

A SEMIPARAMETRIC TRANSFORMATION APPROACH TO ESTIMATING USUAL DAILY INTAKE DISTRIBUTIONS

by

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ABSTRACT

The distribution of usual intakes in dietary components is important to individuals formulating food policy and to persons designing nutrition education programs. Usual intake of a dietary component for a person is the long run average of daily intakes of that component for that person. Because it is impossible to directly observe usual intake for an individual, it is necessary to develop an estimator of the distribution of usual intakes based on a sample of individuals with a small number of daily observations on each individual. Daily intake data for individuals are nonnegative and often very skewed. Also, there is large day-to-day variation relative to the individual-to-individual variation and the within-individual variance is correlated with the individual means. We suggest a methodology for estimating usual intake distributions that allows for varying degrees of departure from normality and recognizes the measurement error associated with one-day dietary intakes. The estimation method contains four steps. First, the original data are standardized by adjusting for nuisance effects such as day of week and interview sequence. Second, the daily intake data are transformed to normality using a combination of power and graded polynomial transformations. Third, using a normal components-of-variance model, the distribution of usual intakes is constructed for the transformed data. Finally, a transformation of the normal usual intake distribution to the original scale is defined. The approach works well for a set of dietary components of varying distributional shapes selected from the 1985 Continuing Survey of Food Intakes by Individuals.