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Household food and beverage purchasing

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To the Editor

In their article published in the December 2008 issue of the *Journal*, French and colleagues stated, “Currently, annotated receipts and records are the most comprehensive, detailed measure of household purchasing behavior, and are feasible for population-based samples. Universal Product Code scanning is not recommended due to its cost and complexity” (1). Given our experience with Universal Product Code (UPC) scanning technology (2–8), we respectfully take issue with these statements. As currently used, receipt annotations and UPC scanning are used to capture two different constructs: foods purchased vs foods in the home. A statement that UPCs are an inferior method for capturing purchases should be accompanied by a statement that receipt annotation is an inferior method for capturing foods in the homes. In addition, the receipt methodology requires extensive compliance from subjects, a large amount of processing and interpretation by trained personnel, and an unknown number of repeated measures in order to be comprehensive, which may not fully assess food acquisition. Each methodology has strengths and weaknesses, but overall we believe UPC scanning is the method of greater promise.

To collect data on food purchases using receipts, participants must be relied upon to collect, save, and deliver paper receipts to the researcher; but even more problematic is the fact that receipts are often printed with very few or no details concerning the nature of the purchase other than cost. Thus, the participant must carefully annotate each purchase. The receipt functions mostly as a memory prompt, not as a record. It is very likely that many individuals will not fully comply with the required rigorous involvement, and therefore the collection of data from a “population-based” sample is threatened. In comparison, UPC scanning technology avoids self-report and social desirability bias introduced by consumers annotating their own receipts, avoids errors introduced by missing or illegible handwritten annotations to receipts, and has a much lower participant burden. The burden of receipt annotation will reduce both data validity and subject recruitment. It is true that some

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individuals will consider allowing data collectors in their homes to assess foods an unacceptable invasion of privacy, but some people will feel the same way about researcher review of personal finance-related materials such as receipts.

After the collection of annotated food receipts from participants, investigators are faced with the task of transfer of the information to a database. Study staff must read and correctly interpret the annotated receipt, type in each food name, select the food from a list of several choices, and identify and select the correct package size. In contrast, UPC information is immediately stored in a database during a scanning process that takes 2 to 3 seconds to perform if the UPC already exists in the database and about 1 minute if information must be added to the database. As UPC databases become better developed, fewer items will need to be added, whereas there is currently no solution to the demands of data entry from receipts. Both methods can utilize computer programs to link the foods to nutrient and food category databases, and for both methods, the size of databases is practically irrelevant given today's computing resources.

The method described by French and colleagues for collecting data via UPC was based on a single feasibility study (9) using now-obsolete technology. Unlike older methods that stored UPC codes in the scanning device for later download at a remote location, current methods use bar code scanners that communicate immediately with a database accessed by software installed on a computer that is physically present at the data collection site (4). This method avoids device memory overload issues and data uploading errors. It also provides verification that the scanned UPC exists in the database or allows immediate rectification if the UPC code is absent (4,6).

French and colleagues. stated that, "UPC bar code scanners ... are only feasible for capturing food purchases from grocery stores" (1). It is true that to directly scan the UPC, the food must be appropriately packaged; however, many types of vendors (not just grocery stores) do sell foods with a UPC. Also, UPC methodology has evolved to allow the entry of foods that are not labeled with a UPC. It should be mentioned that not every food vendor provides a paper receipt. This can result in the omission of purchased foods from sources such as farmers' markets, food cooperatives, and food obtained through emergency assistance and food gifts. Also missed are food obtained through home gardening, fishing, hunting, gleaned, and gathering in the wild. In addition, foods purchased infrequently in bulk amounts (eg, staples such as flour, sugar, and oil and other foods packaged in large quantities by discounters) may not be captured.

UPC bar code scanning can be enhanced by collaborative links with industry (10). By creating a central repository of UPCs matched to their food name, package size, number of portions in the package, and nutrient content and making it available at a reasonable cost, industry could remove the major challenge faced by researchers who use this data collection method. Linking UPC: nutrient databases to UPC: pricing databases would allow the estimation of food costs by the UPC method. In addition, with UPC methodology participants can even scan their own purchases, which could be far less burdensome than annotation of receipts. Also, store records linked to shopper loyalty cards could be used to assess records. Nevertheless, we admit that *currently* receipts or other written records are

needed when cash expenditures on food are of most interest to researchers. In addition, when the research objectives extend beyond describing household availability, receipts can help describe foods purchased in retail eating establishments.

Although both methods have strengths and weaknesses, the salient point remains that UPC scanning methodologies rely much less on participant self-report than does receipt annotation. Diet methodology is saturated with methods that would be accurate and precise if only subject self-report were accurate and precise. Long experience has taught us it is not. The beauty of the UPC method of measuring home food availability is that self-report is refreshingly bypassed. It is a fact that the UPC methodology as currently available does not fully deliver on its potential. Complete databases for UPCs are not readily available, and better database linking methods are needed. Computer programs to reduce the UPC data to relevant food groups need to be further developed so that food groups, as well as nutrients, can be examined. Both UPC and receipt methods require substantial post hoc work to obtain complete, clean files, and this is often not fully captured in published reports. However, further data base development and data linking could greatly reduce these problems in UPC data. There is much work yet to be done on the UPC method for it to fulfill its potential, but we believe that once fulfilled, it will have strong advantages over the receipt annotation method.

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