Table 4.3. Nutrient and/or food intake studies in preschool age populations

Reference/ Study Name	Study Population	Diet Assessment Method	Objective and Design Overview	Nutrients and Outcomes Assessed
FOOD RECORDS (FR)				
Marshall et al., 2003 (114) Iowa Fluoride Study (IFS)	642 infants followed longitudinally through age 5 3 yrs = 441 4 yrs = 410 5 yrs = 396 49% M; 81% HHs with HS education; 13% income <$19,000. Iowa	3d Estimated FRs 1 weekend and 2 week days Iowa Fluoride Study (IFS) Questionnaire (includes beverage FFQ) with each Food Record	Objective: Longitudinal investigation of the relationship of dietary and non-dietary fluoride exposures and the relationship between fluoride exposures and dental fluorosis and caries. Design: Starting in 1992, parents mailed IFS questionnaire and 3d FR at 6 wks, 3, 6, 9, and 12 mo every 4 mo until 3 yrs. and then every 6 mo through 5 yrs. IFS questionnaire collected information on child's beverage intake, general health, and oral health behaviors. Dental examinations at 4 and 7 yrs. Supplement Intake: Questions on IFS questionnaire. Child Care Input: Not specified Instrument Selection Rational: Not specified	Energy intake and intake of 21 nutrients, dairy products, sugared beverages, and sugar-free beverages. Dental caries at 1, 2, 3, 4, 5 years.
Rogers et al., 2002; Emmet et al., 2002; Northsone et al., 2002 (109;111;112) Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC) Children in Focus (CIF) substudy	18 mo = 1,026 (77% response rate) 43 mo = 863 (69.1% response rate) UK	3d Estimated FR 1 weekend and 2 weekdays not necessarily consecutive	Objectives: To investigate food and nutrient intake in toddlers and preschoolers and to investigate the relationship between fat intake as a percentage of energy, and nutrient adequacy, growth, blood lipids, and iron status in 18- and 43-month-old children. Design: Parents sent FR one week before clinic visit. Mothers recorded all drinks consumed in a 3d FR and containers for drinks. Data analyzed for 1st 24h period. A capillary blood sample was taken at 18 mo for measurement of hemoglobin and ferritin levels. Non-fasting venous blood samples were taken at 31 and 43 mo and analyzed for total and high-density lipoprotein cholesterol. Supplement Intake: Not specified BM Intake: Record breastfeeding; 2.4% at least one BF at 18 mo Child Care Input: Not specified Instrument Selection Rational: Not specified	KCAL, CHO, starch, sugar, non-milk energy sugar, protein PUFA, MUFA, P:S ratio, cholesterol, 15 vitamins and minerals

Table 4.3. Nutrient and/or food intake studies in preschool age populations, continued

Reference/ Study Name	Study Population	Diet Assessment Method	Objective and Design Overview	Nutrients and Outcomes Assessed
FOOD RECORDS (FR), CONTINUED				
Sichert-Hellert et al., 2001 and 1998 (154;155) DONALD Study (Dortmunc Nutritional and Anthropometric Longitudinally Designed Study)	2-14 yrs = 787 49% M; 45% of parents have grammar school education and 39% hold university degrees. Germany	3d Weighed FR annually 24H urine collection on third day of recording	Objective: The DONALD Study is a cohort collecting detailed data on diet, metabolism, growth and development from healthy subjects between infancy and adulthood (once a year for subjects older than 2 yrs). (http://www.fke-do.de/donald.html) Design: Parents of children or older children kept 3d FR of all food and fluids consumed as well as leftovers using electronic scale. Product wrappers were kept. Dietary records evaluated with dietitian. In 75% of completed records more than 90% of food weighed. For external validation investigators calculate a ratio **(EI/BMR)** of the reported energy intake (EI) and estimated basal metabolic rate (BMR) on the basis of individual measured body weight and height. FRs with a Goldberg ratio of less than 1.06 excluded for implausibly low intakes. Dietary information of underreporters analyzed separately. For the direct validation of reported intakes by biomarkers: a) The **protein intakes** of the 3d Weighed dietary records were validated against total **nitrogen excretion** measured in the collected 24hr urine samples. b) Anthropometry-based creatinine excretion in valid 24hr urine samples should exceed 0.1 mmol per kg body weight per day Supplement Intake: Not specified Child Care Input: Not specified Instrument Selection Rational: Not specified	Energy and nutrient intakes (total vs. fortified), growth

Table 4.3. Nutrient and/or food intake studies in preschool age populations, continued

Reference/ Study Name	Study Population	Diet Assessment Method	Objective and Design Overview	Nutrients and Outcomes Assessed
FOOD RECORDS (FR), CONTINUED				
Skinner et al., 1999 (157)	2-5 yrs = 72 Followed longitudinally from birth until 60 mo Recruited with mothers; healthy, full-term white infants; 52%M; mothers >18yrs; 50% college degrees; middle or upper SES families. Tennessee, US	2d Estimated FR and 24HR interviews in home at 24, 28, 32, 36, 42, 48, 54, and 60 mo	Objective: To determine the nutrient and food intakes of healthy, white preschoolers from middle and upper SES families and to compare intakes to current recommendations. Design: In 1994-97, using incomplete random block design, mother-child pairs were interviewed longitudinally in mother's home, collecting 24HR, and food likes and dislikes. Mothers kept 2d FR. Supplement Intake: 24HR Child Care Input: Not specified. Instrument Selection Rationale: This combination of 24HR and 2 days of food records has been used in national studies such as CSFII.	Intakes of energy, carbohydrate, protein, fat, calcium, iron, magnesium, phosphorus, potassium, sodium, zinc, Vitamins A, D, E, K, C, B6, B12, thiamin, riboflavin, niacin, folate, and pantothenic acid. Introduction of complementary foods. Weight, length, and head circumference.
Boulton et al., 1995 (117) Adelaide Nutrition Study Cohort	4 yrs = 155 South Australia	3d Weighed FR	Objective: This study re-examined data collected in the 1980s on food energy and nutrient intake and somatic growth measured at intervals throughout infancy to 8 yrs. Design: Children randomly selected by birth order and followed longitudinally from birth to mid-teenage. At 4 yrs of age parents kept a 3d Weighed FR before annual visit. Supplement Intake: Not specified Child Care Input: Not specified Instrument Selection Rational: Not specified	Food energy, nutrient intake, and somatic growth.

Table 4.3. Nutrient and/or food intake studies in preschool age populations, continued

Reference/ Study Name	Study Population	Diet Assessment Method	Objective and Design Overview	Nutrients and Outcomes Assessed
FOOD RECORDS (FR), CONTINUED				
Singer et al., 1995 (156) Framingham Children's Study	3-4 yrs = 77 5-6 yrs = 86 7-8 yrs = 91 61% M; white; middle SES; 50% of mothers employed outside of home Framingham, MA.	3d Estimated FR Collected longitudinally for 6 yrs Y1 = every 3 mo Y2, 3, & 5 = every 6 mo Y4 & Y6 = every 12 mo	Objective: To compare the nutrient intake of children at 3-4 yrs of age with that in ages 5-6 and 7-8 yrs to determine whether nutrient intake tracked over time. Design: Intakes of 10 nutrients were estimated by means of multiple days of food diaries collected over a span of up to 6 yrs of follow-up for children in the Framingham Children's Study. All diaries collected during each of three age periods (age 3 through 4 yrs, age 5 through 6 yrs, and age 7 through 8 yrs) were averaged. Nutrient density intakes at each age period were compared. Supplement Intake: Not specified Child Care Input: Supplementary food intake information collected from other care givers Instrument Selection Rational: Not specified	Energy, protein, CHO, fat, SF, MUFA, PUFA, cholesterol, calcium, potassium, and sodium
24-HOUR RECALL (24HR)				
Aranceta et al., 2003; Aranceta et al., 2001 (151;152) enKid Study	2-5 yrs = 385 50% M; cross-section of population; total of 3534 children 2-24 yrs Spain	24HR and 164-item FFQ Repeat 24HR in 25-30% subsample	Objective: To analyze prevailing food patterns among Spanish children and young people and their relationship to sociodemographic and lifestyle factors. Design: Cross-sectional population survey. Supplement Intake: FFQ contained questions on supplement intake Child Care Input: Not specified Instrument Selection Rational: Not specified	Food groups, activity patterns

Table 4.3. Nutrient and/or food intake studies in preschool age populations, continued

Reference/ Study Name	Study Population	Diet Assessment Method	Objective and Design Overview	Nutrients and Outcomes Assessed
24-HOUR RECALL (24HR), CONTINUED				
Kohlmeier et al., 1998 (108) Russian Longitudinal Monitoring Survey	0-6 yrs = 746 48% M; recruited from a probability sample of 7,200 HHs Russia	24HR	Objective: Russian Longitudinal Monitoring Survey is designed to monitor social, economic, and health conditions in Russia using interview administered questionnaires, 24HR, and anthropometric measurements. This study evaluated iron sufficiency in the Russian diet. Design: In 1992 through 1994, four rounds of interviewer-administered 24HR of a nationally representative longitudinal survey of 10,548 women and children. Supplement Intake: Not specified BM Intake: Not specified Child Care Input: Not specified Instrument Selection Rational: Not specified	Total iron, heme, and bioavailable iron in diet.
Stein et al., 1991 (135) Columbia University Study of Childhood Activity and Nutrition	3-4 yrs = 181 47% M; 93 % Hispanic; 7% black New York, NY	7 24HRs Y1 = 4x Y2 = 3x	Objective: To examine intra-individual day-to-day variation in nutrient intakes and tracking nutrient intakes over time. Design: 24HRs administered to mother with 3-dimensional food models and measuring cups and spoons 7 times over 19 mo period. Supplement Intake: Not specified Child Care Input: Not specified Instrument Selection Rationale: 24HR has been validated in adult populations, but utility and limitations in preschool populations not well studied.	Tracking of nutrient intakes of participants over a 19 mo period. Energy, fat, SF, PUFA, cholesterol, protein, CHO, sodium, potassium, calcium.

Table 4.3. Nutrient and/or food intake studies in preschool age populations, continued

Reference/ Study Name	Study Population	Diet Assessment Method	Objective and Design Overview	Nutrients and Outcomes Assessed
24-HOUR RECALL (24HR), CONTINUED				
Webber et al., 1987 (118) The Bogalusa Heart Study	440 infants born 1/1/1974 through 6/30/1975 Followed longitudinally from birth through 7 yrs 48% M; 50% Black Bogalusa, LA	24HR on subsample @ 3 yrs (n=106) and 4 yrs (n=219).	Objective: To describe distributions, interrelationships, and trends over time for selected anthropometric measurements, BP levels, serum lipid and lipoprotein concentrations, and dietary intake patterns in longitudinal cohort from birth through 7 yrs of age. Design: Infants recruited at birth in 1974 and 1975. When children were 1, 2, 3, 4, and 6 mo of age, Infant Feeding Practices questionnaires mailed to parents. When the children were 6 mo and 1, 2, 3, and 4 yrs of age, replicate cardiovascular disease examinations were performed and 24HR on subsample. Supplement Intake: Multivitamin (Vi-Daylin F) provided as incentive. Child Care Input: Not specified. Instrument Selection Rationale: Not specified	Birthweight, any complications, Apgar scores, morbidity, serum lipid levels, length, weight, blood pressure, energy, and 11 nutrients.
FOOD FREQUENCY QUESTIONNAIRE (FFQ)				
Basch et al., 1994 (70)	3.6-5 yrs = 160 Hispanic; low-income New York, NY	Modified HFFQ 3x over a 1 yr period Interviewer-administered 3x @ 6 mo intervals Modified for 6 mo period; portion sizes changed for 24 foods; 10 common Hispanic foods added	FFQ administered to mothers three times for their own intakes and three times for their child's intake over 1 yr Child Care Input: Not specified Supplement Intake: Not specified	Mother's intake vs. child's intake for 10 nutrients and reproducibility for 3 mo vs. 1 yr.