We concluded that QAPSE had demonstrated excellent repeatability and good validity for physical fitness and anthropometric data in an elderly population. This questionnaire investigated important dimensions of elderly people's activity and provided a good estimation of usual DEE for that age group.

Validation of impedancemetry measurements of body composition in the elderly.

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Significant body composition changes occur with ageing that make it necessary to reappraise the revelant measurement techniques. The density of lean body mass (LBM) decreases with age. This generates biases in densitometric methods. The hydratation of LBM varies little with age; therefore, total body water (TBW) is a good parameter for estimating body composition in the elderly. Estimates of TBW with impedancemetry has not been properly validated in the elderly, both for low (50 kHz) and high (> 500 kHz) current frequencies. In particular, the only published equations [Deurenberg (1990) *Am J Clin Nutr*] overestimate fat mass by about 7%. The aim of the present study was therefore to perform such a validation, the reference technique for measuring TBW being ^{18}O dilution.

TBW was measured by ^{18}O dilution in 40 healthy volunteers (19 women, 21 men), aged 67.7 ± 5.0 years (mean ± SD). ^{18}O dilution space was calculated from the plasma isotopic plateau achieved after the dose was given orally. Resistance (R), reactance (Xc) and impedance (Z) were measured at two frequencies (50 and 100 kHz) with an Analycor3 impedancemeter (Eugedia, France).

TBW (^{18}O dilution) was 34.78 ± 6.74 kg. At 50 kHz, R was 491.1 ± 71.5 Ω and Xc was 42.8 ± 6.6 Ω. At 100 kHz R was 478.6 ± 70.0 Ω and Xc was 32.7 ± 5.5 Ω.

Multiple regression models that minimize the standard error of the estimate (SEE) involved three variables: i) the ratio of height² over impedance (H^2/Z, in $cm^2.\Omega^{-1}$), ii) weight (W, in g), iii) gender (S) as a discrete variable (women = 0, men = 1).

Corresponding equations were:
at 50 kHz,

$$TBW (g) = 343.2\ H^2/Z + 0.175\ W + 2\,891.2\ S + 1\,925.3$$

$r^2 = 0.951$, SEE = 1 556.3
at 100 kHz,

$$TBW (g) = 339.9\ H^2/Z + 0.168\ W + 2\,638\ S + 1\,975.4$$

$r^2 = 0.955$, SEE = 1 490.0

In conclusion, specific equations were derived that describe TBW in the elderly from impedances at either 50 or 100 kHz. Precision (SEE) of TBW estimates with such models were 1 556 g (4.5%, 50 kHz) and 1 490 g (4.3%, 100 kHz).

Evaluation of weight gain composition using DXA in preterm infants fed HM fortifier or two different preterm formulas.

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Recently reproducibility, accuracy and precision of dual X-ray absorptiometry (DXA) measurements were determined in newborn piglets suggesting that bone mineral content and fat content could be easily evaluated in small subjects. Reference values were also determined at birth in preterm and term infants appropriate for gestational age ($n = 107$) with body weight ranging from 1 100 to 3 800 g. The aim of the present study was to evaluate the usefulness of DXA in determining weight gain composition in preterm infants.

Thirty-three preterm infants with a birthweight (1 315 ± 369 g) and a gestational age (30.3 ± 2.7 weeks) were enrolled in the present study. Infants were assigned to receive either HM fortifier or when formula feeding was indicated, one of two formulas PTFI (n = 13) or PTFII (n = 11) differing in their energy and mineral content.

Two DXA measurements were performed on each infant; the first DXA when full oral feeding was obtained and the second 3 to 4 weeks later. Weight gain and weight gain composition were determined by the difference in weight, BMC and fat between the two determinations ($DXA_2 - DXA_1$).

The results were close to the weight gain composition determined by metabolic and energy balance studies (Putet et al [1984] *J Pediatr* 105, 79-84; [1987] *Pediatr Res* 21, 458). Weight gain was significantly higher in the formula groups than in the human milk fortified group: 19.8 and 17.2 g/kg/day in the formula groups versus 15.5 g/kg/day in the HM group. Fat accretion was higher in the PTFI group than in the HMF group (4.5 vs 3.2 g/kg/day, respectively). Absolute BMC accretion (mg/kg/day) was similar in infants fed HM fortifier and those fed PTF1. With PTF2, this value was lower but not significantly. In contrast, the relative BMC accretion in percentage of lean gain or related to bone area increase appeared to be higher in the HM fortifier group than in the formula groups, suggesting that bone mineral accretion was higher with the HM fortifier than with the formulas.

In conclusion, DXA appeared to be a reliable technique to estimate weight gain composition in premature infants according to feeding but complementary studies are necessary to evaluate the relationship between

	n = 10 *HMF*	*n = 13* *PTF*	*n = 10* *PTFII*
Weight DXA_1 (g)	1 540 ± 230	1 502 ± 155	1 509 ± 253
Age DXA_1 (day)	23 ± 25	25 ± 17	23 ± 14
Weight gain (g)	651 ± 186	950 ± 245*	786 ± 263
Age gain (day)	23 ± 8	25 ± 8	25 ± 11
Weight gain (g/kg/day)	15.4 ± 2.6	19.8 ± 2.5*	17.7 ± 3.4
Lean gain (g/kg/day)	12.2 ± 2.3	15.3 ± 1.9*	14.2 ± 4.8
in % of weight gain	79.9 ± 8.2	77.4 ± 5.6	81.1 ± 9.7
Fat gain (g/kg/day)	3.16 ± 1.4	4.53 ± 1.47*	3.53 ± 1.8
in % of weight gain	20.1 ± 8.2	22.6 ± 5.6	18.9 ± 9.7
BMC gain (mg/kg/day)	290 ± 102	298 ± 76	235 ± 84
in % of weight gain	1.9 ± 0.7	1.5 ± 0.3	1.5 ± 0.6
in % of lean gain	2.4 ± 1.0	1.9 ± 0.5	1.7 ± 0.5*
Area gain (cm^2)	50.8 ± 21.1	73.4 ± 23.1*	59.4 ± 23.0
BMC gain/delta area (mg/cm^2)	250 ± 73	197 ± 39*	176 ± 47*

* $P < 0.05$ vs HMF.

BMC accretion and calcium retention in preterm infants.

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Growth and body composition of preterm infants: a longitudinal study from birth to 1 year of age. M Ouzzane, L Leke, G Krim, N Kalach, O Kremp, B Risbourg *(Pédiatrie II, CHU-Amiens, 80054 Amiens cedex, France)*

A study of growth and body composition in preterm infants (n = 45) was performed using anthropometric measurements until the age of 12 months corrected for prematurity. In order to determine the incidence and time of catch-up, they were compared to full-term infants (n = 35).

Body weight (g), height (cm), occipital frontal head circumference (cm) and mid-arm circumference (cm) were measured at birth, at 40 weeks, 4, 6 and 12 months gestation-corrected age by the same pediatrician. Body fat mass was calculated by adiposity indices (weight/height^3 x 100 at birth and weight/height^2 x 10 subsequently) and triceps skinfold thickness (mm). Lean body mass was estimated from upper arm muscle circumference (*AMC) and upper arm muscle area (**AMA), which were calculated from mid-arm circumference (MAC) and triceps skinfold thickness (TSKF) measured on the left midtriceps area by using the Holtain skinfold caliper.

Thirteen percent of preterm and 20% of term infants were breast-fed. Flour supplementation was observed in the second month for 90% of preterm and 76% of term.

We found a difference between preterm and term babies in weight and body mass index (BMI) at 40 weeks postconception; at 6 months, there were no significant differences. Descriptive statistics and estimated growth rates for weight, height, head circumference, plotted by sex, demonstrated greater rates of growth patterns in preterm infants in the first semester of life: weight gain: 770 ± 190 vs 650 ± 160 g/month; height gain: 2.84 ± 0.52 vs 2.74 ± 0.45 cm/month; head gain: 1.47 ± 0.26 vs 1.35 ± 0.13 cm/month ($P < 0.05$). However, the growth rate during the first year was less in preterm when compared to term infants. Muscle mass estimated by arm surface and area was not different at 6 or 12 months.

For BMI, we found that preterm infants with a low ponderal index (birth weight/length^3 x 100) less than the 10th percentile for age and sex experienced a higher growth rate that those with a ponderal index between the 10th and 90th percentile at 1 year: weight gain: 570 ± 90 vs 540 ± 80 g/month; height gain: 2.07 ± 0.3 vs 2.02 ± 0.25 cm/month; head gain: 1.03 ± 0.13 vs 0.91 ± 0.11 cm/month ($P < 0.05$). But despite this higher growth rate, preterm infants with low ponderal index still had a lower weight and BMI at 1 year of age. In term babies with low ponderal index (< P10) the postnatal growth rate at 1 year is lower than those with a higher ponderal index: weight gain: 400 ± 80 vs 606 ± 108 g/month ($P < 0.05$); height gain: 2.21 ± 0.3 vs 2.14 ± 0.2 cm/month (NS); head gain: 1.02 ± 0.17 vs 1.08 ± 0.17 cm/month (NS).

No correlation was detected between any of the infant feeding variables such as duration of breast-feeding, time of introduction of solid food and formula with the measures of growth rate or body composition.

* AMC(mm) = MAC – (3.14 x TSKF); ** AMA (mm^2) = [MAC – 3.14 (TSKF)]^2/4 (3.14).

Relationships between serum SHBG, body composition and dietary intake in premenopausal women. F Saint-Martin [1], S Dumoulin [1], I de Glisezinski [1], S Jamrozik [1], P Barbe [1], JP Thouvenot [2], B Perret [3], A Bennet [1], JP Louvet [1] *([1] Department*