

to 5 annual measurements of FM, FFM, and REE. Tanner stage ranged from 1 to 5. Mixed model repeated measures analyses were used to test the relationships between FM, FFM, and REE with increasing Tanner stage among ethnic and gender groups. Relative FM decreased from Tanner stage 1 to 3, 4, and 5, but not to 2; however, it was similar among ethnic-gender subgroups. FFM increased from Tanner stage 1 to subsequent Tanner stages. FFM was higher in AA than in CA, and in boys than in girls. AA had a higher relative limb lean mass and lower relative trunk lean mass than CA. REE decreased with increasing Tanner stage after adjusting for age, ethnicity, gender, FM, and FFM. The decrease in REE was significant from Tanner stage 1 to 3, 4, and 5, but not to 2. REE was significantly higher in CA than in AA and in boys than in girls after adjusting for age, Tanner stage, FM, and FFM. In conclusion, REE declined with increasing Tanner stage, and was lower in AA after adjusting for age, Tanner stage, FM, and FFM.

Growth of fat in well-off NW Indian children

S PRAKASH, G PATHMANATHAN
*Department of Anthropology, Panjab University,
 Chandigarh, 160014, India*

The attained means of subcutaneous fatfolds at Triceps, Biceps, Subscapular and Suprailiac sites of 597 boys and 589 girls from well-off families of NW Indians were presented by us earlier. Here we give their tempo unconditional 1-year velocities. These fatfolds were measured using Holtain Skinfold Caliper by a trained measurer with high reliability twice with an interval of about one year. Annualized velocities were calculated for each subject and their means and standard deviations plotted at an age center determined by adding half of the time interval to the age at first examination. The growth pattern of fatfolds of these children reveals that:

- The girls have significantly larger skinfold means than the boys do at their respective comparable ages.
- The tempo unconditional 1-year velocities display that both the sexes had a mid growth spurt and an adolescent spurt.
- Although both, boys and girls did show a trend of reduced velocities this is much better seen in case of the limb fat folds. This represents the classical pattern of fat deposition and especially in boys the characteristic fall of velocities in fatfolds results in the 'mirror image' of height velocities.
- The pattern of the suprailiac fatfold is distinct in the sense that in both the sexes the 1-year velocities are much higher. This is more pronounced in boys. Meaning that more fat is being deposited at this site as compared to the limbs where the velocities largely remain negative due to relatively greater expansion of the underlying lean tissue.
- Compared to the British the well-off NW Indian children display higher means with low 1-year velocities. Although the 1-year velocities show a similar pattern they exhibit a shift to the left by 1.5 years. This could probably be due to their advanced Skeletal Maturity.

Effects of age and standard of living on the measures of upper arm anthropometry and components of body composition in urban Bengali boys of Calcutta, India

P DASGUPTA¹, A PIETROBELL², EM REBATO³, J ROSQUE³, S RANA¹

¹Anthropology and Human Genetics Unit, Indian Statistical Institute, Calcutta, India; ²Department of Pediatrics, University of Verona, Policlinic, "GB. Rossi", Verona, Italy; ³Dpto Biología Animal y Genética, Facultad de Ciencias, Universidad del País Vasco, Bilbao, Spain

Objective We examined the effect of age and standard of living of family on: (1) measures of upper arm anthropometry and (2) body composition components of middle class urban Bengali boys of Calcutta.

Methods Following the Protocol of the International Biological program, cross-sectional data on triceps, biceps, subscapular, and supra-iliac skinfolds, upper arm, chest, and calf circumferences and body weight were collected on 825 boys aged 7.0-16.0 years by measuring on and around their verified birth dates. Standard of living was assessed by a two-way classification of per month per capita expenditure of the families < or = Rs. 250.00 and Rs 251.00 and above. Analyses of the data were carried out on the derived measures like (a) upper arm area, (b) upper arm muscle circumference, and (c) upper arm muscle diameter and (d) upper arm fat area.

Results Two-way ANOVA show statistically significant (5% level) effects of age and per-capita expenditure level on all four measures. Age wise Principal Component analysis between 7.0 to 16.0 years on the measures of body composition has extracted five components. The first component shows high loading for circumferences and weight and has been designated as the component of body mass. It has explained 55 to 76% of variance. The second component was positively loaded with four skinfold sites in highest magnitude and has been designated as the components of fatness. It has explained 9.5 to 24.3% of variance. The third component was positively loaded on the extremity sites and can be designated extremity-trunk fat distribution component. It has explained only 3.3 to 7.8% of variance. The components show repeated reversals over the ages and therefore not very stable. Multivariate analyses tend to show that whereas the measures of fatness are affected by economic condition, fat distribution remains unaffected.

Conclusions Although for the children of the third world countries, economic condition is the major factor influencing variation in body composition, but the Principal components of fat distribution, namely, peripheral-central, is universal for the Homo Sapiens.

Multiple indicator cluster survey in Fyr Macedonia with micronutrient component

L ROSSI, K VENOVSKA, F BRANCA
*Istituto Nazionale di Ricerca per gli Alimenti e la Nutrizione, Roma Italia
 UNICEF Skopje Macedonia*

A survey to investigate the health and nutritional status