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Purpose We aimed (1) to describe and evaluate the “EPIC-Soft DataEntry” application developed as a user-friendly data entry tool for pan-European and national food consumption surveys among infants and children, and (2) to compare two food record-based dietary assessment methods in terms of food description and quantification using data quality indicators. EPIC-Soft DataEntry was used for both methods. Methods Two pilot studies were performed in both Belgium and Czech Republic in a total of 376 children (3 months to 10 year olds): one using a consecutive 3-day food diary; and the second with two non-consecutive 1-day food diaries with data entry during a completion interview. The collected dietary data were compared between the two dietary assessment methods by country and by age groups: (i) <1 year; (ii) 1-3 years; (iii) >3-10 years. Results Overall, 70 % of the interviewers evaluated the work with EPIC-Soft DataEntry as easy. With both dietary assessment methods, an equally high proportion of specific food names (e.g., "yoghurt, strawberry") were reported, where only between 5 and 15 % of foods were non-specified (e.g., "yoghurt, n.s."). The two 1-day food diaries yielded a higher proportion of foods with detailed description. For example, in the age category of 1-3 year olds in Belgium, for 7 out of 16 systematic questions on food description (e.g., "preservation method,") specific answers were significantly higher (all P < 0.03). The proportion of missing quantities of consumed foods was comparable between the two methods. Conclusions The EPIC-Soft DataEntry application was positively evaluated by the majority of the interviewers. Two non-consecutive 1-day food diaries with data entry during a completion interview provide a more detailed description of consumed foods as compared with a 3-day food diary. © 2014 Springer-Verlag Berlin Heidelberg.