid-infrared analyzer) were measured.

Results
Case 1: boy, birthweight 3.8 kg. Weight-for-age curve (WHO) in Fig 1. Exclusively breastfed until 5 mo. At 5.5 mo milk intake was about 1100 ml/24hr and milk macronutrient content (g/100ml): fat foremilk 0.4-2.1, hindmilk 4.3-6.9, protein foremilk: 0.6-0.8. Case 2: girl, birthweight 4.45 kg. Weight-for-age curve in Fig 2. Exclusively breastfed until 5 mo. At 4 mo milk intake was about 1500 ml/24hr and milk macronutrient content (whole-breast pumping, g/100 ml): fat 2.4-3.8, protein 0.7-0.8.

Conclusion
Case 1 gained ≈8 kg for the first 5 mo, but the following 20 mo he only gained 2.7 kg. Case 2 gained 13 kg in 8 mo with no sign of reduction in weight velocity. In both infants milk macronutrient content was within normal range and milk intake high, which could be part of the explanation of the excessive weight gain. A better understanding of the causes (e.g. appetite hormones in milk and blood) and risk of later obesity, will provide valuable information on early regulation of appetite and growth and if interventions are needed.
Infancy

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CHARACTERISTICS OF INFANTS WHO PRESENT TO A PAEDIATRIC HOSPITAL: FEEDING HISTORY
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Background and Aims
Sick infants have the most to gain from optimal feeding yet there is a paucity of studies specifically on feeding in infants presenting or admitted to hospital. Choice of infant feeding may increase the risk of illness. We investigate the association between clinical, demographic and social characteristics and infant feeding at presentation/ admission to hospital.

Method
A questionnaire based survey of parents to ascertain information about feeding, health and sociodemographic characteristics of infants who presented or were admitted to a tertiary paediatric hospital in Brisbane, Australia, during their first year of life. Data was collected between March 2013 and October 2013.

Results
Parents of 335 infants were surveyed, 23% of infants were aged 0-6 weeks of age (23%), 81% were born at term and 83% of mothers initiated breastfeeding. Infants who were preterm, delivered by caesarean section, or whose disease was first noticed at birth were less likely to have initiated breastfeeding. Breastfeeding at the time of presentation and/or admission was significantly associated with diseases of the skin and subcutaneous tissue and diseases of the musculoskeletal system and connective tissue, with not being higher SES, and with having longer disease duration.

Conclusion
This study consistently measured mode of feeding to identify if protective effects of breastfeeding in infants presenting and/or admitted to hospital could be identified. Choice of infant feeding and characteristics may influence infant presentation and/or admission to hospital, with a protective effect of breastfeeding reducing infection in some diagnostic categories.
Background and Aims

The Graduation with Resilience to Achieve Sustainable Development (GRAD) project carried out a nutrition-sensitive Value chain (VC) development project in Ethiopia which used the agriculture-nutrition pathways to enhance maternal and child nutrition. Social Behavior Change Communications (SBCC) activities were carried out in the Village Economic and Social Association (VESAs) groups to improve maternal and child nutrition.

Method

The results analyzed information from project formative mid-term evaluation (MTE) and Intermediate Result (IR) studies conducted. Triangulation with secondary data, project reports, and project M & E data bases was also used to draw conclusions.

Results

Over 10,060 HHs were addressed with SBCC on maternal, Infant and Young Child Feeding (IYCF) practices and cooking demonstrations. Since the start of GRAD, at least one IGA and/or VC engagement is reported in about 77% and 75% of cases, respectively. Households benefited more from complementary food for women and children and earning income from sales. Exclusive Breast Feeding increased from 69.7% to 95.7%; with caretakers reporting that exclusively breast-fed children were much healthier than senior siblings. The dietary diversity of women increased from 2.9 to 3.2 and minimum dietary diversity of children increased from 17.2% to 46.7% (2015 IR).

Conclusion

SBCC with nutrition sensitive agricultural interventions increased the nutrition knowledge and feeding practices of beneficiaries. VESA discussions helped to increase understanding on the benefits of improved maternal and IYCF practices and provided a platform to identify and discuss harmful beliefs and myths on breastfeeding.
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NUTRITIONAL STATUS AND FOOD CONSUMPTION PATTERNS OF SCHOOL CHILDREN LIVING IN KENITRA (NORTH-WESTERN MOROCCO)
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Background and Aims
The problem of malnutrition is the most important public health problem associated with a rapid nutrition transition, and affects many children in the world and in developing countries. The aim of this work is to determine the nutritional status and food consumption patterns of school children aged 6-15 years in the city of Kenitra (Morocco).

Method
The survey covered 271 students (52.4% of boys and 47.6% girls) aged 6 to 15. The anthropometric parameters were measured. A questionnaire was developed to obtain information about nutritional status and food consumption of children.

Results
The results showed that the percentage of Height / age <-2 of girls and boys are 8.5% and 4.2% respectively, the percentage of BMI / age <-2 is 2.3% and 5.6% for girls and boys respectively. No significant association was found between gender and nutritional status of children. Only 23% of children drink milk daily and the consumption of fruit and vegetables are below recommendations.

Conclusion
The prevalence of stunting and underweight increases with age in both sexes and food consumption of children is not varied. The consumption of sugars is higher than the recommended proportions, and breakfast as an important meal of the day should be reinforced. Information programs to improve nutritional knowledge, and awareness therefore prove urgent to put in place.
Background and Aims
There is scientific evidence that healthy dietary patterns have a role in the occurrence of less depressive symptoms, however the association with fish consumption remains controversial, especially in children. To investigate whether a healthy diet and increased fish consumption are associated with less depressive symptoms in a cohort of Brazilian children.

Method
This study included 912 children aged 4-11 years old in 2005, living in Salvador, Brazil. Food Frequency Questionnaire was used to define dietary patterns classified in tertiles. Depressive symptoms were evaluated using Child Behaviour Checklist. Self Reporting Questionnaire evaluated the mother’s mental health. The dietary pattern was assessed using factorial analysis. Multivariate logistic regressions were performed.

Results
The overall prevalence of depressive symptoms in children was 32.2%. Those symptoms were more frequent in children up to 8 years old (34.8%) and males (38.7%). Minor psychiatric disorders in mothers was 35.7%. In the adjusted multivariate logistic regression, the medium tertile of consumption in the healthy dietary pattern (fruit, vegetables, pulses, cereals and sea food) was associated with less depressive symptoms in young children (<8 years old) (OR=0.40; 95%CI 0.22; 0.73) and the highest tertile too, while without statistically significance (OR=0.61; 95%CI 0.32; 1.17). In oldest children the symptoms were more frequent when there was higher consumption of fried food, sweets, snacks, soda/artificial juice (OR=1.87; 95% CI 1.09; 3.21).

Conclusion
This study found evidence to support a protective role of a healthy dietary pattern that includes seafood on depressive symptoms in children effect in, even after adjusting by mothers’ minor psychiatric disorders.
Background and Aims
For the last four consecutive years (2012-2015), we conducted a systematic nutritional assessment survey in pediatric wards. Eight hospitals participated in this cross-sectional survey using a web-based tool: e-Pinut. We want to determine the prevalence of malnutrition in hospitalized children.

Method
All participating centers conformed to the Pediatric Nutrition Week guidelines for systematic nutritional assessment. Children admitted the same week were measured, weighed and their diagnoses recorded. Diagnostic procedure (clinical examination) was conducted only for children below the third centile of BMI for age and sex (World Health Organization Reference).

Results
Eight centers participated in this survey. On 528 observations collected, 528 were analyzed, totaling 528 patients (56.3% boys, median age: 3.2 years). Weight for height (WFH) <-2 Standard Deviation (acute malnutrition) was found in 18% of the whole population. Fifteen point one percent of children had a height for age <-2 Standard Deviation. Chronic diseases were present in a higher number of the children with a higher rate of malnutrition. All of the participating centers claimed to use e-Pinut as a tool to develop the awareness of malnutrition within their staff.

Conclusion
e-Pinut succeeded in mobilizing a growing number of pediatric wards in Colombia and contributed to standardize malnutrition diagnostic procedure. Frequency of malnutrition varied with centers and are in accordance with previous survey e-Pinut made in other countries. Next steps for 2016 are to widen the initiative and to extend it toward paramedical health professionals.
Background and Aims
Longitudinal studies help move researchers closer to understanding determinants and mediators of maturation, physical activity (PA) and adiposity. The aim of this study was to explore the influence of maturation on PA and adiposity changes in adolescents.

Method
Eighty healthy adolescents (42 girls and 38 boys) were followed over three academic years. A PA score was estimated using the Physical Activity Questionnaire (PAQ-A). Fat mass percentage (FMP) was assessed by anthropometric measurements. Sexual maturity was estimated by percentage of predicted adult stature and adolescents were classified into three changes groups: C0, change from on time to late maturation; C1, no change; C2, change from late/on time to on time/early maturation. A repeated measures ANOVA was conducted to examine temporal changes.

Results
An interaction between PA change and sex was statically significant (F = 4.889, P<0.05). A non-significant trend was observed between three stages of change with a progressive reduction of fat mass percentage across the three stages of change in maturation level (C0 = 0.275±2.70%; C1= -1.490±1.10%; C2= -6.417±2.57%; pairwise comparisons: C0 - C2 = 6.69%, P=0.081 and C1-C2 = 4.93%, P=0.080).

Conclusion
Our results suggest that body composition changes observed during adolescence are not driven by changes in PA. Moreover, the interaction analysis suggests that PA behavior is affected by sex, but is not modified by maturation.

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NUTRITIONAL STATUS AND BLOOD PRESSURE IN FIRST GRADE CHILDREN
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Background and Aims
Province of Vojvodina is characterized as an area with a high prevalence of obesity and hypertension in the adult population. The aim of this pilot study was to determine the nutritional status and prevalence of evaluated blood pressure in the youngest school age children.

Method
The survey was conducted in 2013. on a sample of 137 first-grade students in elementary schools in Novi Sad. Nutritional status was determined based on anthropometric measurements and the calculated BMI, whose values were compared with the WHO cutoffs. Blood pressure values were analyzed in relation to the percentile distribution of body height of measured students in relation to age and gender.

Results
Of all the measured children, inadequate nutritional status in the form of overweight and obesity was found in 39.06% boys and 30.14% girls. Of all the measured children, 18.46% boys and 15.07% girls had systolic blood pressure above the recommended values for body height, age and sex. The measured values of diastolic blood pressure in 24.61% of boys and 16.44% of girls were above the recommended values.

Conclusion
Because of the observed significant prevalence of childhood obesity and elevated blood pressure in children, it is necessary to establish a regular monitoring of the health status of children and potential contributory factors, as well as carry out health education, to promote the principles of proper nutrition and to change habits in the family diet.
Background and Aims
Type 1 diabetes mellitus (T1DM) is frequently associated with celiac disease (CD) which is in this case usually few symptomatic or even silent. Untreated CD exposes to the risk of delayed puberty and growth retardation. We aimed to investigate the effects of T1DM-CD association on linear growth.

Method
Children were followed from T1DM onset until 18 years at least. Linear growth was assessed longitudinally. Statural growth was compared with isolated CD subjects, isolated T1DM subjects, and controls according to Sempé curves. Height was expressed in standard deviations (SD).

Results
196 T1DM-CD were included (95 boys, 101 girls). Mean age at T1DM was 9.27 ± 4.95 years and 13.56 ± 4.52 years at CD. Mean height at diabetes was -1.20 ± 1.55 SD in boys, and -0.87 ± 1.72 SD in girls. Mean height at CD was -2.58 ± 1.54 SD in boys, and -2.15 ± 1.31 SD in girls.

Height velocity in T1DM-CD, was characterized by the absence of any growth acceleration during pubertal period. At 18 years, T1DM-CD height boys was -2.68 ± 1.85 SD, lower than isolated T1DM (-0.86 ± 1.09 SD, p <0.001) and isolated CD (-0.99 ± 1.21 SD p <0.001). At 18 years, T1DM-CD height girls was -2.06 ± 1.51 SD, lower than isolated T1DM (-0.68 ± 1.10 SD p <0.001) and isolated CD (-1.25 ± 1.02 SD, p <0.001).

Conclusion
T1DM-CD children have significant growth retardation, in comparison to isolated T1DM or CD, especially during pubertal growth, although they were under the same conditions of care.
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EVALUATION OF EATING HABITS IN FINAL YEAR HIGH SCHOOL STUDENTS
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Background and Aims
Nutrition is very important for adolescents’ health. This study was conducted due to evaluate eating habits of adolescents.

Method
A cross-sectional study was conducted on 450 students (258 girls and 192 boys) aged 16 to 19 years. Subjects were randomly selected from healthy final year high school students living in Ankara where is the capital city of Turkey. Data were collected in face-to-face interviews. The data analyses were carried out using SPSS.

Results
43.0% of the adolescents are boys and 56.5% are girls; Means of age in them is 17.5±0.6 years. Adolescents consume average 4.1±1.2 meals a day. It was found that the most frequently missed meal is breakfast (45.0%), followed by lunch (41.1%) and dinner (13.9%). The three most commonly consumed beverages at outside are coffee (22.7%), cola (20.9%) and Turkish Coffee (14.7%) respectively and the three most commonly consumed foods are crisps (33.6%), cake (31.3%), pide-lahmacun (similar to meaty pizza) (31.3%).

Conclusion
Promotion of healthy eating should be targeted at adolescents as they tend to depend on outside food. Poor eating habits during adolescence can lead to obesity and diet-related diseases in later years so adolescents should be informed that skipping meals, snacks, unhealthy food choices are harmful.
Background and Aims
Evaluate BP, growth and nutritional status of schoolchildren, who attend public schools.

Method
A cross sectional analytical study of a probabilistic sample of 1.082 schoolchildren from two age groups. The anthropometric and body composition data were evaluated: Weight (W), Height (H), Triceps Skinfold Thickness (TST), Waist Circumference (WC), Abdominal Waist (AW), ratio of WC/H and AW/H, Body Mass Index (BMI), Arm Fat Area (AFA) and Arm Muscle Area (AMA). The analysed the correlation between growth, nutritional status, body composition. Sensitivity and specificity analyses for the WC/H ratio were calculated by ROC curve.

Results
The higher blood pressure were observed in 13.8% of children, most often in the older group (17.6%). Regarding nutritional status, 25.1% were overweight and 13.0% were obese; 4.4% severe obesity (more frequent in boys, at 7.1%) regardless of age. BP levels were higher in children with higher z-scores for height. BP also was significantly associated with higher z-scores for BMI, AFA, AMA, TST and WC, WC/H and AW/H ratio, and an AMA smaller proportion. In the multiple regression analysis, the WC/H and AW/H showed an OR of 25842.37, and in the ROC curve.

Conclusion
The schoolchildren evinced adequate growth and high frequency of prehypertension and hypertension (13.7%), which tends to increase with age. The increased risk of BP elevation associated with a higher stature, body mass index, AMB and a smaller AMA proportion. The WC/H showed correlation with elevated BP and it’s a marker of changes in BP for both sexes and in different age groups.
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CHILDREN’S ORAL HEALTH, A NEED TOWARD THE OPTIMUM NUTRITION AND GROWTH
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Background and Aims
Healthful nutritional and dietary choices promote optimum growth and development and this is usually obtained by oral and dental health. So the aim of this study was determining the relationship between children’s oral health and their nutritional / growth statue.

Method
This cross-sectional study was conducted on 455 children aged 3-11 years old in Zanjan/Iran in 2014. Their oral health statue was measured by DMFT/dmft(decayed,missing and filled teeth) index. The blood vitamin D ,iron and iodine also PEM which were diagnosed by pediatrician were indicators of nutritional statue and the BMI (which is measured by BMI charts for children developed by the US Center for Disease Control) was the representative of growth .The data was analyzed by Linear regression and T test (α≤0.05).

Results
Oral health predicted the nutritional statue \((B^{vit D}=-10.971,B^{Fe}=-2.011,B^{I}=-3.035, p<0.001)\). Every rise of one unit for dmft/DMFT predict an decrease on BMI of \(-8.790\) \((B=-8.790,p<0.001)\). There was relationship between PEM and oral health\((p=0.02)\).

Conclusion
The findings indicate that oral health could affect the children’s nutritional and growth statue. Children with high oral health degree often are belonged to high nutritional and growth statue groups. So, for children’s optimum nutrition and growth more attention to oral health is recommended.
IMPLEMENTING A CLASSIFICATION OF FEEDING PROBLEMS ON AN EATING OBSERVATION CLINIC

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Background and Aims
At our department children with eating and/or weight problems are treated in an outpatient clinic by a dietician and a speech and language pathologist. The aim of this study is to evaluate the assessment and treatment of these patients by using a published model “A Practical Approach to Classifying and Managing Feeding Difficulties” (1).

Method
A retrospective study of the journals on all patients seen at the clinic from January to June 2015.

Results
During six months 69 children were seen at the eating clinic. All three types of feeding difficulties described in the model were found; limited appetite, selective intake and fear of feeding. All the described feeding styles were seen; responsive, controlling, indulgent and neglectful. Many children and feeders had more than one difficulty and feeding style. Every family had received one or more of the treatments suggested in the article, aimed at the child’s difficulty and the caregiver’s feeding style. Some families also received additional treatments for their problems not suggested in the article.

Conclusion
The classification model has helped to understand how the different types of feeding styles and difficulties are connected to different treatments and why different treatments are recommend to children with similar problems. It has facilitated informing the parents and healthcare professionals why specific recommendations are selected.

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STUDY OF HABITS IN ADOLESCENTS BEFORE AND DURING HIS STUDIES AT THE UNIVERSITY IN MADRID, SPAIN

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Background and Aims
The objective was to study the relationship between some modifiable habits like: activity, dietetic habits . Also the nutrient intake

Method
Methods: Participants were 450 volunteer females and males, that gave their informed consent. Body weight and height were measured with standardized methods. From the 3-d FR, dietary intake was calculated using DIAL® program.
We studied 450 students from Madrid: ≤ 17 years (73,2 %) and ≥18 years (26,8 %), of both sex 58% women y 42 % male.

Results
BMI was: 32,5% male and 46,6 % women had normal weight; 9,2 % male and 8 % women presented overweight/obesity; 10,9% male and 13,5% women had underweight. The 8% of both sex present big intake of hard alcohol every weekend.

The way of life of young people have some trend and habits that will be necessary to study deeply in order to identify some future health problems like obesity

Conclusion
A dietary imbalance was observed. The intake of some nutrients do not meet the established recommendations for Spain people. The unfavourable lifestyle of the great majority of students may have implications during the maturity. It is necessary to promote physical activity to prevent future nutrition related health problems.
EFFECT OF DIOSCOREA BATATAS ON LONGITUDINAL BONE GROWTH RATE IN RATS

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Background and Aims
Short stature is a concern for pediatric endocrinologists and other physicians who care for children. Since 2000, we developed in vivo model which can evaluate the rate of longitudinal bone growth with tetracycline as a marker of the longitudinal bone growth in rats. Dioscorea batatas was selected for the research by screening herbs in traditional Korean medicine. This study was aimed to investigate the efficacy of the D. batatas on growth in adolescent female rats.

Method
Female Sprague-Dawley rats were divided into three groups: the control, recombinant human growth hormone (rhGH; 20 μg/kg), and D. batatas (30 and 300 mg/kg) groups were received the respective treatments for 10 days. On day 8, tetracycline was injected intraperitoneally into all individuals to form a fluorescence band on the newly synthesized bone. On days 8-10, 5-bromo-2'-deoxyuridine (BrdU) (50 mg/kg) was injected intraperitoneally to label proliferating cells.

Results
The bone growth rate in groups administered D. batatas 30 mg/kg, 300 mg/kg and rhGH was significantly increased to 370.5 ± 17.7, 375.9 ± 34.1, and 373.6 ± 17.2 μm/day, respectively from control group, 352.8 ± 19.4 μm/day. Both IGF-1 and BMP-2 were highly expressed in the growth plate compared to control group. The number of BrdU-positive cells in chondrocytes of the rhGH and D. batatas groups was increased compared to control. No difference was observed in the amount of food intake or mean body weight among all groups during the acclimation or administration period.

Conclusion
These results suggest that D. batatas could help height growth of children.
MALNUTRITION IN HOSPITALIZED PEDIATRIC PATIENTS WHO AGED UNDER-5 YEARS
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Background and Aims
Malnutrition is an important factor of the deaths in under-five children worldwide. Furthermore, several evidences indicate that undernourished patients not only increase risk of poorer outcomes but also associate with higher medical expenses. This study aimed to evaluate the prevalence of malnutrition and its influence on the outcomes among under-five hospitalized patients.

Method
A cross-sectional study was conducted in a tertiary center located in Thailand. A hundred and five patients who aged 1-59 month-old were enrolled. The patients who admitted to the intensive care unit were excluded. During 5 weeks of the study, the demographic data, disease category, anthropometric measurement, length of stay (LOS) and total medical cost were recorded. The nutritional state; wasting and stunting were defined by World Health Organization (WHO) classification.

Results
The average age was 26.9 month-old (range 1-59 months). The majority of overall patients were male (61%) and the main etiologies were infectious diseases (25.7%) and cardiovascular problems (22.9%). The percentages of moderate and severe acute wasting were 13.3 and 12.4, respectively. The prevalence of stunting was more than one third. According to the outcomes, the wasting patients had longer LOS (10.5 vs 7.1 days; \( p = 0.10 \)) and higher overall medical expenses (1,798.6 vs 1,324.2 €; \( p = 0.08 \)). However, there are no significant differences of LOS and medical cost between stunting patients and others.

Conclusion
The prevalence of malnutrition is common, especially, in hospitalized patients who aged under-five years. Acute wasting significantly prolongs LOS; in addition, it might increase the medical expense during hospitalization as well.
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STUNTED CHILDREN HAS HIGHER RISK OF OVERWEIGHT IN CHILDREN AGED 6-12 YEARS FROM EIGHT PROVINCES IN INDONESIA
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Background and Aims
A higher risk of overweight has been described in other populations, but very limited information available among Indonesian school-aged children (ISC). This study was aimed at analyzing association between stunting and overweight among ISC.

Method
This study used electronic files data of Basic Health Research 2010 which was design as a cross sectional survey. A total of 8599 children aged 6-12 years from eight provinces in Indonesia were selected for the analysis. Overweight and obese was defined as Body Mass Index for age z-score (BAZ) of \( \geq +1 \) and \( \geq +2 \) standard deviation (SD) and stunting was defined as height-for-age z-score (HAZ) of <-2 SD of the WHO reference, respectively.

Results
Results showed that prevalence of overweight, obese and stunting in ISC were 19.5%, 7.9% and 28.0%, respectively. There was 7.5% of ISC categorized as stunting and overweight. ISC which categorized as stunting and overweight were significant more in male, younger, low economic status, rural and low paternal education of ISC (p<0.05). In multivariate logistic regression analyses adjusted for all factors, stunting was associated with overweight (OR=2.32, CI 95%:2.06-2.61).

Conclusion
Clearly, there is an important association between stunting and overweight in ISC. This association implies that Indonesia has been experience nutrition transition which has to be taken into consideration when designing ISC nutrition program.
Background and Aims
Although it has been suggested that socioeconomic status is associated with dietary quality, the possible mediation effects of eating behaviors on dietary quality are unclear. Thus, we investigated the mediation effect of eating behaviors on dietary quality among children using data from the Korean National Health and Nutrition Examination Survey (KNHANES).

Method
The study focused on children who completed the 24-hour dietary recall survey (n=3,391). Using causal mediation analysis, we assessed the relationship between socioeconomic status and poor dietary quality in children and examined the mediation effects of eating behaviors. Socioeconomic indicators included household income, parental education, and parental occupation. The number of nutrients at insufficient levels was used as a measure of poor dietary quality.

Results
In this study, more than half the children did not consume the recommended amounts of vitamin A, vitamin C, iron, and calcium. Eating breakfast had a significant impact on poor dietary quality regardless of socioeconomic indicators. Otherwise, children from lower middle-income households consumed insufficient amounts of more nutrients than their counterparts regardless of eating behaviors. Through the mediation model, we found that lower-middle household incomes were associated with poor dietary quality, but that dietary quality was significantly mediated by eating breakfast.

Conclusion
Our results showed significant effects of lower household income on children’s poor dietary quality as well as a mediation effect of eating breakfast. Thus, to reduce differences in dietary quality, children should be encouraged to eat breakfast.

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BACKGROUND AND AIMS
Celiac disease (CD) is a chronic condition precipitated by exposure to gluten. Managing a restrictive gluten free diet is the only available treatment and adherence among children and adolescents involves unique challenges. Understanding this population’s participation characteristics in food-related activities in various environments of everyday life and their self-management and coping strategies is lacking. The aim of this qualitative study was to explore perceptions of daily experiences and challenges among children and adolescents with CD and their parents for deeper comprehension of daily functioning to develop a quantitative questionnaire.

METHOD
Focus group interviews were conducted. Common experiences, concerns, supports and barriers were identified and categorized. Subsequently, a quantitative questionnaire was formulated and validated. Participants were children and adolescents with CD for over six months and their parents participated in 4 separate focus groups: 12 children (8-12 years) and 13 parents, 10 adolescents (13-16 years) and 10 parents.

RESULTS
Similar and different views emerged in the groups. Self-management strategies while participating in food-related everyday activities were revealed. Conflicting and compatible perceptions concerning independence and control were exposed. Experiences of participation limitations in a wide range of activities occurring in the home, school and social environments were described. Findings served as a foundation for development of a unique gluten free participating in real-life occupations (GF-Pro) questionnaire. Primary results indicate good reliability and validity.

CONCLUSION
Focus groups revealed a wide scope of everyday coping with CD issues. The GF-Pro may contribute to understanding individual management needs in daily life with CD.
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JUNK FOOD DIET INHIBITS LONGITUDINAL GROWTH AND BONE QUALITY THROUGH IMPAIRMENT OF GROWTH PLATE DEVELOPMENT IN YOUNG RODENTS
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Background and Aims
In recent decades there has been a radical change in the western society food and beverage consumption habits alongside with sedentary lifestyle. Junk foods and soft drinks are high in fat and refined sugars while not providing the appropriate levels of macro and micro-nutrients for growth requirements of children.

The purpose of our studies was to establish a junk food western diet model in rodents, in order to examine its influence on skeletal development. Our main focus was the process of endochondral ossification taking place in the growth plates.

Method
An in-vivo experiment was conducted on post weaning rodents representing the growth period in human until sexual maturation and growth-plates closure.

Results
These studies demonstrated that junk food consumption in young age resulted in longitudinal growth and weight gain retardation. Furthermore, disruption of bone quality in the cortical and the trabecular areas was observed, such as a reduction in BMD, BV/TV, cortical thickness and load to fracture. This phenomenon occurred in conjunction with a radical growth plate phenotype characterized by a plaque of avascular non calcified cartilage in the metaphysis.

Conclusion
Based on these findings, we suggest that the consumption of unbalanced junk food diet in addition to its known undesirable impact on metabolic state in young age, also leads to a direct damage to bone and cartilage cells, impairing post-natal longitudinal growth.
VITAMIN D CONTENT IN COMMONLY CONSUMED FOOD IN INDONESIA: A POTENTIAL ROLE FOR FOOD FORTIFICATION FOR YOUNG CHILDREN


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Background and Aims
Vitamin D deficiency is associated with increased risk for bone and metabolic disorders, i.e. rickets, osteoporosis, insulin resistance and obesity [1], and is still prevalent among children in Asia despite abundant sunlight [1-3]. Adequate vitamin D3 intake could help to overcome the deficiency, yet there is no data on vitamin D content of foods in Asia, including in Indonesia [4].

Method
Sixty foods, including those for young children, were selected based on an Indonesian national dietary survey [4]. Samples of raw and processed foods were collected across 13 out of 33 provinces in Indonesia and were analysed for vitamin D3 content using HPLC method [5]. Measured vitamin D content was compared with vitamin D data in the Dutch Food Composition Database (DFCD), as it lists some of the Indonesian foods.

Results
Fifteen of 60 analysed foods naturally contained vitamin D3, of which eleven could be found in the DFCD (Fig. 1).
Vitamin D3 content was highest in Bandeng (milk fish), i.e. 30.00 μg/100 g and the lowest in fried meatballs (0.36 μg/100g). Mackerel (both cooked and steamed) and boiled eggs in the analysis contained lower amount of vitamin D3 than the DFCD.

**Conclusion**
There are limited foods including those for young children that are good sources of vitamin D3 in Indonesia. Data on vitamin D intake, status and content in foods are necessary to explore the potential of food fortification.
LOW PREVALENCE OF VITAMIN D DEFICIENCY IN IRISH TODDLERS DESPITE NORTHERLY LATITUDE AND HIGH PREVALENCE OF INADEQUATE INTAKES

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Background and Aims

While reports of inadequate vitamin D intakes among children are widespread, data on the prevalence of vitamin D inadequacy and deficiency are inconsistent. We aimed to quantify vitamin D intakes and serum 25(OH)D concentrations in children aged 2 years living at a northerly latitude (52°N).

Method

Serum 25(OH)D concentrations were quantified for 742 two-year old children participating in the Cork BASELINE Birth Cohort Study using UPLC-MS/MS. Non-consecutive two-day weighed food diaries were collected for 468 children and both a food diary and 25(OH)D concentrations were available for 295 children.

Results

Mean total serum 25(OH)D concentrations were 63.4 nmol/L [winter: 54.6, summer: 71.2 nmol/L]. During the winter, 27.6% had a 25(OH)D <40nmol/L, decreasing to 2.3% in summer. The prevalence of vitamin D deficiency (<30 nmol/L) was 4.6%. With an overall mean daily intake (MDI) of 3.6 μg/d, 96% of the sample had inadequate intakes <10 μg/d, 78% were <5 μg/d and 13% were <1 μg/d. Children who did not consume vitamin D-fortified foods or supplements had intakes of 1.2 μg/d. The highest intakes were recorded in children who consumed infant formula targeted at toddlers, fortified with 1.5-1.7 μg/100ml (7.2 μg/d) and consumers of vitamin D-containing supplements (8.1 μg/d). While 94% of children with a food diary who were sampled in winter (n=140) had an intake <10 μg/d, the corresponding prevalence <40 nmol/L was 24%.

Conclusion

We show a low prevalence of vitamin D deficiency among Irish 2-year olds despite a high latitude (52°N) and inadequate vitamin D intakes.

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AN INVESTIGATION INTO FOOD OFFERED TO CHILDREN IN A CHILDREN’S HOSPITAL IN IRELAND

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Introduction:

The importance of a healthy, balanced diet is critical in children to achieve optimum physical, mental and cognitive milestones. Inpatient visits to hospital offers an opportunity to promote healthy eating in children improving the health of sick children and their families1, 2. However there is evidence of poor quality hospital food on offer to children.

Methods: This cross-sectional study compares food offered in hospital to food normally consumed at home in children admitted to an Irish children’s hospital. Parent(s)/ primary careers were asked to complete a previously validated questionnaire2 with regard to their child, using opportunistic sampling.

Results: Of the 69 participants, 49 returned completed surveys with a response of rate 66.7%. Approximately 87.7% of parents reported that the food served in hospital was similar to the food served at home. Parents reported however that they would like to see more wholegrain bread, more fruit and vegetables, less overcooked vegetables, less sauces with meals, less fried/greasy foods, and less ‘heavy’ foods like potatoes. Up to 18% (n=9) of children were overweight, and of these only one parent correctly classified their child as overweight.

Conclusions: This study shows that the food served to children in hospital can be improved by offering more healthy options, wholegrain bread and more fruit and vegetables. Inpatient hospital stays offers health care professional an opportunity to educate children and their parents in relation to healthy eating patterns. Early interventions can help families that may have already developed unhealthy eating options.

References


BODY IMAGE PERCEPTIONS AND DIETARY PRACTICES OF FEMALE ADOLESCENTS IN SENIOR HIGH SCHOOLS IN TAMALE METROPOLIS

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Background and Aims
Body dissatisfaction is a risk factor for eating disorder among female adolescents. The main objective of study was to assess body image perceptions and dietary practices of adolescents in senior high schools within Tamale Metropolis.

Method
A cross sectional survey was carried out in Tamale metropolis. A total of 200 teenage girls (13-19 years) were recruited for the study. Demographic data, body image perception and dietary practices were gathered using a validated self-administered questionnaire. A picture showing ranges from thin to the fattest (A-H) were shown them in the questionnaire for them to choose ones they perceive to be thin, fat, normal, more attractive etc.

Results
Almost half (n=98, 49%) of the participants chose E as the one they perceived to look best. Forty seven percent chose H to be clumsy while 33% chose D to have more respect from friends and 34.5% perceived E to be the strongest. Also, less half (n=86, 43%) of the participants perceived H to be the most unhappy and 53% wished to look like E while 66% said their parents would like to be like E.

Regarding dietary practices, less than half (n=81, 40.5%) of the participants were taking meals to enhance their body image. Majority (n=122, 61%) of them did not skip meals because of their outlook. Most (n=170, 85%) of the participants did not enjoy snacking and late night eat. However, the few that enjoyed snacking used fruits, pastries and non-alcoholic beverages as snacks.

Conclusion
Having positive or negative body image may influence adolescent eating habits.
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IMPORTANCE OF PROTEIN AMOUNT AND TIMING TO MAINTAIN WHOLE BODY NITROGEN BALANCE AFTER PHYSICAL ACTIVITY IN HEALTHY CHILDREN

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Background and Aims
Protein ingestion plays an important role in physical growth and development in children including muscles and bones. It is known that post-exercise protein ingestion increases whole body protein balance in adults but the data is scarce in children. The aim of this work was to investigate the optimal amount and distribution pattern (single or repeated doses) of protein intake post-exercise to promote nitrogen balance (surrogate for protein balance) in physically active children.

Method
Thirty-five physically active children (9-13 yrs old) participated in a 5-day adaptation diet providing 0.95 g·kg⁻¹·d⁻¹ of protein. On the intervention day, participants performed a bout of cycling exercise prior to consuming an additional 15g of protein distributed across 2 isoenenergetic beverages after exercise (15 and 240min) but with reciprocal amounts of protein (i.e. 0+15g; 5+10g; 10+5g; 15+0g). Nitrogen balance was measured as the difference between dietary nitrogen intake and urinary and miscellaneous nitrogen losses.

Results
Protein ingested in two doses was generally more effective than a single dose in promoting nitrogen balance over 24h. The greatest significant difference was observed between the 5g+10g vs the 15g+0g group ($P < 0.05$).

Conclusion
Post-exercise protein ingestion increases net protein balance in children. Multiple smaller doses (5g+10g) after physical activity may be more beneficial than a single bolus dose in promoting daily whole body protein balance in healthy physically active children.
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PREVALENCE OF DIETARY, BIOCHEMICAL AND ANTHROPOMETRIC CARDIOVASCULAR RISK FACTORS IN CHILDREN FROM RURAL COFIMVABA, EASTERN CAPE, SOUTH AFRICA

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Background and Aims
Childhood obesity is increasing globally and is associated with cardiovascular disease (CVD) risk factors. The aim was to estimate the mean prevalence of overweight/obesity, abnormal serum lipids as well as dietary intakes among children in resource-poor households in rural Cofimvaba.

Method
A random sample of 240 children, aged 6-18 years, were used for 24-hour recall, weight, height, and fasting biochemical (lipid profile, High Sensitivity-C-reactive protein [HS-CRP], serum glucose) measurements. Data were analysed for descriptive analyses, Levene’s test for equality of variances, one-way analysis of variance and Pearson correlations.

Results
The prevalence of overweight was 4.3% for all the children with 14.2% at risk of overweight. No obesity was observed. Only 1.3% of the children were hypercholesterolaemic, 7.1% had hypertriglyceridemia, 1.7% had elevated Low Density Lipoprotein-Cholesterol (LDL-C) levels and 28.8% had low High Density Lipoprotein-Cholesterol (HDL-C) levels. The group with the highest prevalence of abnormal lipid markers were the 6-8 year old girls. Hyperglycemia was observed in 10.3% of the children. Most of the dietary intake variables, including fats and fatty acids, showed normal intakes, except for low total energy and dietary fibre intakes. No statistically significant correlations were found.

Conclusion
The present study found an undesirable lipid profile of high prevalence of low HDL-C despite a low prevalence of hypercholesterolemia, hypertriglyceridemia and high LDL-C even though most of the dietary fat intake variables were within the recommended intakes.
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DIETARY PATTERNS ARE RELATED TO ETHNICITY AND SES AT AGE 5 IN THE MULTIETHNIC AMSTERDAM BORN CHILDREN AND THEIR DEVELOPMENT (ABCD) COHORT

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Background and Aims
To appropriately target nutrition education in public health interventions, insight in dietary habits in high risk groups is essential. We derived dietary patterns in children in the ABCD cohort, and determined whether these patterns were related to ethnicity and socioeconomic status (SES).

Method
A validated Food Frequency Questionnaire was completed by mothers of 2,769 children (aged 5.7±0.5y). Energy-adjusted intake (g/d) of 41 food groups was used to derive dietary patterns using Principal Component Analysis. We discerned 3 SES groups (low n=313, middle n=980, high n=1476) and 5 ethnic groups (Dutch n=2283, Surinam Creole n=116, Turkish n=61, Moroccan n=112 and Other n=197). Distributions of ethnicity and SES was described across tertiles of the different dietary patterns. GLM with post-hoc Bonferoni was used to test potential associations.

Results
We identified 4 dietary patterns explaining 20.8% of the total variation: a “snacking”, “full-fat”, “meat” and a “healthy” pattern. Children in the highest tertile of the “full-fat” pattern were more often from Dutch origin and the high SES group while children in the highest tertile of the “snacking” pattern were more often from non-Dutch origin and the low SES group. The distribution of SES is illustrated in figure 1. Significantly different dietary patterns (p<0.01) were found between Dutch and Turkish children compared to all other ethnic groups and between children in the 3 SES groups.
Conclusion
Dietary patterns at age 5 were significantly related to ethnicity and SES, which is relevant for future public health interventions.
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371 SCREENING FOR MALNUTRITION IN DUTCH PAEDIATRIC NEPHROLOGY OUTPATIENTS; A PILOT STUDY
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Background and Aims
Malnutrition is common in chronic kidney disease (CKD), but often not recognized. We aimed to evaluate a three-step screenings tool for nutritional assessment in CKD outpatients. This tool has already been used clinically.

Method
Height and weight measurements were retrieved over a one-year interval from patient files. The tool assists of three steps. Step1: height and weight measurements. Step2: calculate z-scores according to Dutch references by electronic hospital system. Patients were malnourished when weight-for-height or height-for-age z-score are <-2.0, or weight-for-height z-score deflected >1.0 in three months and/or z-score height-for-age deflected >0.5 (aged 1-4years) or >0.25 (aged 4-18years) in one year. Step3: evaluation of step2 by taking into account reference values of syndromes, ethnicity, and genetic potential by calculating target height (TH). We handled cut-off value of z-score <-2.0 using TH1997-Tanner and z-score <-1.6 using TH2010-Hermanussen&Cole. The agreement between step2 and step3 was calculated by using Cohen’s Kappa.

Results
We included 94 patients, aged 1-18years. Eighteen patients (19%) were malnourished, after both step2 and step3. After adjusting for reference values for ethnicity and TH, two patients were malnourished after step2 but well-nourished after step3 and two patients were well-nourished after step2 but malnourished after step3. We found a good agreement between the outcomes of step2 and step3 (Cohen’s Kappa 0.86).

Conclusion
Nutrition assessment based on weight and height measurements suffices for screening malnutrition in paediatric outpatients with CKD. For individual patients, adjustment with reference values for ethnicity and TH is recommended to prevent an incorrect diagnose of (mal)nutrition.
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EFFECT OF ZINC AND MULTIVITAMIN SUPPLEMENTATION ON GROWTH OF THAI CHILDREN
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Background and Aims
Zinc has a critical role in the cell growth, metabolism and functioning of several enzyme systems. Deficiency of zinc and multivitamins is very common in the developing countries. This study aimed to assess the efficacy of zinc plus multivitamin supplements in improving the growth of healthy Thai school children.

Method
A RCT was conducted in healthy 4-13 years old Thai children who studied in a public school in central Thailand. Participants were randomized to receive either chelated zinc in the form of zinc bis-glycinate (20 mg elemental Zinc) plus multivitamins (vitamin A 1,000 IU, Vitamin D 200 IU, B1 10 mg, B2 3 mg, B6 1 mg, B12 10 mcg, nicotinamide 40 mg) or placebo once a day, 5 days per week for 6 months. Primary outcome was change in height from the baseline to the end of the study. Secondary outcomes were changes in weight, BMI, waist and hip circumferences and waist to height ratio.

Results
Seventy children each were randomized to study and placebo groups. The children who received Zinc plus Multivitamins had significantly higher gain in height (4.9±1.3 vs 3.6±0.9 cm, respectively; p-value<0.001). The extra gain in height manifested after 2 months of supplementation. The changes in other anthropometric indices were not significantly different.

Conclusion
Supplementation of chelated zinc plus multivitamins for 6 months significantly increased the height gain in Thai school children and was well tolerated.
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FAT MASS AND LEAN TISSUE MASS PERCENTILES IN CHILDREN WITH CHRONIC KIDNEY DISEASE: AGE OR HEIGHT RELATED?

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Background and Aims
Growth failure is common in children with chronic kidney disease (CKD). Lean tissue mass and fat mass related to height (LTM/height, FM/height) could therefore be higher than when related to age (LTM/age, FM/age). In this study we compare both variables with a healthy population.

Method
Bio-impedance spectroscopy was used to develop sex-specific percentiles for LTM and FM according to age and height in 1163 healthy Belgian children between 3-12 years of age. Cole’s LMS method was used. Data of 69 Belgian, Dutch and German children with CKD were plotted on these percentiles. Comparison was conducted by determining the median for both height and age distribution.

Results
Comparison shows that the median height percentile of our healthy population is higher than in children with CKD. The median of LTM/age is 21% (10-60%), in contrast LTM/height is 45% (21-52%) which tends more to the expected median of 50% in healthy children. FM/height does not notable differ from FM/age and both compare to a normal population.

Conclusion
In children with CKD, LTM/age is lower compared to healthy children while LTM/height is more comparable. FM is not different in children with CKD.
Background and Aims
Pattern of human growth is important in monitoring the health status of children. Malnutrition and disease are the most important features that might affect the growth patterns of children particularly in the rural areas. The aim of the study was to investigate the development of skelic index (lower limb height x 100/sitting height) among Ellisras rural children from 1996 to 2003 who are part of Ellisras longitudinal study.

Method
A total of 2,225 children—550 preschool and 1,675 primary school—aged 3-10 years (birth cohorts 1993 to 1986) were enrolled at baseline in 1996 and followed throughout the eight-year periodic surveys. In 2003, 1,771 children—489 preschool and 1,282 primary school—were still in the study. Sitting height and leg length were measured according to the standard procedures. General estimated equation was used to assess the relationship of skelic index over time among Ellisras rural children.

Results
Both preschool and primary school children showed a significant association between the first measurements of skelic index and the subsequent measurement which ranged from B=0.2 (95% CI 0.1-0.3) to B=0.7 (95% CI 0.6-0.8) for primary children. A significant tracking of skelic index during 4-12 years of life was more consistent for preschool children (B=0.6 (95% CI 0.6-0.7) and for primary school children (B=0.6 (95% CI 0.5-0.6).

Conclusion
Skelic index of both preschool and primary school girls were much higher than boys over time. Investigation of nutritional intake and physical activity patterns will shed light on how healthy these children are and their lifestyle.
VALIDATION OF A SHORT FOOD FREQUENCY QUESTIONNAIRE ASSESSING DIETARY VITAMIN D AND CALCIUM INTAKE IN CHILDREN
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Background and Aims
Since appropriate instruments are required for assessing food intake the aim of this study is to validate a short food frequency questionnaire (SFFQ) to a 3-day food record (3D record) for the intake of vitamin D and calcium.

Method
In a longitudinal, food based, double-blinded, randomized, intervention study in 5-7 y old children (n=85), living in Sweden, 79 children (93%) completed SFFQ1 at baseline and SFFQ2 after intervention. Parents of 28 (36%) children also completed the 3D record after intervention and were included in the validation study. In concern to closer in time implementation validation of SFFQ2 is of priority.

Results
The mean (SD) intake of vitamin D was 7.3 (2.73) μg/d, 6.4 (2.38) μg/d and 5.9 (3.37) μg/d in the SFFQ1, SFFQ2 and 3D record respectively. The SFFQ2 and 3D record did not differ in intake and the correlation between all instruments was modest. Calcium mean (SD) intake was 1066 (582) mg/d, 930 (473) mg/d and 959 (375) mg/d, respectively, and did not differ in mean intake and had a modest or good correlation.

Bland-Altman analyse showed that the SFFQ2 overestimate the vitamin D intake with 0.55μg/d in mean difference, the limits of agreement are between 5.74 and -4.64 μg/d. The intake of calcium were underestimate with 29 mg/d in mean difference, limits of agreement were between 808 and -865 mg/d.

Conclusion
The SFFQ used in the present study seems to be a valid tool to assess dietary vitamin D and calcium intake in groups of young children.
Background and Aims: Iron deficiency anaemia is highly prevalent in Bangladesh impeding immunity, psychomotor and cognitive development. About 51% of children aged 6-59 months were suffering from iron deficiency in 2011. We aim to explore the determining factors of childhood anaemia in rural areas of Bangladesh.

Methods: We used data from a cross-sectional survey conducted in Mymensingh and Rajshahi regions between July to October 2014. We collected blood sample of 501 children using Haemoglobin Analyzer. Multivariable logistic regression was used to identify determining factors of anaemia.

Results: Overall, 40% of children under-five years were anaemic in the study area. Nearly 68% households had access to improved sanitation while 51% children took deworming medication within the previous 6 months. Bivariate analysis revealed socio-economic status (P

Our multivariable analysis shows, children belonging to the second quintiles are significantly less likely to be anaemic compared to the lowest quintile [OR 0.54(P

Conclusions: Socio-economic status, deworming and environmental factor like improved toilet facilities are important factors for reducing childhood anaemia. Intervention focused for improvement in sanitation facilities, ensuring deworming medicines to children can help reduce prevalence of anaemia among children.
Background and Aims
Feeding difficulties are relatively common in young children and can cause stress for parents and caregivers. The objectives of this study are to investigate the prevalence and type of feeding difficulties in children (without any underlying chronic medical condition) who presented with various forms of “picky eating” to a multidisciplinary feeding and nutrition (Multi-D) or speech therapist and dietician only (ST/DT) feeding clinic. The Multi-D clinic comprise a speech therapist, dietician, paediatrician and psychologist.

Method
A retrospective analysis of data (from self-reported questionnaires, case history interviews and clinical observations) was conducted for 149 children, aged between 2 months to 14 years, who were first seen from December 2012 to June 2015. Statistical Package for the Social Sciences 23 was used for analysis.

Results
Children seen in the ST/DT clinic were more likely to have delayed feeding skills than patients in seen in the Multi-D clinic (Table 1). History of tube feeding was associated with either delayed feeding skills or sensory-related feeding issues (p=0.031), but not a history of prematurity or delayed weaning to solids. Children with delayed feeding skills were significantly more likely to refuse new foods (p=0.002), stuff food in their mouths (p=0.049), and be easily distracted during meals.
Conclusion
A number of children who are labelled as "picky eaters" may have underlying delayed feeding skills or sensory-related feeding issues, which contribute towards their feeding difficulties. An awareness of these issues is important for timely referral and appropriate intervention.

Table 1: Prevalence of delayed feeding skills and/or sensory-related feeding issues in children presenting with feeding difficulties

<table>
<thead>
<tr>
<th>Types of feeding difficulties</th>
<th>Both clinics (N=149)</th>
<th>Multi-disciplinary feeding and nutrition clinic (N=100)</th>
<th>Speech therapist and dietician feeding clinic (N=49)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Delayed feeding skills or sensory related feeding issues</td>
<td>60</td>
<td>40.3</td>
<td>34</td>
<td>34.0</td>
</tr>
<tr>
<td>Only delayed feeding skills</td>
<td>41</td>
<td>27.5</td>
<td>22</td>
<td>22.0</td>
</tr>
<tr>
<td>Only sensory related feeding issues</td>
<td>11</td>
<td>7.38</td>
<td>7</td>
<td>7.00</td>
</tr>
<tr>
<td>Both delayed feeding skills and sensory related feeding issues</td>
<td>8</td>
<td>5.37</td>
<td>5</td>
<td>5.00</td>
</tr>
</tbody>
</table>
Background and Aims
Main aim was to study factual nutrition in adolescents in order to reveal micronutrient deficiency.

Method
We have studied the ration of the nutrition of the adolescents and conducted its analysis. The research was conducted in the boarding house among the adolescents (between the ages 11 and 13) in which 36 adolescents participated, (22 girls and 14 boys). The results are compared to the norms of physiological requirements of the adolescents taking into account the major substances and energy. Besides that, biochemical monitoring of the micronutrient requirement in the adolescents has been conducted. The research on the quality and quantity of the ration displayed the disbalance of certain substances among them are micronutrients (Iodine, iron, zinc), which may have negative affect on the growth and development of the adolescents as well as on the puberty.

Results
Qualitative and quantitative analysis of children’s diet revealed some irrelevances: disbalance between carbohydrate, lipid and protein composition and disbalances in micronutrients (Iodine, iron, zinc). Such disbalance of micronutrients in the diet can eventually lead to iodine, iron and/or zinc deficiency.

Conclusion
Monitoring of the nutrition of adolescents in the present none stable economic conditions is absolutely necessary. This method is cost-effective, and can be conducted in big populations, by avoiding invasive methods.
Background and Aims

Earlier reviews indicated that intake of total polyunsaturated fatty acids (PUFA) and specific n-3 and n-6 PUFA in adults worldwide are below the recommendations to prevent CVD by WHO/FAO. However, such data is currently not available for vulnerable groups. The aim of the present systematic review is (1) to investigate the current dietary intakes of total and specific n-3 and n-6 PUFA in European infants, children and lactating women; (2) to identify the latest PUFA intake recommendations and their scientific criteria; (3) to highlight gaps between current intakes and recommendations.

Method

The systematic review was performed according to PROSPERO guidelines (http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42014014717).

Results

Results show that a limited number of studies measured total n-3 or n-6 PUFA intake in the selected vulnerable groups and even less reported on individual n-3 or n-6 PUFA such as linoleic acid (LA) and α-linolenic acid (ALA): none vs. 1 on infants (6-12m), 5 vs. 3 studies in young children (1-3y) and 2 vs. 2 in lactating women. There was only sufficient data to compare LA and ALA intake in young children to the EFSA recommendations; In this age group, LA intake was inadequate (<4.0 E%) in France and Finland, but sufficient in Belgium. ALA intake met the 0.5 E% recommendations in Belgium and Finland but below 0.5 E% in France.

Conclusion

Due to the lack of data, it is difficult to compare the current intake to the recommendations. More studies are needed that measure intake of total and individual n-3 and n-6 PUFAs in vulnerable groups in Europe.
EFFECT OF OMEGA 3 POLYUNSATURATED FATTY ACIDS ON BASAL AND OXIDATIVE DNA DAMAGE IN PATIENTS WITH MAJOR DEPRESSION

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Background and Aims
Major depression is multifactorial disorder that is accompanied by elevation of basal and oxidative DNA damage in adults. Aim of the research was to examine effect of omega 3 polyunsaturated fatty acids (PUFA) on oxidative damage in leukocytes exogenously exposed by hydrogen peroxide, oxidatively damaged DNA in patients and strand breaks (basal) DNA damage in children and adolescent with major depression and/or anxiety disorder.

Method
Enzymatically modified comet assay was performed on whole blood samples, stored for 3-5 weeks at -80°C, from 13 patients (15.3±2.0; M/F = 4/9) under the administration of omega 3 PUFA for 6 and 12 weeks and 13 patients (15.3±1.2 M/F = 1/12) under the administration of omega 6 PUFA for 6 and 12 weeks. 20 healthy children and adolescent without history of major depression (14.3±2.6; M/F = 8/12) was included in control group.

Results
We didn’t detect significant effect of neither omega 3 PUFA nor omega 6 PUFA on basal oxidative DNA damage or significant improved leukocytes protection against exogenous exposure to hydrogen peroxide. We paradoxically observed significantly elevated oxidatively damaged DNA and also significantly worsened protection against hydrogen peroxide in control group in comparison to patient group.

Conclusion
We failed to confirm elevation of basal and/or oxidative DNA damage in children and adolescent with major depression and/or anxiety. We didn’t observe positive effect of omega 3 or omega 6 PUFA supplementation for 6 and 12 weeks on DNA damage in patients.

Acknowledge
The research was financially supported by VEGA grant Depomega No. 1/0703/12.
SOMATOTYPE AND SCHOLASTIC ACHIEVEMENT IN THE EDUCATION QUALITY MEASUREMENT SYSTEM (SIMCE) IN CHILEAN SCHOOL-AGE CHILDREN

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Background and Aims
Children and teenagers worldwide as in Chile are presenting an increased adiposity biotype due to inactivity and inadequate nutrition; as regards, different health problems have negative consequences for scholastic achievement (SA). To evaluate the relationship between the somatotype and SA outcomes in the 2009 SIMCE tests both language (SIMCEL) and mathematics (SIMCEM), in Chilean school-age children.

Method
A representative sample of 33 schools was randomly chosen in the Metropolitan Region of Chile. The total sample consisted of 819 school-age children, from the sixth elementary school grade (n=425) and the second grade of high school (n=394) and of both sexes (mean age±SD was 11±0.38 and 15±0.45 years, respectively). The field study was carried out during 2011. Nutritional status was assessed by anthropometric measurements of weight, height, folds, circumferences and diameters to obtain the anthropometric somatotype according to the Heath-Carter’s method. The 2009 SIMCE scores were provided by the Ministry of Education.

Results
The total sample showed a predominant component endomesomorphic. In the second grade of high school and in both sexes, those students with higher SA in SIMCEL and SIMCEM tests showed higher ectomorph component (r=0.20;p<0.0001; r=0.22; p<0.0001, respectively). In females from the sixth elementary school grade, SA in the SIMCEM and in females from the second grade of high school, SA in the SIMCEL was found positively correlated with the ectomorph component (r=0.23; p<0.01; r=0.21; p<0.01, respectively).

Conclusion
The results reveal that SIMCEL and SIMCEM outcomes are associated with ectomorph component. This is an important finding for education and health planning, to implement educational and health policies. Grants FONDECYT 1100431 and 1150524
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GROWTH CHARTS: DO THEY REFLECT HEALTHY BODY COMPOSITION
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Background and Aims
Anthropometry-based growth charts are used for growth monitoring. Within ±2SD of median is considered “normal” and efforts are taken to make a child grow within this range. We investigate the hypothesis that children within the designated “normal growth range” have a healthy body composition.

Method
Five to 15-year-old healthy Sri Lankan children were studied. SD scores for height, weight, waist circumference(WC) and BMI for age were assessed(WHO 2007). Fat mass(FM) index and fat free mass(FFM) index were calculated by dividing each parameter(kg) by height squared(m). %FM (assessed by BIA) was compared between SD group of each anthropometric parameter for gender and age groups, using one-way ANOVA. Adverse %FM was considered as >25% for boys and >32% for girls.

Results
12851 children were studied. %FM compared between SD group for height and BMI for age, showed significant difference even within “normal limits” %FM increase with the SD group. FFMI and FMI showed a similar pattern. Mean difference of FFMI was <1.5kgm⁻² and FMI was >3.4kgm⁻² within the ‘normal” range. This denotes that a child in a higher SD accumulates more FM than FFM. >40% of children had adverse %FM in median to +2SD group.

Conclusion
This study shows Sri Lankan children have high body FM at “normal” range of growth. Children reach higher SD level mainly due to accumulation of fat. This could contribute to the current obesity epidemic. Therefore growth chart does not detect adverse body composition and direct measurement of is very important to ensure healthy growth.
GROWTH AND MEALTIME STRESS LEVELS IN SPANISH CHILDREN RECEIVING ORAL NUTRITIONAL SUPPLEMENTATION (ONS)

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²Hospital Clínico San Carlos de Madrid, Pediatric Gastroenterology and Nutritional Unit, Madrid, Spain
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Background and Aims: Children who have highly selective intake of specific foods, or refuse to try new foods, are often labeled “picky eaters” (PE). Caregivers become concerned about both short and long-term effects from not eating well, with sub-optimal intakes of energy or key micronutrients. As a result of their concern, families can experience stress around eating occasions. This study was conducted to assess the effects of ONS usage on growth and meal-related stress in PE children.

Methods: A 12-week post-marketing observational study was conducted in Spain in children ages 2-5 years, who were below the 10th percentile for weight-for-age, currently on ONS, and exhibiting PE behaviors. One-hundred eighteen children received approximately 337 kcal ONS daily. Anthropometrics and family stress level related to mealtimes via questionnaire were measured at baseline and 12-weeks, while ONS acceptance by subjects and caregivers was assessed at 12-weeks via visual analogue scales.

Results: After 12-weeks, weight and height increased, with mean gains of 1.0 kg, 1.0 cm and 4.2 percentiles for weight, height and weight-for-age respectively (all p<0.0001). Family stress levels related to mealtime occasions decreased over the 12-weeks (p<0.0001). 73% of children rated the ONS as “good” or “very good” and 89% of caregivers felt the ONS reached or exceeded expectations for their child at the end of the trial.

Conclusions: Reducing family stress levels and increasing growth in small PE children, as shown in this study, may have beneficial long-term results on eating behaviors and the family dynamic.
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384 QUALITY OF LIFE IN SHORT AND LEAN PRE-PUBERTAL CHILDREN BEFORE AND FOLLOWING INTERVENTION WITH NUTRITIONAL SUPPLEMENT INTENDED FOR GROWTH PROMOTION

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2Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel
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Background and Aims

Short stature is a potential psychological stressor and a risk factor for developing social problems and lower self esteem, which may result in lower quality of life (QOL). Recently, we reported that a nutritional supplement was effective in promoting growth in short and lean pre-pubertal children [1]. We extended our research to examine the effect of this nutritional supplement on QOL in short and lean pre-pubertal children.

Method

Double-blinded, placebo-controlled RCT. Participants were healthy, lean, short, pre-pubertal children 3-9 years old. Outcome measures (baseline and after 6 months): Anthropometric measurements and the Pediatric QOL Inventory (PedsQL,version 4) with 4 core-scales (physical/emotional/social/school functioning), 2 summary-scales (physical/psychosocial functioning), and total score.

Results

200 participants (149 boys) entered the study and 171 (85.5%) completed the intervention period [1]. In the formula group only, positive correlations were found between the increment in height-SDS and social functioning (r=0.330, P=0.004), psychosocial functioning (r=0.240, P=0.041) and total score (r=0.301, P=0.041) after 6 months. ‘Good’ consumers (intake of ≥50% recommended dose) in the formula group improved their physical functioning (P=0.018), ‘Good’ consumers in the placebo group marginally improved their emotional functioning and significantly improved their overall PedsQL’s score (P=0.051 & P=0.029, respectively).

Conclusion

Improvement in linear growth by consumption of this nutritional supplement was associated with a better quality of life in short and lean children.

References:

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EATING HABITS AND BMI OF ADOLESCENTS STUDYING AT THE IRANIAN SECONDARY SCHOOL IN KUALA LUMPUR
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3, Tehran,

Background and Aims
Nutritional status during adolescence plays an important role in the human life cycle. The purpose of this study was to assess BMI-for-age of adolescents as well as determine the quality of their daily diets and collect information on some nutritional habits.

Method
296 adolescents (boys & girls) aged from 12 to 17 years studying at the Iranian secondary school in Kuala Lumpur were measured weight and height and BMI was calculated. A two-day dietary intake recall was conducted by the investigator. The food frequency questionnaire and meal consumption questionnaire were self-administered. Dietary intake between the sexes was analyzed using statistical T-test and weight status was compared using Correlation.

Results
Analysis of body weight status with dietary intake showed that there is a positive relationship with vitamin D and a negative relationship between protein and most vitamins ($p<0.05$). Across all the average intakes of fat, cholesterol, vitamin D, B12, iron in male were higher than female. In both groups the energy, carbohydrate and protein intakes were lower than DRIs. All micronutrient intakes among respondents in both ages and sex were found to be higher than DRI, except B2, D, zinc, folate, calcium. Iron intake was deficient among the females in age 14 to 17 groups. Generally their diets were also deficient in vegetables and fruits but excessive in sweets and soft drinks. Distribution of BMI by gender was significantly different ($p<0.05$) with more girls (16.4%) being overweight than boys (12.7%) and more males were underweight compared to females.

Conclusion
Nutrition education is necessary for adolescents not just at this time of growth spurt but in forming good nutritional habits which will benefit them throughout life.
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DIETARY SUPPLEMENT USE AMONG PHYSICALY (IN)ACTIVE ADOLESCENTS

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Background and Aims
Examine the influence of physical activity (PA) intensity and sports club membership on the prevalence of dietary supplement (DS) use among adolescents. The underlying reasons for DS use were also studied.

Method
Data on 1589 adolescents enrolled in 15 high schools (14–19 years old) were obtained from the ACDSI 2014 (Analysis of children's development in Slovenia) cross-sectional study. PA intensity (inactive, moderate, vigorous) was determined by standard SHAPES questionnaire and potential membership in sports clubs was noted. DS data were collected by a guided, purposely prepared questionnaire. Chi-square test was used for statistical analysis.

Results
67% of adolescents reported use of at least one DS in the past year (among them 78% of vigorously active and 53% of inactive), with multivitamin-multimineral DS being the most popular. Highly significant increase in DS use was observed with higher PA intensity and for sports club members (p<0.001), increasing with time spent in training (p<0.05). Half of adolescents used DS by their own decision, one third were advised from parents, and the rest from coaches and/or other sources. The most common aim of DS use was to increase sports performance or to improve immune system function.

Conclusion
Dietary supplementation was widespread in adolescents, both among athletes and non-athletes, and was positively associated with PA intensity. High prevalence of self-administered DS use in order to increase sports performance calls for urgent establishment of an educational intervention programme for adolescents and their parents that would include evidence-based information on potential benefits as well as adverse effects of DS.
NASOGASTRIC TUBE FEEDING IN MALNOURISHED CHILDREN IMPROVES NUTRITIONAL STATUS AND HAS NO NEGATIVE IMPACT ON THE ACQUISITION OF SUFFICIENT ORAL INTAKE

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Background and Aims
Feeding problems in young children can lead to malnutrition with negative effects on health. In our hospital, malnourished children are given tube feeding in order to achieve a good nutritional status while at the same time sufficient eating patterns are stimulated. We studied the effect of this treatment on nutritional status and eating habits.

Method
This study includes 37 malnourished children, aged 0 to 6 years, treated with tube feeding. A retrospective longitudinal cohort research design was used; variable were anthropometric parameters and eating patterns at start (T1) and at the end (T2) of the treatment period.

Results
The mean age at start of the treatment was 16.3 months (± 12.7). Mean tube feeding treatment was 12.2 months, range 1-35 months.

Table: anthropometric data at start and end of tube feeding.

<table>
<thead>
<tr>
<th></th>
<th>T1 - Start tube feeding</th>
<th>T2 - Stop tube feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDSheight</td>
<td>-0.53 ± 1.01</td>
<td>-0.41 ± 0.95</td>
</tr>
<tr>
<td>SDSweight</td>
<td>-1.62 ± 0.98</td>
<td>-0.94 ± 0.91*</td>
</tr>
<tr>
<td>SDSMUAC</td>
<td>-0.94 ± 0.85</td>
<td>-0.55 ± 0.77*</td>
</tr>
</tbody>
</table>

* p=0.001, # p= 0.048

At T1, 22% of the (n=28) children had no oral intake, 2% had good feeding, 48% moderate intake (balanced but insufficient amount) and 28% had almost no varied intake. At T2, 50% of the (n=34) children had good oral intake, 45% had moderate intake and 5% had almost no varied intake.

Conclusion
Temporary tube feeding is effective for improving nutritional status in malnourished children. This treatment can serve to augment learning of good eating patterns and oral intake, thus growth, improves.
Obesity

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PREVALENCES OF OVERWEIGHT AND OBESITY AMONG SAUDI CHILDREN
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1, Riyadh, Afghanistan

Background and Aims
In recent years, the prevalence of childhood obesity has increased considerably across developed and developing countries. Over the past three decades, Saudi Arabia has undergone an enormous lifestyle-related transformation, which has largely contributed to the increase in the prevalence of obesity observed among Saudi children. The aim of this study was to determine the prevalences of overweight and obesity among Saudi children in Riyadh, Saudi Arabia.

Method
A cross-sectional study conducted in pediatrics clinics in the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia, was carried out over a six-month period, December 2014 through May 2015. A sample of 1000 Saudi children (age 2 - 14 years) was selected. Anthropometric measurements of the weight and height for these children were performed. In order to determine overweight and obesity, the percentile ranges established by the Centers for Diseases and Control were used, thus overweight was defined as the 85-95th percentile and obesity was defined as >95th percentile, with respect to age and sex.

Results
The overall prevalence of overweight was 9.5% and 14.4% in boys and girls, respectively, and obesity was 13.5% and 18% in boys and girls, respectively. The overall prevalences of overweight and obesity were higher among girls than among boys.

Conclusion
Overweight and obesity are important public health problems among Saudi children. A national prevention program is recommended to avoid obesity-related morbidity in adulthood.
Obesity

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MILK CEREAL DRINK THE FIRST YEAR OF LIFE INCREASES THE RISK OF OVERWEIGHT AT 5 YEARS OF AGE
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Background and Aims
We have previously shown that milk cereal drink (MCD) at 6 months was a risk factor for a high BMI at 12 and 18 months. In this study the aim was to examine the impact of MCD at 12 months on body mass index (BMI) at 5 years of age.

Method
A longitudinal cohort study of 2666 children in the Halland Region, recruited in 2007–2008. Feeding practices were obtained from parental questionnaires and anthropometric data collected by child health nurses over the first five years of life.

Results
At 3 years, 13.2% were overweight or obese, at 4 years 14.5% and at 5 years 16.3%. MCD was consumed by 84.7% at 12 months and by 79.8%, 68.5%, 45.5%, 21.4% and 9.6% at 18, 24, 36, 48 and 60 months, respectively. The risk for overweight at 5 years was increased by MCD intake at 12 months (OR 1.70, 95% CI (1.02, 2.86)) adjusted for breastfeeding, porridge, parental education, parental obesity and birth weight. High weight gain the first year also increased the risk (OR 3.75, 95% CI 2.74, 5.13), but, being an intermediate factor, it was excluded from the final model.

Conclusion
Milk cereal drink at 12 months was a risk factor for overweight at 5 years. We hypothesise that this is mediated via an influence on weight gain very early in life.
Obesity

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DIETARY INTAKE OF FRUCTOSE IN CHILDREN AGED 7 - 12 YEARS WITH SIMPLE OBESITY

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Background and Aims
Childhood obesity is on the rise, causing children to be at risk of diet-dependent diseases (eg. heart diseases, diabetes). Healthcare providers have attributed childhood obesity, inter alia, to the consumption of fructose. The aim of the study was to evaluate dietary intake of fructose in relation to children’s nutritional status.

Method
The study included 59 children aged 7 – 12 years: 29 with simple obesity (group I) and 29 non-obese ones (group II – control). The inclusion criterion for the obese group was BMI z-score > +2.0, for the control group BMI z-score between -1.0 and + 1.0. The intake of fructose was estimated using Finnish Food Composition Database (Fineli) on the basis of 24-hour diet recall. Differences in intake of energy and nutrients between both groups were assessed using Student’s t-test and Pearson correlation (statistical significance was set at p=0.05).

Results
Median habitual fructose intake in group I was 43.7 g/d and 38.7 g/d in group II. Fructose comprised 12% of the mean daily energy intake in the obese children and 9% in the control group. The main dietary source of fructose in obese children were sugar-sweetened beverages, whereas children from control group in most cases consumed natural fresh juices. A positive correlation between fructose consumption and BMI value was observed, however it was not statistically significant (p=0.62).

Conclusion
Regardless of the nutritional status, children’s diets were rich in monosaccharides, including fructose. It appears that a high intake of fructose may influence nutritional status of children, but this requires confirmation.
Obesity

ASSOCIATIONS OF MATERNAL MACRONUTRIENT INTAKE DURING PREGNANCY
WITH INFANT BMI PEAK CHARACTERISTICS

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Background and Aims
Infant BMI peak characteristics (Agepeak, BMIpeak, pre-peak velocity) are associated with obesity and later health outcomes, but little is known about their maternal determinants. We investigated associations between maternal macronutrient intake during pregnancy and infant BMI peak characteristics in an Asian population.

Method
Maternal macronutrient intakes were ascertained using 24-h dietary recalls at 26-28 weeks gestation. Among infants with 8 BMI measurements from birth to 18 months, BMI peak characteristics were estimated from individually-fitted BMI trajectories using mixed-effects models with restricted cubic spline functions. Using multivariable linear/logistic regressions and both substitution and addition models, we analyzed 768 mother-offspring dyads with macronutrient intake and BMI peak information.

Results
On average, mothers consumed 15.5% of their energy from protein, 32.7% from fat, and 51.8% from carbohydrate. A 1% higher maternal carbohydrate intake at the expense of protein intake was associated with a 0.03 (95% CI: 0.002, 0.06) kg/m² higher infant BMIpeak and 0.01 (0.0003, 0.02) kg/m²/month higher pre-peak velocity. In the addition model, a 10 g increase in absolute maternal carbohydrate intake was associated with a 0.02 (0.002, 0.03) kg/m² higher BMIpeak, 0.01 (0.001, 0.01) kg/m²/month higher pre-peak velocity, and a higher odds of infant overweight (BMI> 85th percentile) at ages 12 and 24 months [OR (95% CI): 1.03 (1.01, 1.06) and 1.04 (1.003, 1.07), respectively]. These associations were mainly driven by maternal sugar rather than starch intake.

Conclusion
Maternal carbohydrate intake is associated with infant BMI peak characteristics and may be
a modifiable lifestyle factor to improve offspring outcomes.
Background and Aims
The number of severely obese children is growing in France. Our multidisciplinary team participated since 1998 to multi level interventions:

School-based intervention to prevent obesity progression: (2004, 34 Parisian kindergartens, 3700 children; risk factors for overweight decreased after 1 year [p=0.008], nutritional behaviors and skills increased after 5 years [p<0.05]), identification and management of overweight by general pediatricians in the region and multidisciplinary hospital program.

A beneficial but moderate weight reduction can be expected in 40% of patients (BMI: -0.68±0.7 SD). Central obesity and age more than 11 years are the major risk factors for failure of management (OR: 3.35, 2.27) El Taguri, Pediatrics 2008.

Method
Our cohort has a high level of insulin resistance (71.8%, HOMA: 2.3(1.5-3.5), Druet, Clin Endocrinol 2006), and a high prevalence of hirsutism and menstrual disorders in girls (36.5, 42%) associated with low sex-hormone Binding globulin levels (25.4 nmol/L] Boustani, Eur J Endocrinol 2012.

Obese adolescents have frequent mental disorders (58%) especially separation anxiety and social phobia (32%) Vila, Psychosom Med 2004.

Results
Since 2008 we started a bariatric surgery program in adolescents (LAGB:> 14 years and 40 BMI). Results were conclusive (after 3 years: n=45, BMI: -13.3±5.9, HOMA-IR decreased from 5.5±3.3 to 1.4±1.1, p<0.005).

These results require a high degree of patient cooperation and professional support (number of consultations /year was significant on weight loss [≤ 6 or ≥ 12 p=0.005]), Khen, obes surg 2015

Conclusion
An adult transition plan is now implemented.

Long-term outcomes are still lacking, further strategic steps need to be suggested and shared.
Background and Aims
The main objective of this paper was to explore the prevalence of Stunted Child and Overweight Mother (SCOM) pairs in a South African setting. In the absence of SCOM literature in South Africa (SA), a pilot study was conducted to encourage authors to report more SCOM prevalence in SA.

Method
Anthropometrics of 91 mother (Waist & height) and child (Stunting) pairs were collected from a bigger study and analyzed for relationships and SCOM prevalence.

Results
The study found that there was a positive linear prediction and association between a mother's waist circumference and her child's stunted status. The linear regression model (n = 6, r = 0.40, p-value 0.042) of the mother's baseline waist measurement (p-value 0.010, standard beta coefficient 0.298)) was the only significant predictor of the child's height-for-age Z-scores (stunting).

Conclusion
This study found that mothers with a larger waist circumference had more children who were stunted than mothers with a normal waist circumference.
DO SCHOOL FOOD SERVICE PERSONNEL SUPPORT SCHOOL-BASED SALAD BARS?
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Background and Aims
About one-third of the child population in the U.S. is overweight and about 12% is obese. Increased consumption of fresh fruit and vegetables (FFV) is one way to improve health and decrease consumption of energy dense foods. Since 95% of U.S. children are in school, a viable method of increasing child intake of FFV is through salad bars (SBs) during lunch; however, barriers to school-based SBs exist. The aim of this study was to examine school food service facilitators, barriers and attitudes associated with SBs in New Orleans public schools.

Method
Cross-sectional survey data were collected from food service directors (FSDs) (n=19) and staff (FSS) (n=37) in 19 schools (12 with SBs and 7 without SBs).

Results
FSDs in SB schools reported infrastructure, staff and training to maintain the SB; FSDs from non-SB schools reported the opposite. Most commonly cited barriers in SB schools were: costs, storage space, and keeping food fresh. FSDs in non-SB schools reported not enough space. Most FSS and FSDs felt lunchroom atmosphere improved with the SB (~89%) and they had appropriate equipment and preparation time for the SB. Most of the food service personnel increased consumption of FFV since SB implementation but not the students. Most FSS and FSDs had positive attitudes about the SB.

Conclusion
This study showed that school food service was positive about the SB, and that facilitators for initiation and maintenance were greater than barriers to the SB. The conclusion is that opposition to implementing school-based SBs is not generated by food service personnel.
Obesity

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THE DIFFERENCE OF PHYSICAL ACTIVITY BETWEEN LOW SOCIOECONOMIC OBESE AND HIGH SOCIOECONOMIC OBESE IN INDONESIA

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Background and Aims
Obesity Prevalence has increased in recent decade either in developed countries or in developing countries. Lower Socioeconomic Obese in developed countries evidently increase, on the contrary in developing countries, it increased in population with higher Socioeconomic and tend to increase. Sedentary lifestyle and overweight are major public health, clinical, and economical problems in modern societies. The worldwide epidemic of excess weight is due to imbalance between physical activity and dietary energy intake. The aim of this study is to analyze the difference of frequency, duration and variation of physical activity between low socioeconomic obese and high socioeconomic obese in Indonesia.

Method
Cross sectional study design and data are used from National Basic Health Research (Riskesdas Nasional) 2007. Participants of this study were 7703 respondents from biomedic household samples for Indonesia. The criteria for obesity status are used BMI (obese=27 and overweight = >25). Multivariate analysis used logistics regression.

Results
Average of respondent age is 38.7±15.49 years old, with range around 15-97 years old, where 53.7% is women and 46.3% is men, and the higher age around 35-44 years old. There was no significant difference (p=0.457) in mean duration of physical activity between low socioeconomic obese and high socioeconomic obese in Indonesia. Median length of screen time was longer for high socioeconomic obese than for low socioeconomic obese.

Conclusion
In this research physical activity duration for high socioeconomic obese group is lower than low socioeconomic obese group. Research pattern relationship each determinant does not follow a trail of current transition pattern.
Background and Aims
Background: Exercise contributes to the most variable component of energy expenditure but its impact is beyond the energy cost of exercise including physiological, behavioural, and appetite effects. Exercise is known to acutely influence effect appetite but evidence as to the independent effect of intensity is lacking. Aim: to investigate the role of exercise intensity on appetite, energy intake (EI), appetite related hormones, fat utilisation and subjective measures of appetite.

Method
Methods: One hour after a standardised breakfast, 30 healthy normal-weight volunteers subjects undertook either 8 repeated 60 second bouts of cycling at 95% VO2 max (high intensity) or 30 minutes of continuous cycling, at a fixed cadence, equivalent to 50% of the participant’s VO2 max (low intensity) in a randomised crossover design. Glucose, insulin, triacylglycerol (TAG), nonsaturated fatty acids (NEFAs) and glucagon-like peptide-1 (GLP-1) were measured fasted, postprandial, and pre and post exercise. Satiety was assessed subjectively throughout the study using visual analogue scales. Ad libitum intake of a pasta meal was measured at the end (3-h post-breakfast).

Results
Results: exercise depressed prospective food consumption, increased EE (P<0.001), fatty acid (NEFA) utilisation (P=0.004) and fat oxidation (P<0.001), but did not affect appetite, EI, plasma glucose, insulin, GLP-1 or lipid levels post-exercise.

Conclusion
Conclusion, there are mechanisms and consequences of exercise in short and long-term appetite control; however, these mechanisms warrant further explanation. These results support the need for future research in to the role of in regulation energy balance, especially for obese people. Supported by King Saud University Grant.
Obesity

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PEDIATRIC OBESITY AND VITAMIN D
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Background and Aims
Adequate levels of vitamin D are essential to normal growth and development of children. Although literature suggests an association between obesity and vitamin D deficiency it is unknown the prevalence and the level of that deficit.

Method
Prospective study evaluates the levels of 25-hydroxyvitamin-D in an opportunist sample of 6-18-year-old children of two groups (50 children with obesity and 50 children without obesity). Children were classified as healthy-weight, overweight or obese by using recommended age- and gender-specific BMI-percentile cut points. Associations between BMI-percentile classification and vitamin D deficiency were examined after adjustment for relevant confounders.

Results
Preliminary results indicate that there is a vitamin D deficiency among the majority of obese children when compared to healthy children. Due to sample dimension (n=100) prospective character of the investigation, the study is still ongoing but differences to final results are not expected.

Conclusion
This pioneer study at our region points to a relation between vitamin D deficiency and obesity. This deficit is one modifiable comorbidity of obesity, so there is an urge to understand why this occurs to correctly direct treatment.
PROTEIN INTAKE IN LATE INFANCY: HOW MUCH IS TOO MUCH?

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Background and Aims
Protein contributes approximately 5% of energy intake in breastfed infants and 8.6-8.8% in formula-fed infants. Protein intakes over 14% of energy in 6-24 month-olds are associated with increased risk of overweight development. This research sought to evaluate protein intake quantities and sources in 6-23-month-olds.

Method
The Feeding Infants and Toddlers Study (FITS) 2008 is a cross-sectional dietary intake survey of US children ages 0-48 months. Intakes were ascertained using dietary recalls. Protein intakes, including amounts and sources, were obtained from 6-11 month and 12-23 month age subsections.

Results
Protein intake was about 10% of calories in 6-11 month-olds and about 15% of calories in 12-23 month-olds. Mean protein intake in infants 6-11 and 12-23 months, respectively, was 22.4 g/day and 44 g/day. More than 75% of 12-23 month olds had protein intakes above 14% of energy. Major protein sources between 6-11 months were formula (34.8%), and breast milk (~9%). For 12-23-month-olds, the major source was cow’s milk (32.7%).

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<th>6-11 Months (n=505)</th>
<th>12-23 Months (n=925)</th>
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<td>(% energy)</td>
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Conclusion
Protein intakes doubled between late infancy and 23 months in this cohort. Major sources of protein were infant formula and cow’s milk. Breastfeeding initiation and continuity must be encouraged and attention to protein levels in infant formulas is warranted.

1Agostoni, 2005

2Butte, 2010
ETHNIC DIFFERENCES IN PREVALENCE OF OVERWEIGHT IN PRESCHOOL CHILDREN IN NORWAY

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Background and Aims
Prevalence of overweight, here including obesity, in Norwegian preschool children has increased over the last decades. According to earlier studies, total prevalence at age 4 years is 12-13%, but higher in girls. There are associations between size at birth and in early childhood, and adult obesity and metabolic diseases, which affect some ethnic groups more than the general population. Our aim was to explore prevalence of overweight at 4 years in a multi-ethnic community, and whether there were associations with gender, ethnicity, and parental characteristics.

Method
Population based cohort study of 629 children living in North-East Oslo (STORK-Groruddalen). 59% had ethnic minority background. We have broad data on parents. Children’s growth data are available from 3 ultrasound measurements during pregnancy, at birth, and from routine measurements at local Child Well Clinics. Primary outcome was overweight (including obesity) at age 4 years, according to WHO definitions. We have made preliminary regression analyses on prevalence of overweight, adjusted for gender and ethnicity. In Vienna we will present further analyses on parental exposure variables.

Results
Overall prevalence of overweight at 4 years was 21%, and there were no gender differences. Prevalence (%) in children with European background was 25% (reference), for Middle Easterners 31%, for East Asians 17% and for South Asians 12%. Only South Asians differed significantly from Europeans.

Conclusion
Total prevalence of overweight at the age of 4 years was high in this multi-ethnic population (21%), but differed by ethnic origin. We found no association with gender.
CORRELATION BETWEEN CENTRAL OBESITY WITH SCREENING STATUS OF PROTEINURIA AMONG OBESE ADOLESCENTS IN DENPASAR CITY, BALI PROVINCE, INDONESIA

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Background: Obesity in adolescents is a great concern of public health issue. It has been known increase the risk of proteinuria. Elevation of proteinuria level increased the risk of progressive renal and cardiovascular disease. There are few studies that provide evidence of the main factors associated with proteinuria status. This study was aimed to explore the correlation between Central Obesity (CO) and proteinuria screening status among obese adolescents in Denpasar District, Bali Province. Methods: A cross-sectional study involves 163 obese adolescents (aged 12-14, BMI percentile ≥P95) was conducted. Sample taken from 10 private Junior High School and selected by cluster random sampling. Demographic characteristic data (gender, age, family history), the anthropometric data (body weight, height, BMI, BMI Percentile, waist circumference, and family history) and proteinuria screening status were assessed. Data were analyzed using univariate and bivariate analysis (chi-square test with cramer’s v). Results: The prevalence of CO and proteinuria among obese adolescents is 58.9% and 10.4%, respectively. The mean of waist circumference among obese adolescents is 91.5 centimetre. There is a significant difference of proteinuria among obese adolescents based on CO status (4.7% vs 17%; p
AN APPROACH TO INCREASE NUTRIENT INTAKE OF INFANTS IN SRI LANKA:
BOOKLET OF FOODS AND RECIPES FOR COMPLEMENTARY FEEDING

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Background and Aims
Food and menus for complementary feeding in the form of printed material has not available in Sri Lanka. This study designed to develop a booklet containing appropriate food and menus of complementary feedings.

Method
Available complementary food and recipes in Sri Lanka were gathered by reviewing the literature, face to face interviews with health professionals who deal with infant nutrition and mothers who have infants. Further, a focus group survey was conducted to identify commonly consumed foods, meals, dietary habits and food believes regarding complementary feeding. The booklet was developed including nutritious complementary foods. Draft version of the “Booklet” was given to the experts in the field of nutrition and dietetics for validation. Furthermore, ten mothers justified the booklet.

Results
The developed booklet is a colourful booklet with 14.5 cm in width and 20.5 cm in length. The first section of the booklet provides the general information on complementary feeding and the second section lists out the nutritionally balanced complementary foods for the infants of 6 months to one year of age. The content validity and format of the draft booklet proved that right messages are given. The aim of the justification of the format and contents of the booklet was to confirm the understanding-ability and relevance of the foods and menus for complementary feedings.

Conclusion
The developed booklet provides appropriate food and meals for complementary feeding for infants in Sri Lanka. The booklet may be beneficial for improving the nutritional status of infants by improving the nutrient intake.
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ANTIOXIDANT POTENTIAL AND FATTY ACIDS PROFILE AMONG THREE TUNISIAN VARIETIES OF MULBERRY FRUITS: MORUS ALBA L, MORUS NIGRA L, MORUS RUBRA L

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Background and Aims

Due to their nutritional value, fats and antioxidants are essential for normal growth and development especially for young children (Koletzka et al., 2015). This study aims to focus on the most edible varieties of Morus fruits in terms of antioxidants and fatty acids profile.

Method

For three mulberry varieties, total phenol contents and the antioxidant ability (using free radical 2,2 diphenyl-1-picrylhydrazyl (DPPH assay) were investigated in ethanol extracts. Also, the comparative fatty acid profile is established using GC/MS.

Results

Morus alba (MA) ethanolic extract showed the best polyphenols content expressed of Gallic acid Equivalent (GAE) with 46.42 ± 0.765 (GAE)/g Extract) Also, it was the most antioxidant with Effective Concentration 50% :EC50= 1.78 ± 0.024 mg/ml, followed by Morus Nigra(MN) and Morus Rubra(MR).

From the 18 identified fatty acids, MA showed a best amount of palmitic acid (C16:0), an important fatty acid in early human development, contained in human milk (Innis.,2015), while MR showed the biggest amount of Linoleic acid (C18:2n6).

Conclusion

This work has provided some comparative informations of three Morus fruits and revealed the importance of their antioxidant activity due to polyphenol contents. The high fatty acids variability profile highlight the importance of Mulberry as good source of benefic Fats.

References


Other

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NUTRITIONAL STATUS AT DIAGNOSIS IN CHILDREN AND ADOLESCENTS WITH CANCER IN A PEDIATRIC ONCOLOGY DEPARTMENT IN ALGERIA
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Background and Aims
Prevalence of malnutrition in pediatric oncology is variable according to the type of cancer, the intensity of the treatment, the moment, the method of assessment, and the socio-economic status of patients. In developed countries, less than 10% of patients affected by leukemia are malnourished at diagnosis versus 50% of children affected by metastatic neuroblastoma.

This study aimed to assess the nutritional status of children with cancer at diagnosis and to compare the nutritional status of the patients admitted for hematological malignancies and those admitted for solid tumors.

Method
All patients aged less than 16 years and hospitalized for cancer between January 2014 and December 2014 were included and divided into two groups: solid tumors and hematological malignancies.

We assessed the following parameters: weight, height, body mass index, presence of a major loss of weight and albuminemia.

Results
We found that 18.6% of our patients presented a severe or moderate malnutrition at time of diagnosis (58% for the group hematological malignancies and 42% for the group solid tumors). We also noted a major loss of weight during the treatment in 20% of the cases, associated with a greater risk of morbidity and/or mortality in particular in the group solid tumors.

Conclusion
The prevalence of malnutrition is higher among the children admitted for cancer compared with the general population. In addition, the nutritional status is correlated to prognosis and the evaluation of the nutritional status using simple anthropometric parameters would improve the chances of survival for our patients.
Background and Aims
Brazil’s Management of Urban Solid Waste Diagnostic estimates that only 30% of 61.1 million tons of household and public waste collected in 2013 were recovered. The country experienced an increase of 5.5% in waste generation from 2012 to 2013. These data can be considered troublesome, as 2.9 million Brazilians have care deficits, 50% are residents of the country’s Northeast region (BRAZIL, 2015). In the state of Bahia, located in the Northeast, 33.4% of the produced waste is openly dumped. Incorrect procedures in the management of solid waste result in deteriorating health conditions for the population. This study aims to investigate the level of knowledge of nutritionists in food and nutrition units about the existence of innovative technologies for the reuse of final waste and their willingness to change daily practices in the city of Salvador.

Method
Data provided by field research and literature.

Results
Data from the past four years show increases in the supply of food and nutrition services that generates organic waste. The studies about generation and treatment of organic waste are still incipient in Brazil, however it represents approximately half of the country’s total production, impacting the environment and people’s health. Currently, new trends and technologies are in the initial phase of being discussed for the treatment of this material, such as dry aerobic digestion of organic and advanced composting.

Conclusion
It concludes that most professionals are unaware of such technologies but at the same time are willing to adopt new ways to dispose the waste generated.
Developing a Survey to Assess Diet and Physical Activity Patterns in Nulliparous Women

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Background and Aims

Background

The main determinant of maternal nutritional status is maternal diet, which impacts on the woman’s and baby’s health and pregnancy outcome. Having poor diet quality is one the top five predictors of mortality in women, and poor maternal nutrition can negatively affect fetal development.

Aim

To develop a tool to assess diet and physical activity patterns in first-time mothers before and during pregnancy.

Method

A systematic review was performed to investigate what type of pregnancy-related diet assessment tools were most frequently used and recommended in epidemiological studies. Findings showed that food frequency questionnaires were the most commonly used ways of assessing diet in pregnancy. Three validated instruments, the Irish Survey of Lifestyle, Attitudes, and Nutrition questionnaire, the Norwegian Mother and Child Cohort Study’s diet questionnaire and the International Physical Activity Questionnaire, were modified and combined to develop the ‘Dietary and physical activity survey’.

Results

The ‘Dietary and physical activity survey’ was developed to gather information on women’s general health, life-style and wellbeing, physical activity before and during pregnancy, food and food supplement consumption, and breast-feeding intention. The survey was tested for validity with dietitians practising in maternity care, and reliability was tested with 60 pregnant women. Results will be presented.

Conclusion

Choosing the right research tool is essential to answer the research question, and well-planned research, using a validated and reliable instrument, will provide high-quality accurate information. The knowledge gained can support or challenge current practices, and present alternative research-based evidence.
Background and Aims
Adequate nutrition is essential for human life and is particularly vital in the early years. Currently, under nutrition accounts for about 3 million deaths per year in children under-five worldwide. The problem of over nutrition is also significant, predisposing children to non-communicable chronic diseases such as diabetes, hypertension and cardiovascular disease. This dual burden of malnutrition is one which Colombia is not spared from and unhealthy eating is a key factor that can perpetuate this burden. It is therefore paramount that this burden is tackled, and research into healthy eating is a key tool which can be utilised.

The aim of this research is to explore perceptions on factors which influence healthy eating in underprivileged children in Medellin, Colombia.

Method
To conduct this research, a qualitative approach was utilised. In depth-interviews with 23 participants were conducted to collect primary data and a literature review was conducted to collect secondary data. The data was analysed using an inductive framework analysis approach.

Results
From the data collected, several inter-related factors, which influence healthy eating, were elicited. These factors were economic, educational, social, environmental and personal.

Conclusion
In conclusion, it was perceived that several inter-related factors were influential on the healthy eating habits of underprivileged children in Medellin, Colombia, with economic and educational factors being highlighted as more significant. Therefore, a multi-factorial approach including the education of parents and children in these situations is absolutely vital in helping to forge new healthy eating habits and ensure a healthier future for these children.
SOCIODEMOGRAPHIC PROFILE OF SCHOoled CHILDREN IN ERRACHIDIA PROVINCE, TAFILALET OASIS, MOROCCO

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Background and Aims
The healthy well-balanced diet remains fundamental for the maintenance of good health by the adult subjects generally and the children in particular. The aim of this study was the analysis of socio-demographic factors of the population.

Method
Data were collected from the urban and rural primary schools of Errachidia city, in the southeast of Morocco using an assisted questionnaire. The study was led by 838 scholars from 6 to 15 years old, with an average age of 9.3 ± 2.1 years.

Results
The study make out a set of results: 71.24% of the respondents live in urban area against 28.96% in rural area. The sample consists of 50.60% girls and 49.40% boys. The average number of brother’s scholars was 1.25±1.15 with a minimum of zero and a maximum of 7 and the average number of sisters was 153±1.14 with a minimum of zero and a maximum of 6. Illiteracy mother’s scholars was 36.63% against 21% for fathers. The average number of families per household was 1.07 ± 0.39. The average number of persons per household was 6.11 ± 2.11, almost all of our sample live in houses 94.27%, and only 5.61% in apartments and villas 0.12%. 99.88% of the children live within their family. All of the sample were connected to the network electricity and possessed the potable water within homes.

Conclusion
Key-words: Scholars, Socio-demographic factors, Errachidia, Morocco.

This work was supported by the CNRST under grant N° PPR/2015/35.
Background and Aims

Egg yolk oil is a natural source of bioactive compounds such as polyunsaturated fatty acids, fat-soluble vitamins, lutein and others. These are important ingredients also found in breast milk: DHA for brain development, lutein to support eye health, vitamin E to support developing cells. Egg yolk oil, being an animal source product, naturally contains vitamin D, which is required for normal bone development. Also fatty acid profile of egg yolk oil is close to human milk. The aim of this study was to check the conformity of egg yolk oil for infant nutrition.

Method

In this study egg yolk oil was extracted from liquid egg yolk using two stage solvent extraction with polar and non-polar solvents. Extracted egg yolk oil was analyzed for fatty acids, fat-soluble vitamins and lutein using GC and UPLC methods. Results were compared to human milk chemical composition and nutritional recommendations for infant feeding.

Results

Bioactive compound content of eggs is affected by hen diet. Egg yolk oil extracted from eggs used in this study was high in DHA (1.17±0.19 g 100g⁻¹) and contains 9.80±1.18 mg kg⁻¹ of vitamin A, 0.127±0.015 mg kg⁻¹ of vitamin D, 205.56±24.67 mg kg⁻¹ of vitamin E and 13.7±0.9 mg kg⁻¹ of lutein. Fatty acid profile was similar to breast milk in terms of palmitic, stearic, linoleic and α-linolenic acids.
Conclusion
Due to the high bioactive compound content and fatty acid profile similar to human milk egg yolk oil can be successfully used in infant formulas naturally increasing it biological value.
AUXOLOGICAL DYNAMICS OF BODY PROPORTIONALITY IN TRANSFUSION DEPENDENT β-THALASSEMIA CHILDREN

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Background and Aims
Auxological information on body proportionality is scarce, and altogether missing amongst Indian β-Thalassemia children. This presentation aimed to study body proportionality of transfusion-dependent β-thalassemia children using Manouvrier’s Indice Skelique which classifies individuals into Brachyskelia (long trunk and short legs), Macroskelia (short trunk and long legs) and Mesatyskelia (intermediary state).

Method
A total of 400 boys and 163 girls diagnosed as β-Thalassemia major, aged 1 to 20 years, getting blood transfusions in Department of Pediatrics, PGIMER, Chandigarh were mixed-longitudinally measured for length/height and crown-rump length/ sitting height at half yearly age intervals in Growth Laboratory/ Clinic of the Institute. Using Manouvrier’s Indice Skelique (sitting height-standing height/sitting height ×100), patients were classified into Brachyskelia (upto 84.9), Mesatyskelia (85.0-89.9) and Macroskelia (≥90).

Results
Transfusion dependent β-thalassemia patients grew normally in height upto 9 years, thereafter, suddenly all became short stunted (<3rd percentile of CDC standards) despite, blood transfusions. This may be a disease related phenomenon. All Thalassemia children were brachyskelique upto 6.0 years and subsequently started becoming macroskelique, which makes majority of thalassemia patients disproportionately short stunted due to truncal shortening. Average pre-transfusion hemoglobin levels were 9.0 g% in boys and 9.1 g% in girls.

Conclusion
The compromised growth and disproportionate short stature (macroskelia) noticed amongst majority of transfusion dependent β–Thalassemia children beyond nine years of age, besides, blood transfusions; call for timely institution of need based medicinal, surgical and nutritional interventions to ensure their proper growth, body proportionality and overall health status.
EVALUATION OF THE NUTRACEUTICAL ROLE IN HUMAN AND ANIMAL MODELS OF SOME MOLECULES HIGHLY CONSUMED

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Background and Aims

Diet has a strong influence on human development of the entire human life from the prenatal stage through the childhood to the adulthood. We have studied molecules contained in foods consumed all over the world with the aim to evaluate their nutraceutical value. We selected essential nutrients for each stage of human development i.e. folic acid which incidence on the prenatal stage, indigotin mainly consumed during the childhood, acesulfame-K in the adolescence stage and choline and curcumin in adulthood and old age to study the final outcome of their effects against degenerative processes and their longevity induced potential.

Method

We carried out studies of cytotoxicity and proapoptotic DNA fragmentation in human leukaemia HL-60 cells by studying tumour growth inhibition. Cells were inoculated at 2x10^5 cells/ml and incubated with the tested compounds at 37°C during 72h. This study was complemented by assessing on the degree of DNA fragmentation occurred in the treated cells. Moreover, bioassays of longevity in the Drosophila melanogaster animal model were developed. Alive animals were counted and media renewed twice a week till the complete life extension for each control and concentrations established.

Results

Results are summarised in the following table.
### Conclusion

In conclusion, our results suggest that: (i) appropriate doses should be considered in most of the studied molecules, (ii) a health promoting molecule not necessarily exerts this activity in all the studied checkpoints, (iii) a specific food must be consumed in each stage human development according to their effects.
ANTHROPOMETRIC ASSESSMENT OF CYSTIC FIBROSIS ADOLESCENTS AND ITS IMPACT ON BONE MINERAL DENSITY

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Background and Aims
Cystic fibrosis (CF) is the most common inherited, monogenic autosomal recessive disorder in Caucasian population. CF patients, due to many factors are exposed to malnutrition. Modern therapies for bronchopulmonary disease and intensive nutritional care prolong survival of CF patients. It might cause comorbidities, which include bone mineral disease (BMD).

The aim of this study was to examine influence of nutritional status in children and adolescents with cystic fibrosis on bone mineral density.

Method
The study included 100 CF patients (49 girls, 51 boys) aged 10 to 18 years. An assessment of nutritional status (standardized values for weight, height, BMI) and of the content of muscles (Mid Arm Muscle Area - MAMA) and fat (Mid Arm Fat Area - MAFA) was conducted. BMD was assessed by dual energy X-ray absorptiometry (DXA) using a Hologic Explorer. All analyses were carried out using the STATISTICA 10.0.

Results
The values of standardized height, weight, and BMI were reduced and statistically significantly different from the reference population (p<0.001). The study group was characterized by higher content of muscles (91 % of norm) compared to fat tissue (74 % of norm). The average value of BMD was decreased and amounted to -0.95 ± 1.17. Important factors influencing bone mineral density were BMI (F=8.35, p<0.001), MAMA % (F=15.18, p<0.01) and MAFA % (F=3.27, p=0.042). The increase of all above variables caused improvement in bone mineral density.

Conclusion
Appropriate nutritional status has a positive effect on bone mineral density in CF adolescents.
Background and Aims
Sickle cell anemia (SCA) is the most common hereditary disease in the world. Objective: To analyse the nutritional status and bone mass of 2-5 year old children with SCA and without the disease.

Method
Participants were assessed by z-scores for body mass index for age (BMI/A), weight for age (W/A), height for age (H/A) and weight for height (W/H) and by arm circumference (AC), triceps skinfold (TSF) and arm muscle circumference (MAMC). Biochemical examinations were performed (hemoglobin, hematocrit, reticulocyte count, LDH, VHS, iron and transferrin), bone age (x-ray of carpal regions) and evaluation of bone mass (absorptiometry dual energy X-ray).

Results
52 children with SCA and 47 without the disease were analyzed. Using the BMI/A indicator, the prevalence of overweight (7.7% at risk of overweight and 3.8% overweight) was higher than the prevalence of malnutrition (1.9%) in children with SCA. In this group, 13.5% were stunted. The body composition by DXA revealed that the total mass, total fat and % of body fat were significantly higher in the control group than in the SCA group (p <0.001). The relative bone age was significantly smaller (p <0.01) in children with SCA (-8.9 ± 9.9 months; -0.74 ± 0.83 years) compared with the control group (-2.4 ± 8.5 months; -0.2 ± 0.7 years). The relative bone age was positively associated with the hemoglobin and hematocrit (p <0.01), and negatively associated with reticulocyte count (p=0.037), leukocyte (p=0.002) and LDH (p=0.002).

Conclusion
SCA leads to compromised nutritional status and delayed bone age in children.
Background and Aims
Among children treated with standard rhGH dose was SGA (small for gestational age) group. SGA children took the same dose of rhGH. Aims: Analysis of growth velocity of children with GHD treated with rhGH depending on birth weight.

Method
The study group consisted of 200 children aged 4-16 years with GHD (age 10.53±3.26 year): 73 girls and 127 boys. The research was retrospective. Maximum GH concentrations during stimulation tests were <10 ng/ml in all children. Height and weight of children were measured before treatment and after 1st year of treatment. Children with birth weight of <-2.0 SD for the duration of pregnancy were diagnosed with SGA. The resultant growth velocity (GV) after 1st year of treatment was compared in groups of children depending on gender and birth weight in groups born SGA and AGA (appropriate for gestational age).

Results
The difference in GV was found between genders: ♀ 8.46±1.25 cm, ♂ 9.41±1.60 cm. The research showed that 12 girls and 25 boys were born SGA (18.5%). GV in SGA group: ♀ 8.07±1.23 cm and ♂ 9.26±1.76 cm while GV in AGA group: ♀ 8.53±1.17 cm and ♂ 9.45±1.58 cm after 1st year of treatment.

Conclusion
1) No statistically significant differences as a result of growth hormone treatment in children with GHD depending on birth weight.

2) Boys have a slightly better growth response after 1st year of rhGH treatment.
GROWTH OF LATE DIAGNOSED TURNER SYNDROME WITH BREAST DEVELOPMENT: CASE REPORT
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Background and Aims
Turner Syndrome (TS) is caused by monosomy or structural abnormalities of the X chromosome. Most important clinical features of TS are short stature and gonadal failure.

Method
We report a case of a variant Turner syndrome with breast development.

Results
9-years old girl was referred to clinic with complaints of short stature and breast budding. She was born at 35+2wks with a birth weight of 1930g and a length of 41.5 cm. Her height on referral was in the 10th percentile on a Korean standard growth chart and at the 90th percentile on a TS growth chart; her weight 70th percentile. The mid-parental height was 164.5 cm (75th percentile). A physical examination revealed a Tanner stage III for breast development and Tanner stage I for pubic hair development. Her bone age was 11 years. Chromosome analysis revealed a 46,x,der(x)t(x;X)(p11.21;q11.2). A gonadotropin-releasing hormone (GnRH) agonist stimulation test demonstrated a basal LH level of under 0.1 mIU/mL with a peak level of 4.8 mIU/mL at 45 minutes. A serum levels of IGF-1 and IGFBP-3 were within normal limits. The patient was treated with growth hormone. And it can be helpful for her growth and emotional support.

Conclusion
Our case highlights the possibility of precocious puberty as an atypical clinical feature of TS. We emphasis on careful assessment on unusual growth pattern in any child, even though other underlying conditions.
Other

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FACTORS INFLUENCING BREASTFEEDING IN CHILDREN ADMITTED TO A PEDIATRIC DEPARTMENT

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Background and Aims
Objectives. We aimed to identify the factors affecting the breastfeeding in children admitted in Department of Pediatrics of Filantropia Hospital.

Method
We performed a retrospective study of the patients admitted between January and June 2015. 751 children aged over 2 were followed regarding the duration of breastfeeding, the introduction of solid foods, the mother age and the socio-economic status. We performed a logistic regression adjusted for social, economic and clinical factors.

Results
The duration of exclusive breastfeeding was 10.5 ± 8.3 weeks. The weaning was reported at 5.93 ± 4.85 months (median 5). The introduction of solid foods was made at 4.97 ± 0.77 months (median 5). 79.2% of all mothers decided to breastfeed before pregnancy, 12.6% during pregnancy and the rest during the neonatal period. Breastfeeding over 6 months correlated with the economic status: the medium income was associated with reduced breastfeeding – p = 0.01, OR = 1.94 (1.23-3.06) vs. high income and p = 0.02, OR = 1.08 (1.2-2.71) vs. low income. The education or the age of the mother had no significant influence regarding the breastfeeding or the solid foods. The main reason for discontinuing breastfeeding was returning to work (56.7%), followed by health issues (18.3%), advice from the non-medical persons (14.3%), fatigue (5.5%), advice from the medical staff (1.5%).

Conclusion
Breastfeeding and the introduction of solid foods are similar to the European trend. The medium income families are at risk of early discontinuation. The job or the bad advices are responsible for a premature weaning.
Childhood nutrition is known to have a considerable impact on children’s health. Protein and fat are the two most important macronutrients with high impact on children’s growth and energy provision. The aim of the present study is the assessment of children’s nutrition based on energy, protein and fat intake with respect to their anthropometric and oral health. A total of 788 7-year old primary school children selected via a cluster sampling in Tehran city, Iran. The general information about children has been asked from their mothers. Anthropometric measurements including weight and height measurements are also taken for each child. Finally the routine standard tooth check up was performed to get the dmft index. The chi-square test, Mann-Whitney U-test and Kruskal-Wallis test were used for detecting statistical associations. Results showed that there is not a significant associations between Macronutrients intakes and anthropometrics indices; however it was found that children who get saturated fat less than 75% recommended have higher dmft. The same results were found for energy, protein and total fat, but none of which were statistically significant. This study highlights the important role of saturated fatty acids in prevention of dental caries.
Other

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VALIDATION PRO-DIARY AGAINST THE TRADITIONAL PEN AND PAPER (P&P) METHOD IN A LABORATORY SETTING USING HEALTHY YOUNG ADULTS
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Background and Aims
Background: Using visual analogue (VAS) scale on portable electronic devices instead of using the traditional P&P based questionnaires is inexpensive and easy. Aim: to validate a wristwatch-based electronic appetite rating system PRO-Diary against P&P method in a laboratory setting for adults

Method
Methods: thirty normal BMI participants aged between (18-34 y) years with were recruited in the cross-over study in two visits with 5 day gap. Standard liquid meal was given immediately after the first VAS at time =0 (F).The participants completed the traditional VAS and PRO-Diary questionnaire independently. The validation was for rating of hunger, prospective food consumption and fullness during the fasting and every 30 minutes during intervention. The mean AUC was calculated from fasting point to 60 min

Results
Result showed four, three and eight notable misses for the three appetite components respectively. However, the Pearson coefficient were statistically significant 0.922, 0.940 and 0.802 (p<0.001) and shows a positive correlation between both methods. The mean difference relating to the mean AUC for hunger, prospective food consumption and fullness indicating no statistically significant difference between both scores, paired t-test p=0.083, p=0.238 and p=0.168 respectively with no association between the true mean AUC confirmed by a Pearson’s correlation test (r=-0.049; p=0.709), (r=-0.140; p=0.228) and (r=-0.138; p=0.294). Pro-Diary displayed a higher score, a restricted agreement and the limit of agreement (Bland and Altman) is unacceptably high

Conclusion
In conclusion, Pro-Diary is not a robust alternative to P&P and we would recommend the use of P&P, which is a validated technique
COMBINED TREATMENT OF LIQUID EGG WHITE: HIGH HYDROSTATIC PRESSURE AND HEAT TREATMENT

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Background and Aims
Minimal processings are alternatives to traditional thermal food preserving technologies, which don’t involve direct heat impact, are investigated in order to obtain safe food products, but in the same time with fresh-like quality attributes. High hydrostatic pressure, HHP (high pressure processing HPP) is a cold pasteurization technique which offers an opportunity to preserve food products quality with high content of minerals and vitamins.

Method
Combinations of thermal treatments and HHP of liquid egg white (LEW) were studied. The aim of our experiment was to examine the effects of different treatment’s parameters to most important techno-functional properties of product, like colour, viscosity, pH-value and microbial state were investigated. Homogenized LEW from production line of Capriovus Ltd. was prepared for samples to our study.

After samples were pasteurized (45.9 - 74.1°C, 600 s) then HHP treated (279.3 - 420 MPa for 300 s). The experiment was composed a Central Composite Design.

Results
Results show that colour of LEW had visible changes (CIE-Lab colour-system) while pH-value is stable. Viscosity characteristic has deteriorated, the influence of that changes to techno-functional properties. We experienced a convincing decrease of microbiological load that can extend shelf-life.

Conclusion
Combination of treatments is great opportunity to extend shelf-life of LWE while less deteriorate the characteristic of products. Further investigating of sequence and parameters of treatments are recommended.

Our research materials were produced with generous contributions from the KMR_12-1-2012-0181 research and development project titled “Support of market-oriented development ability in the central Hungary region.” We are very grateful for this.
PECULIARITIES OF NUTRITIONAL STATUS IN PATIENTS WITH CYSTIC FIBROSIS

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Background and Aims
Malnutrition in CF is a cumulative result of a profound alteration in digestion and absorption of food, and lung infections.

Method
The study was conducted on 60 patients with CF, divided into four age groups: 18 children 0-2 years (30%), 2-5 years (21.7%), 5-10 years (18.3%) and older than 10 years (30%). To determine nutritional status was used body mass index (BMI) converted into Z-score.

Results
Z score value of BMI in children with CF younger than 2 years was importantly reduced to -1.49±0.31. This value is comparable to the one in patients older than 10 years (-1.56±0.33), showing a mild degree of malnutrition. Z score of BMI in children aged 2-5 years and 5-10 years showed the values of -0.69±0.16 and -0.93±0.31 respectively, marking a good nutrition.

These results can be explained by the fact that the major criteria for the diagnosis of CF is malnutrition and the average age of confirming the diagnosis in assessed children was 2.36±0.51 years. Thus, in the age group 0-2 years were predominant primary diagnosed children who haven’t previously received enzyme replacement therapy. Children older than 2 years were diagnosed early and have made some treatments, presenting a better nutrition. For patients with CF older than 10 years is very difficult to achieve and maintain an adequate nutrition, due to the association of severe pulmonary complications.

Conclusion
Assessment of nutritional status has the same clinical importance in monitoring children with CF, as the valuation of pathological changes in respiratory system.
THE SARPHATI COHORT: A DYNAMIC COHORT OF 150,000 CHILDREN IN AMSTERDAM

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Background and Aims
Overweight, including obesity, forms a serious health threat in the Netherlands and worldwide. In Amsterdam, 23% of children are overweight. Sarphati Amsterdam is a newly established, unique collaboration between the city of Amsterdam and its research institutions, focusing on innovative multidisciplinary research beneficial to preventing non-communicable diseases effectively and sustainably. With the Sarphati Cohort, Sarphati Amsterdam aims to establish a dynamic cohort study that systematically monitors growth and its determinants from birth until adulthood, in order to 1) identify causes of overweight and 2) evaluate interventions to combat overweight.

Method
The Sarphati Cohort is set-up in conjunction with routine youth health care (YHC) consultations. YHC monitors the health of ~150,000 children (0-18 yrs), and each year 10,000 newborns are included in the cohort. Growth and its determinants, such as sleep, nutrition and physical activity, will be systematically monitored during 15 YHC consultations in the first 4 years of life and 4 consultations in childhood and adolescence. The cohort’s magnitude, socio-cultural diversity and dynamic nature enable the evaluation of existing and new interventions to combat overweight.

Results
The cohort is currently being developed, intended start is September 2016. During the conference, we will present the development of the cohort as a joint collaboration of multiple stakeholders.

Conclusion
With the Sarphati Cohort, Sarphati Amsterdam facilitates excellent research in the field of overweight & obesity that will contribute to the ambitious policy objectives of the city of Amsterdam to promote healthy behaviour and improve the quality of life of young people.
GETTING THE REAL PICTURE OF THE INFANT ADMITTED TO HOSPITAL: BREASTFEEDING AND HEALTH

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Background and Aims
Infant feeding can be disrupted by admission to hospital. The aim of this study was to explore the factors that affect breast feeding in hospital and change in feeding of infants who were admitted to hospital.

Method
A cross-sectional study was conducted at a tertiary paediatric hospital in Brisbane, Australia, between March 2013 and October 2013. A questionnaire based survey of parent’s ascertained information about feeding, health and sociodemographic characteristics of infants admitted to hospital during their first year of life. The association between infant and maternal characteristics and feeding mode was investigated.

Results
Parents of 75 infants admitted to hospital were surveyed. At admission 56\% of infants were receiving breastmilk and the median (IQR) age of all breastfed infants was 22 (10-35) weeks. Eight percent of breastfeeding mothers ceased to breast feed their infant as a consequence of the condition they were admitted for.

Conclusion
Hospitalised infants were breastfed or receiving breastmilk from their mother in the over 26 week age group in a similar rate to that found in the wider Australian population. Maternal health and the hospital experience for infants requires further exploration to promote optimal nutrition for hospitalised infants.
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