

Review

Capturing the Spectrum of Household Food and Beverage Purchasing Behavior: A Review

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ABSTRACT

The household setting may be the most important level at which to understand the food choices of individuals and how healthful food choices can be promoted. However, there are few available measures of the food purchase behaviors of households and little consensus on the best way to measure it. This review explores the currently available measures of household food purchasing behavior. Three main measures are described, evaluated, and compared: home food inventories, food and beverage purchase records and receipts, and Universal Product Code bar code scanning. The development of coding, aggregation, and analytical methods for these measures of household food purchasing behavior is described. Currently, annotated receipts and records are the most comprehensive, detailed measure of household food purchasing behavior, and are feasible for population-based samples. Universal Product Code scanning is not recommended due to its cost and complexity. Research directions to improve household food purchasing behavior measures are discussed.

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A large proportion of individual daily food choice occurs in household food environments (1,2), and can include foods purchased at grocery stores, supermarkets, restaurants, fast-food places, coffee shops, convenience stores, and department stores. Household food purchasing behavior is important to measure because it contributes to understanding potential important influences on individual energy intake and dietary quality, and possibly excess weight gain and obesity (3-6). Household food purchasing behavior is an intermediate level of influence between the neighborhood retail food environ-

ment and individual dietary intake. It may exert direct effects on individual intake through food exposure and availability (3-8), and indirect effects through its role as a mediator of the neighborhood retail food environment (4-8). Community, household, and individual level influences and interventions can be better understood if household food purchasing behavior can be described and measured with fidelity.

To reflect this broader conceptualization, we use the term "household food purchasing behavior." Household food purchasing behavior refers to all foods and beverages purchased by a household from all sources, including grocery stores, restaurants, convenience stores, coffee shops, and department stores. One reason for this more inclusive definition of household food purchasing behavior is the household shift from purchasing foods from grocery stores and eating home-prepared meals to purchasing prepared foods from full-service and fast-food restaurants, coffee shops, and other stores. This has been a major trend in the United States during the past 2 decades (1,2,9,10). In 2000, almost half of US household food dollars were spent at eating out food sources (11). It is estimated that by 2010, 53% of US household food dollars will be spent at eating out food sources (11). About 57% of US adults eat away from home on any given day (9). Food eaten away from home comprises about 25% or more of daily energy intake (9).

Household food environments have been measured in previous research using home food inventories, food purchase records, grocery store receipts, and bar code scanners (12-24). Despite the important role that eating out plays in individual-level food choices and dietary quality, no household-level measure is available to determine the proportion of home food purchases or to gather information about the types of foods and beverages purchased from eating-out sources (1,2,25). Quantitative information about the amounts of food and beverages purchased has not been captured by current home food inventories or receipt measures. Purchasing patterns (ie, food sources and types) and variability over time for purchases of key food categories have not been captured with previous measures. These are important dimensions to measure so that the patterns and sources of food and beverage purchasing that relate to individual dietary quality and body mass index can be identified, quantified, and measured reliably and validly. Thus, although household food purchasing behavior is a key concept to understand individual food choices, very little research has been done to develop reliable and valid measures of household food purchasing behavior.

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We reviewed the currently available measures of household food purchasing behavior, including home and eating out food sources. We included studies that measured only food availability or food purchases, studies that attempted to validate home food availability or purchases, and studies that examined associations between food purchases and individual dietary intake. Measurement issues, strengths, and limitations of each measure, and research recommendations are discussed following the review of the different types of household food purchasing behavior measures.

Our review has minimal overlap with a recently published review of home food inventories and self-report checklists to assess food availability in the home (12). That review included only home food inventories, and did not include receipts and scanning studies. It also included measures of the perceived home food environment. We did not include studies of the perceived home food environment or studies that refer to indefinite time periods, usual availability, or perceived frequency of availability. Eighteen studies were included in the review and are summarized in the Table.

METHOD OF ARTICLE SEARCH

Articles were located using a computerized search of the databases MedLine, PsychInfo, and ISI Web of Science from 1990 to 2007. Key words included home, food, UPC, barcode, food purchase, scanners, household food, receipts, tills, shelf inventory, pantry, register tapes, and food inventory. In addition, reference lists from key published articles were reviewed for relevant articles. Inclusion criteria for this review were that the research had to include a measure of foods and beverages currently available in the home or purchased. The measure could be an on-site observation by trained research staff or by the household participant, or it could be a self-report by the household participant to the research staff. Food sources could be grocery stores, other food stores, restaurants and other eating out food sources.

HOME FOOD PURCHASING BEHAVIOR MEASURES

Home Food Inventories (HFIs)

HFIs have been used to describe the cross-sectional availability of certain foods and beverages in the home environment at a single point in time and are completed either by the participant or by a trained research staff person. Inventory studies have either attempted to capture all of the foods in the home, or else have focused on certain subsets of food types (eg, fruits and vegetables or high-fat foods). Seven studies (six American, one Italian) were located that used HFIs (see the Table). To capture all of the foods and beverages in the home environment, Crockett (13) developed an 80-item shelf inventory as part of an evaluation of a community-based nutrition intervention. The HFI was mailed to a random sample of 50 households recruited from a telephone directory. Foods were checked as present or absent in the household. Quantities were not recorded. Eating out foods were not measured. A research staff person visited the home to complete a second HFI within 3 hours of the participant's completion of the HFI. Using the researcher-completed

HFI, sensitivity and specificity of the foods at the item level were calculated (26) and found to be high when comparing the household and researcher completed inventories (0.86 and 0.92, respectively).

A similar study examined the validity of an HFI among older adults with type 2 diabetes (15). The HFI included all food and beverage items in the household. Eating out foods were not measured. Food items were coded as present or absent, and no quantitative information was collected. For the overall inventory summary of items, sensitivity was 0.90 and specificity was 0.97, based on comparison of participant and research staff inventories. Food categories varied in their sensitivity and specificity, however all values were high and ranged from 0.79 to 0.99.

A comprehensive study of household food purchasing behavior was conducted in Italy among 1,147 households (19). The study purpose was to describe Italian national food consumption patterns in the four main geographic regions in Italy. This study is notable in its use of multiple data collection methods (home food inventory and food purchases) and observers (trained research staff and household participants). The research staff person visited the household to conduct an HFI that included weighing the foods in the cupboards at the beginning and end of the 7-day survey week. The primary shopper recorded all foods purchased during the 7-day survey week, quantities, prices, and food wastage, and recipes used to prepare home foods that week. Foods prepared at home and foods consumed away from home were included. The coding of the home food items and eating out foods was not described in detail.

Other studies using HFIs have focused on capturing the home availability of a specific food category such as fruit and vegetables (16,17) or high-fat foods (14).

Based on the limited available data, HFI measures that include a broad range of foods appear to be feasible to complete and show reasonable validity. Although only two validation studies were located that compared household-reported and researcher-reported food inventories, average sensitivity across food categories was 0.88, and average specificity was 0.93. A third validation study that was specifically limited to fruit and vegetable availability in the home reported lower values (average sensitivity was 0.39 and average specificity was 0.36). However, the time frame for the participant-reported inventory and the researcher home observation was different. Overall, little research has been done to validate HFIs, especially those that measure a single food group. Several measurement issues have been identified, but have not been further examined in the research to date. These measurement issues are discussed in detail later in the section Household Food Purchasing Behavior Measurement Issues.

Records and Receipts of Food Purchases

A second method to measure household food purchasing behavior is the collection and annotation of food and beverage purchase receipts, or the recording of all household food and beverage purchases using a structured data collection form and protocol over a 1-week or longer time period. Food record studies are similar to the receipt studies in their focus on capturing household foods pur-

chased over a defined time period. This method differs from home food inventories in that it provides information about the flow of foods through the home over a defined time period, rather than providing only a cross-sectional snapshot of current foods in the home. The focus of household food purchase studies to date has been on purchases from supermarkets and grocery stores. We were unable to locate any published studies that used receipts to describe household food and beverages from restaurants, fast-food places, convenience stores, or other nongrocery stores that sell food, such as department stores. Five studies (all European) using records and four studies (two in the United Kingdom, two in the United States) using receipts were located. No validation studies for food purchase records or receipts were located.

The most comprehensive food purchase record studies are from household consumer expenditure studies, or household budget surveys (27,28). These national surveys are collected at regular intervals by several European countries to estimate price indexes, but they also provide detailed data on household food purchasing patterns (27-34). In household budget survey studies, households are instructed to keep a detailed record of all household expenditures over a defined time period. A standard set of forms and data collection protocol is used to collect data from households. Detailed food expenditure data are recorded by households, including home (grocery store) and eating out purchases and prices. These data allow for cross-country comparisons of food expenditures among households. For example, the Data Food Networking initiative is a multicountry study that pooled and analyzed nationally representative household food expenditure data from the household budget surveys of several European Union countries (27,28). The purchase per day per person of food groups was calculated. Details of the methodology are available (29,30).

Household food expenditures data have been used to examine associations with individual dietary intake within households. For example, Sekula and colleagues (31) compared household food expenditures with household individual measures of dietary intake among 1,215 households in Poland. Twenty-one aggregated food categories from household budget surveys and individual measures of dietary intake showed good agreement levels for vegetables, potatoes, meat, meat products, poultry, and animal fats. A similar study was conducted in Sweden in which household food purchase data were collected among 2,079 households for a 4-week period (32). For both of these studies (31,32), differences in the time period covered for food purchases and for the individual recall, as well as food preparation wastage and foods purchased and consumed from away from home sources may explain some of the discrepancies between household- and individual-level dietary measures.

Another study examined associations between household food purchase data and individual dietary intake within the household using pooled data from four countries (33). The purpose was to evaluate whether household-level purchase data could be used as a proxy for individual intake. This study was the only study located that examined agreement between household purchase and individual intake separated by the frequency of purchase of the specific food group. For example, food groups

were classified as rarely purchased foods purchased by <10% of the households (n=65 foods/food groups), commonly purchased foods purchased by 30% to 70% of households (n=115 foods/food groups), and very commonly purchased foods purchased by more than 80% of households (n=11 foods/food groups). Individual consumption of the rarely purchased foods were more accurately predicted from the household purchase data than the frequently purchased foods, but consumption of most food groups was estimated within $\pm 15\%$ using the household purchase data. The interesting point about the analysis is the effort to examine differences in frequency of food purchases and how this relates to measurement issues (see Household Food Purchase Behavior Measurement Issues).

The studies using food record data from national household budget surveys have several advantages as a methodology for measuring home food purchasing behavior. Detailed data at the household level on specific foods purchased, quantities, prices, and sources are collected using a standardized protocol and data forms, and data are collected over an extended time period. Data are collected at the food-item level, and so can be aggregated into food groups or disaggregated into nutrients for analysis. The population-based sampling frames typically yield a sample that includes large numbers of households that represent a diverse range of income and education levels, configurations of adults and children, and geographic regions. Receipt studies at the household level use a similar methodology to the household budget survey food record. Receipt studies, unlike the food record expenditure studies, require households to turn in the food purchase receipts along with the annotation sheets. Food annotation records are thus enhanced in receipt studies by the addition of an objective record of the foods purchased. Receipt studies typically are smaller in the number of households included and encompass a localized geographic area. Receipt studies have included descriptive data on household food and beverage purchases, including foods, quantities, prices, and sources. Some have included comparison with individual dietary intake surveys collected contemporaneously with the household food purchase receipts. These studies are described below (20-22).

Rankin enrolled 105 shoppers who purchased at least 20 items per week from a regional grocery store chain (20). Shoppers collected and annotated receipts from all grocery store food and beverage purchases (not including restaurants) for an average of 8 weeks and were paid \$5 per week for the receipt collection. Receipt foods were coded into one of 11 categories, and the categories were analyzed using a nutrition database. Despite the lengthy time period for receipt collection, receipts were annotated and sent to the researchers with little prompting of participants. Limitations of this method that were noted by the authors included lack of information on food and beverage purchases from non-grocery stores, potential changes in food and beverage purchases that might result from the receipt collection process itself, and the issue of large purchase quantities or bulk purchases that could potentially skew the data. This study provided interesting data to show the feasibility of the receipt collection method, demonstrating that people can and will complete

Table. Studies that explore various household food purchasing behavior measures								
Measurement method	Sample/country	Who collects	Time span covered	Food items measured	Away foods?	Data aggregation^a	Validation	Comparison with individual dietary intake?
Inventory								
Marsh and colleagues, 2003 (17)	48 HH ^b US	PPT ^c	Past week	34 fruit/vegetable items	Not measured	Sum score	Researcher site visit	No
Miller and Edwards, 2002 (15)	31 adults with diabetes US	PPT	Current	166 food items	Not measured	14 food categories	Researcher site visit	No
Satia and colleagues, 2001 (18)	244 adult Chinese women US, Canada	PPT in-home interview	Current	14 high-fat and 7 reduced-fat foods	Not measured	Item-level present (yes or no)	None	Yes Fat-related eating behavior score
Turrini and colleagues, 2001 (19)	1,147 HH Italy	PPT and researcher	Past 7 days	All foods	Total amount of each dish was recorded	65 food categories	None	Yes 7-day food diary, each household member
Hearn and colleagues, 1998 (16)	13 HH US	PPT	Past week	10 fruit/vegetable items	Not measured	Sum score	None	No
Patterson and colleagues, 1997 (14)	1,002 HH US	PPT	Current	15 high-fat foods	Not measured	Sum score	None	Yes Quick dietary screen estimate of percent energy from fat
Crockett and colleagues, 1992 (13)	50 HH US	PPT	Current	80 foods	Not measured	Item-level present (yes or no)	Researcher site visit	No
Records								
Ricciuto and colleagues, 2006 (35)	9,969 HH Canada	PPT	2 weeks	All foods	Recorded weekly; no detailed information	17 food categories	None	No
Sekula and colleagues, 2005 (31)	1,215 HH Poland	PPT	1 month	All foods	Only cost was recorded	20 food categories	None	Yes 1-day dietary recall for each HH member
Becker, 2001 (32)	2,079 HH Sweden	PPT	1 month	All foods	Only cost was recorded	18 food categories	None	Yes 7-day food record
Lambe and colleagues, 1998 (33)	19,069 HH Sweden, Netherlands, UK, Ireland	PPT	7 days-1 month	All foods	Not measured	60 food categories; 80 food categories; 89 food categories; 90 food categories	None	Yes 7-day food record
Nelson and colleagues, 1985 (34)	82 HH UK	PPT	7 days	All foods except alcohol, soft drinks, sweets	Not measured	Nutrient-level	None	Yes 7-day food record
Receipts								
Cullen and colleagues, 2007 (36)	107 HH US	PPT	6 weeks	All foods	Not measured	15 food categories	None	No

(continued)

Table. Studies that explore various household food purchasing behavior measures (continued)								
Measurement method	Sample/country	Who collects	Time span covered	Food items measured	Away foods?	Data aggregation ^a	Validation	Comparison with individual dietary intake?
Ransley and colleagues, 2001 (21)	105 HH UK	PPT	28 days	All foods	Not measured	Nutrient-level	None	Yes 4-day food record each household member
Rankin and colleagues, 1998 (20)	223 HH UK	PPT	6-10 weeks	All foods	Not measured	11 food categories	None	No
DeWalt and colleagues, 1990 (22)	50 HH US	PPT	2 weeks	All foods	Recorded in food log	8 food categories	None	No
Scanners								
Weinstein and colleagues, 2006 (23)	32 HH US	Research staff	Current	All foods	Not measured	Item-level	Researcher site visit	No
Baxter and colleagues, 1996 (24)	2 community markets US	Supermarket	Current	All foods	Not measured	Item-level	None	No

^aAggregation level that was reported in the publication.
^bHH=households.
^cPPT=participant.

the receipt collection and annotation for a significant duration without high levels of investigator prompting or large financial incentives.

Ransley and colleagues (21) enrolled 223 households in a receipt data collection study. Households were instructed to collect and annotate food and beverage receipts for a 28-day period. Food purchases from grocery stores without receipts were recorded by the household diary keeper in a food log. A 4-day food diary was completed for each individual person in the household. A separate record was kept for recording food eaten outside the home. However, the coding and analysis of these data are not further described. Results showed high agreement between the grocery receipt and individual food record data for energy ($r=0.77$).

Two smaller US studies collected grocery store receipts (22,36). In the first study (22), consistent with the experience of Rankin and colleagues (20), the receipt data collection protocol was well-adhered to by the households. The second study (36) reported a 64% adherence rate to the receipt data collection protocol.

The results of the studies of food and beverage purchase receipts share a common approach to capturing, coding, and analyzing the receipt data. The first three studies (20-22) noted that the receipt data collection protocol, including annotation, was well followed by participants with little prompting from the researchers for the receipt returns. The studies developed similar food categories to capture the receipt food and beverage purchases. However, food and beverage categories need to be developed to capture the specific research questions at hand.

Universal Product Bar Code (UPC) Scanners

UPC scanner studies measure home food and beverage purchases and are the least studied of the three measures reviewed here. In principle, the measurement of household food purchases from stores could be greatly enhanced by the use of UPC scanners. The scanning can be accomplished quickly with minimal training of participants. Participants use a handheld device to scan the UPC code on packaged foods. Random-weight products such as fresh produce can be scanned using a generic or preprogrammed UPC code. The UPC codes are stored in the handheld device during the data collection period, and afterward are downloaded by the researchers as an electronic data file. The foods and beverages purchased can be uniquely identified and aggregated at several levels and according to the research question of interest. The scanners may minimize social desirability bias and may enhance the collection of complete data during the measurement period if they reduce participant burden by eliminating or reducing the time needed for recording or annotating food purchase records or receipts.

Only two UPC studies were located in the literature that examined grocery store food purchases at the household level (23) or at the grocery store level (24). The only study located that used UPC bar code scanners to describe home food purchases was a feasibility study that examined agreement between researcher-scanner and researcher-observed home food inventories among a sample of 32 lower-income families (23). Comparisons were made between the scanner and the HFI for the amount of time to complete the measure, and for the food and bev-

erage items recorded. Scanners were the faster of the two measures (scanners 44 minutes, HFIs 64.5 minutes). Scanners agreed with the HFI for 95% of foods. The primary disagreements were lack of UPC scanning for items such as leftover foods and foods that did not have a UPC code. Technical difficulties with the scanner also represented a limitation of this method. A majority of the data collected was lost due to scanner memory limits and data uploading errors.

Scanners present several significant challenges for their use in community-based nutrition studies. For example, the databases that store the UPC codes must be large and need to be updated on a continuous basis to accommodate new foods introduced into the market and to remove foods that are no longer on the market. Foods and beverages must be linked to nutrition information if any assessment of energy, fat, or other nutrients is to be conducted. Food and beverage items must be coded at some level of aggregation to present a meaningful characterization of the home food purchases. These aggregate categories will vary from study to study, depending on the focal research question. The potential for UPC bar code scanning may be enhanced by collaborative links with industries that may have the resources to maintain the UPC databases. Bar code scanners also do not capture restaurant and fast-food restaurant purchases. An attractive feature of the UPC codes is that detailed information on branded items is available. However, for research purposes the level of information of interest is often the food group, not the food item. This means that individual food items are aggregated into food categories for analysis. If the endpoint data of interest are food categories and not specific food items, then the amount of time and effort needed to maintain the UPC food database may not be worth the cost if other less expensive methods are available to provide data at the food category level.

HOUSEHOLD FOOD PURCHASE BEHAVIOR MEASUREMENT ISSUES AND RESEARCH RECOMMENDATIONS

The three measures described in this review illustrate the current state of the science for measurement of household food purchasing behavior and offer a range of household food purchasing behavior data collection opportunities. Several important methodological issues need to be considered carefully when selecting a measure of household food purchasing behavior and in developing the next generation of research studies in this area.

Capturing Grocery Store and Eating Out Household Food Purchases

By its very nature, the HFI method will only capture foods that were brought into the home hence will not capture eating out foods. UPC bar code scanners similarly are only feasible for capturing food purchases from grocery stores. Receipt and record collection methods have the potential to capture eating out food purchase data, but to date have focused solely on grocery store food and beverage purchases (19-22,31,32). Nevertheless, the best available method for capturing household purchase of eating out foods appears to be the annotated receipts or records method.

Capturing the Current Home Food Environment vs the Flow of Food Purchases over Time

A second important methodological consideration in measuring household food purchasing behavior is the time window included. Receipt data have been the most widely used household food purchasing behavior measure to capture the flow of food purchases over time. Data collection periods range from 2 to 10 weeks. Collected at one or more time points over a period of months, receipt data provide a large sample of home food and beverage purchase data that can more reliably characterize the stable and fluid aspects of household food purchasing behavior. HFI measures are usually limited to a single cross-sectional snapshot of the currently available foods and beverages in a home and are thus not able to capture the flow of foods through a home, unless multiple HFIs are collected over time. The HFI also may be influenced by the timing of the HFI collection relative to the recency of a major grocery shopping trip. UPC scanner measures also have the potential to provide food and beverage purchase data over longer time periods. However, UPC scanner measures do not capture eating out purchases, and new codes must continually be created to capture foods not in the database.

Variability of Specific Food and Beverage Purchases within Households

The variability of household food and beverage purchases is an important issue to consider in reliably capturing household food purchasing behaviors but little is known about this area. Variability in household food and beverage purchases occurs at multiple levels. Variation within and between households in the frequency with which they shop at the supermarket or grocery store, or other food stores, and in the frequency with which they purchase food and beverages from restaurants, fast-food places, and other types of stores that sell food will affect the number of weeks of food purchase data needed to estimate foods or food groups. Households vary in the types of foods they purchase, at the item level (eg, potato chips), and at the category level (eg, prepackaged snack foods). The number of days or weeks needed to provide food and beverage purchase estimates may vary depending on the target food or beverage item.

A comparison with dietary recall estimates is instructive. The number of days of dietary recalls needed to estimate an individual's total energy intake is much fewer than that needed to estimate intake of specific foods or specific nutrients, because total energy intake is less variable than intake of any specific food (37-41). Each level of variability needs to be understood to better determine the number of days or weeks of data needed to provide reliable estimates of the home food purchases.

Levels of Aggregation of Food and Beverage Purchases

A major methodologic challenge when working with household food purchasing behavior measures is how best to represent the data, both the dimensions of the foods and beverages, and the level at which the data are aggregated. To address the immense quantity of data that result when a complete census of food and beverages is

recorded, researchers have frequently selected a subset of foods and beverages on which to focus data collection measurements (eg, fruits and vegetables or high-fat, energy-dense foods). This approach foregoes the recording of items unlikely to be of interest to the focal research question. Although limiting the range of foods captured improves feasibility of measurement, the problem of examining purchase and spending totals or proportion of total food spending results when a universe of food purchases is not measured. Obtaining a denominator for a reference point of comparison is a particular challenge when exhaustive food purchase measures are not collected.

The question of level of aggregation is particularly important in developing measurement and analysis methods for eating out foods. Frequently entrees and meals are purchased that include multiple food items and side dishes. Receipts may have little detail about the foods and beverages included in entrée orders or in bundled meals. Complimentary foods such as bread, soups, or side salads may not be captured. Further work is needed to determine whether a similar or different approach is needed to the coding and aggregation of eating out food and beverage purchases.

Validation of Measures of Home Food Purchasing Behavior

Only two studies were located that validated a household food purchasing behavior measure (13,15). Both studies validated the HFI measure. Validation was accomplished by comparing the participant's report of home food availability with a site visit by the trained research staff at a time point proximal to the participant's completion of the measure. No validation has been reported for food purchase receipts, records, or bar code scanner methods. The strongest method of validation for each method is not clear. For a food receipt or record, the entity to be captured is the universe of food and beverage purchases over a defined time period. No known method is available to determine whether all food purchases have been measured. Collection of household food purchasing behavior data using two or more methods may be the best approach to validation. Receipt collection in tandem with multiple HFIs could be used. Ecologic momentary assessment measures could also be collected to measure each individual's food purchases during a defined time period (42). However, other than direct observation of each household member, there may be no method to validate household food purchases. Comparison of HFIs, receipts, and scanned items with individual-level dietary intake does not comprise a household food purchase validation because it compares foods purchased at the household level with individual level dietary intake. The former is a measure of the universe of foods purchased by the household; the latter is a measure of individual intake from all food sources.

CONCLUSIONS

The choice of method for measuring the household food purchases in a research setting depends on the research question of interest and the feasibility of obtaining quality data. The available studies are limited in terms of lack of control for confounders, including household socioeconomic status, number of people and configuration of the

household, and neighborhood availability of food retail stores. However, available data clearly show that annotated receipt collection and food purchase records provide the most detailed data on household food purchases, with the potential to capture both grocery store and eating out sources over a multiweek time period. This method also captures food quantities and prices. However, food records and receipts require motivated participants to obtain detailed quality data. HFIs, by contrast, can be a simple, quick, and efficient method to capture home food purchases and appears to validly capture food items self-reported by household members. HFIs can be used at a single time point or repeatedly over time. The major drawback of HFIs is their inability to capture foods purchased from eating out sources. Inventories also do not provide information on food expenditures or food quantities, although these easily could be added to the inventory form.

Researchers should consider whether information on food purchases other than grocery store sources is needed, as well as whether the research questions involve issues related to food expenditures. Interventions that focus on changing household shopping behaviors are best served using the annotated food purchase receipt method over a 2- to 4-week time period. This method could also be applied in clinical settings to describe household food purchase behaviors, develop interventions and track changes over time to provide feedback about progress in changing household food purchase patterns. Consideration of participant and researcher burden on both the front end (data collection) and back end (data coding and analysis) is important when choosing a household food purchasing behavior measure.

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