ESTIMATING THE INTAKE DISTRIBUTION OF A NUTRIENT DENSITY

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Heart disease, obesity, and other undesirable health outcomes are believed to be associated with the proportion of certain kinds of fat in the diet of individuals. Fat dense foods are those in which a relatively high proportion of the energy is provided by calories from fat. In practical terms, the proportion of calories from fat in the diet is obtained as the ratio of kcal from fat sources to kcal from all sources, and of interest is the distribution of intakes of proportion of calories from fat in a group. Thresholds such as 30% of calories from total fat have been established to indicate what is an "acceptable" level of fat intake. Researchers in this area are interested in the *usual*, or long-run average distribution of intakes of the fat density.

From a statistical viewpoint, estimating the distribution of usual intakes of fat expressed as a density is equivalent to estimating the distribution of a ratio of random variables, both of which are observed with (possibly heterogeneous) measurement error, and whose marginal distributions are non-normal.

We present a statistical approach to estimating the density of a ratio of random variables observed with measurement error, and apply the results to dietary intake data obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals conducted in the United States. We concentrate on children, and compare the resulting distributions estimated for overweight and for normal weight children.