ESTIMATING USUAL FOOD INTAKE DISTRIBUTIONS
FROM 24-HOUR DIETARY INTAKE DATA

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ABSTRACT

The distribution of usual intakes for foods and other dietary components plays an
important role in formulating food policy, designing nutrition education programs, and
assessing risk of exposure to contaminants. The usual intake of a dietary component is
defined as an individual's long run average of daily intakes for that component. While it is
impossible to directly observe the usual intake for an individual, an estimator of the
distribution of usual intakes can be developed based on a sample of individuals with a
small number of daily observations on each individual. The estimator must accommodate
several characteristics commonly exhibited by daily intake data. For example, daily intake
data for individuals are nonnegative and often very skewed. There is large day-to-day
variation relative to the individual-to-individual variation, and the within-individual
variance is typically correlated with the individual means. In addition, food intake data
contain a high fraction of zeros arising from nonconsumers and consumers of the food
who were not observed to eat the food on given sample days.

A method of estimating usual intake distributions for food intakes containing
numerous zero observations will be presented. The approach allows for varying degrees
of departure from normality and recognizes the measurement error associated with 1-day
dietary intakes. The usual intake for an individual is specified to be equal to the usual
intake on days when the food is consumed multiplied by the probability of consumption.
The consumption day usual intake distribution is estimated using a modification of
methods developed at Iowa State University for frequently consumed dietary components.
An estimate of the joint distribution of the consumption day usual intakes and the
probability of consumption is then used to estimate usual intake distribution for all days.
The approach is illustrated using data collected in U. S. Department of Agriculture food
consumption surveys.