RESEARCH
Commentary

A Need for Empirical Evidence Concerning the Accuracy of Joint Parent–Child Reports of Children's Dietary Intake

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THE 24-HOUR DIETARY RECALL IS AMONG THE MOST trusted of dietary assessment methods[1] and considered optimal for collecting dietary data.[2] By providing high-quality intake data with minimal bias, the 24-hour dietary recall is the preferred tool to monitor diets of populations and to study diet–disease associations.[3-5]

Although 24-hour dietary recall data collected from adults can be reasonably accurate, the accuracy of 24-hour dietary recall data collected from children is less so. One approach to collecting 24-hour dietary recall data about children's intake has been joint recalls—interviewing a child and parent together about the child's intake. Joint recalls are used widely, yet policy makers, researchers, and practitioners seem to have overlooked the sparse research concerning the accuracy of joint recalls. This commentary summarizes the use of joint recalls in national dietary surveys, discusses past research on joint recalls, provides new descriptive analyses of 24-hour dietary recall data about children's intake from national surveys to identify issues about joint recalls, and identifies research needs.

USE OF JOINT RECALLS IN NATIONAL DIETARY SURVEYS

For many national dietary surveys that include child respondents, those child respondents are assisted by parents in providing 24-hour dietary recalls. Joint recalls have been used in the National Health and Nutrition Examination Survey (NHANES),[6-20] Continuing Survey of Food Intakes by Individuals,[21-23] and School Nutrition Dietary Assessment Studies.[24-26] For these surveys, the child's age is used to determine who of the child and parent is the primary respondent and who assists. For example, since 2002, for children aged 6 to 11 years, NHANES has used joint recalls[7-19]: for children aged 6 to 8 years, the parent is the primary respondent and the child assists; for children aged 9 to 11 years, the child is the primary respondent and the parent assists. For children aged younger than 6 years, proxy interviews (usually of a parent) are used; children aged 12 years and older are interviewed alone.[7-19] Although children's age is used to assign respondent roles for NHANES joint recalls, NHANES procedures manuals for interviewers surprisingly have cited no empirical justification for the specified child age cut points.[7-19] Furthermore, despite the continued use of joint recalls of children's intake in national surveys, no survey[6-26] has cited empirical justification for their use, or for the supposition that joint recalls of children's intake are more accurate than child-only recalls would be.

PAST RESEARCH ON ACCURACY OF CHILDREN'S INTAKE AS REPORTED IN JOINT, PARENT-ONLY, AND CHILD-ONLY RECALLS

Sparse research compares the accuracy of children's intake as reported in various recall types—joint, parent-only, and child-only. Only one study, published in 1989 by Eck and colleagues,[27] validated joint recalls (referred to as "consensus" recalls by Eck and colleagues). Comparing joint recalls—by mother, father, and child together—of a single meal eaten by children aged 4 to 9.5 years to recalls by mother or father alone, Eck and colleagues concluded that joint recalls better reflected observed intake of that meal than did recalls by mother or father alone. Although the study by Eck and colleagues has been cited as evidence for using joint recalls, two aspects of their design raise concern about the validity of their conclusion that joint recalls are the optimal way to obtain information about children's intake: First, the design did not include child-only recalls; thus, Eck and colleagues could not assess the possibility that child-only recalls could be more accurate than mother-only, father-only, and/or joint recalls. Second, recall type was confounded with recall order: Eck and colleagues obtained joint recalls after mother and father provided their individual recalls; as back-to-back recalls may function like successive passes in prominent 24-hour dietary recall multiple-pass protocols,[28-30] the initial solo recall may have inflated accuracy of the subsequent joint recall. Two other aspects of the study by Eck and colleagues limit the generalizability of its conclusions: First,

the observed lunch may have been more memorable than usual meals because it was obtained and eaten in a special setting (college cafeteria) with parents and child present. Second, study participants were a convenience sample of 34 children and parents, a single race, and middle-to-upper socioeconomic status. Given these four concerns, the study by Eck and colleagues should be viewed, at best, as weak evidence for joint recalls as the optimal method to obtain information about children's dietary intake.

Only two small studies have examined reporting accuracy of child vs parent. One study[31] compared accuracy of energy intake of nine children aged 8 to 11 years reported by food frequency questionnaire (FFQ) to total energy expenditure from doubly labeled water and parent-completed weighed food records. Mother, father, and child independently completed an FFQ of the child's intake. Children's FFQs were most accurate; FFQs by fathers were more accurate than FFQs by mothers.[31] Another study[32] compared accuracy of recall of a previous-day school lunch by 25 children aged 6 to 8 years to parents' reports and teachers' records, all of which were validated by the duplicate-plate method. Children's recalls were more accurate than teachers' records. Only four parents knew what foods children ate for school lunch; no parent could report quantities eaten.[32] Neither study included joint recalls. Given this evidence that children reported more accurately than parents, joint recalls may not be more accurate than child-only recalls.

ANALYSES OF 24-HOUR DIETARY RECALL DATA FOR CHILDREN AGED 6 TO 12 YEARS FROM NHANES 2003–2014

Due to the sparse research comparing accuracy of children's intake by recall type, this section presents descriptive analyses of NHANES 2003–2014 24-hour dietary recall data for children aged 6 to 12 years; from these analyses, issues were identified about the use of joint recalls with children ages 6 to 12 years. The data are available in public use files; the University of South Carolina's Institutional Review Board deemed the analyses exempt.

Each NHANES respondent was to be interviewed twice, with the first interview conducted in person and the second by telephone 3 to 10 days later.[7–19] For children of each age (6 to 12 years), for each 24-hour dietary recall (first, second) we tabulated:

- recall type—child (if the only respondent was a child), joint-adult (if a joint recall's primary respondent was an adult), joint-child (if a joint recall's primary respondent was a child), proxy (if the only respondent was a proxy, typically a parent);
- reported breakfast type—no breakfast reported, only school breakfast reported, only non-school breakfast reported, both school and non-school breakfast reported;
- reported lunch type—no lunch reported, only school lunch reported, only non-school lunch reported, both school and non-school lunch reported; and
- intake day—weekday, weekend day.

For the NHANES years analyzed, the data included a first 24-hour dietary recall for 7,529 children and a second 24-hour dietary recall for 6,590 of these children (87.5%).

Table 1 (available at www.jandonline.org) shows the number of 24-hour dietary recalls, for the first and second 24-hour dietary recalls separately, by children's age, recall type, breakfast type, and lunch type. The first and second 24-hour dietary recalls were uniformly distributed over age (approximately 14% per age). Table 2 (available at www.jandonline.org) shows the number of 24-hour dietary recalls, for the first and second 24-hour dietary recalls separately, by recall type, children's age, and intake day. Intake weekdays and weekend days were represented in the first and second 24-hour dietary recalls for each recall type and age level; thus, intake day was not considered further.

Four issues were identified concerning joint recall use for intake of children aged 6 to 12 years:

- Issue 1—numbers of 24-hour dietary recalls by recall type and age differ for the first and second 24-hour dietary recalls;
- Issue 2—recall type as a source of school-meal intake data differs for the first and second 24-hour dietary recalls;
- Issue 3—mean school-meal kilocalorie intake varies by recall type, and differs between the first and second 24-hour dietary recalls; and
- Issue 4—mean 24-hour kilocalorie intake that included school meal(s) varies by recall type, and differs between the first and second 24-hour dietary recalls.

For Issues 2 to 4, which concerned school meals, greater than 95% of intake days were weekdays for the first and second 24-hour dietary recalls (data not shown). The following paragraphs discuss the four issues more fully.

For Issue 1, as Figure 1 shows, the numbers of 24-hour dietary recalls by recall type and age varied dramatically for the first and second 24-hour dietary recalls. For the first 24-hour dietary recalls, the recall type used predominantly but not exclusively was joint-adult for children aged 6 to 8 years, was joint-child for children aged 9 to 11 years, and was child for children aged 12 years. However, for the second 24-hour dietary recalls, the recall type used predominantly but not exclusively was proxy for children aged 6 to 10 years; was fairly evenly split across four recall types for children aged 11 years; and was child for children aged 12 years. Variation in the frequency with which recall type was applied to children of different ages for the first and second 24-hour dietary recalls is of concern due to inconsistent adherence to NHANES age cut points for child roles in joint recalls. Different recall types for the first and second 24-hour dietary recalls could create variability in NHANES data for the first and second 24-hour dietary recalls. Without validation of the different recall types, the extent to which variation in accuracy is attributable to recall type is unknowable.

For Issue 2, recall type as a source of school-meal intake data differed vastly between the first and second 24-hour dietary recalls. Specifically, of the first and second 24-hour dietary recalls, respectively, 12% and 14% included school breakfast (child [11%, 15%], joint-adult [43%, 32%], joint-child [42%, 16%], proxy [4%, 37%]) whereas 28% and 39% included school lunch (child [14%, 17%], joint-adult [41%, 30%], joint-child [41%, 16%], proxy [4%, 37%]). Thus, proxy first 24-hour dietary recalls had the fewest school meals but proxy