

# A Government Statistical Service perspective on official estimates of calorie consumption: 2019 update

This is an update to the response that the Government Statistical Service provided to the Behavioural Insight Team on shortcomings with official statistics on calorie intake published in August 2018.

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# 1 . Background

In 2016, the [Behavioural Insights Team \(BIT\)](#) published a report titled [Counting Calories](#), which discussed the limitations of published government data on calorie intake. The report explained the apparent decrease in calorie intake over time by presenting evidence that calorie consumption is underestimated and also suggested that the degree of underestimation had increased over time.

The BIT report was accompanied by an [initial response from the Government Statistical Service \(GSS\)](#), which provided details of the main sources of data, the methodological limitations and the development work that was underway to improve the data. This article provides an update and summary of the work that has been completed.

## 2 . Developments in the Living Costs and Food Survey (LCF)

The National Statistics Quality Review (NSQR) of the [Living Costs and Food Survey \(LCF\)](#) was published in May 2016 with an initial response published by the Office for National Statistics (ONS) in January 2017 and [a more detailed response in April 2018](#), this was further updated in January 2019. There were 30 recommendations in the original review and a response was provided against each one.

There have been a number of specific actions undertaken, which were discussed in the original Government Statistical Service (GSS) response.

### Further analysis to understand more about under-reporting

A project has started to understand and quantify differences between the LCF and national accounts to determine if they are due to coverage differences (for example, LCF covering private households only), certain expenditure items not being covered in LCF, under-reporting in LCF, national accounts adjustments and so on. Findings will be published with UK National Accounts, The Blue Book 2020.

### Updating the layout and content of the current paper diary

A project to review the current diary design was completed in December 2017. Additional funding is required to work the recommendations into a new design and test the new instrument.

We have investigated and reported on the [trade-offs between maintaining a two-week diary period and adopting a shorter diary period \(PDF, 1.89MB\)](#).

### Improvements in data collection methods by making use of new technology and commercial data sources

A six-month Data Science project was completed in April 2018 exploring proof of concept for receipt scanning and optical character recognition (OCR), as well as automation of the Classification of Individual Consumption by Purpose (COICOP). A report on this is available in the [ONS Survey Methodology Bulletin \(PDF, 1.65MB\)](#).

### Further information

A summary report arising from the paper diary design project is available from us [on request](#). A [high-level work plan](#) outlining further plans for further development was published in January 2019.

### **3 . Developments in the National Diet and Nutrition Survey (NDNS)**

Since the Behavioural Insights Team (BIT) report was published, the National Diet and Nutrition Survey (NDNS) has been retendered. As part of the open tender process, Public Health England (PHE) asked bidders to propose new, more automated data collection methods, which would be compatible with new technologies and offer potential to improve data quality while reducing costs.

The NDNS contract for years 11 to 14 was awarded to a consortium led by NatCen Social Research, working with the National Institute for Health Research Biomedical Research Centre (NIHR BRC) Diet, Anthropometry and Physical Activity Group and Nutritional Biomarker Laboratory in the MRC Epidemiology Unit at the University of Cambridge.

The consortium undertook a review of automated dietary data collection tools available and three candidate tools were identified that had the potential for use in NDNS.

Following discussions with the tool owners, the consortium recommended to PHE that Intake 24, a web-based, automated, self-administered 24-hour recall tool, developed by the University of Newcastle, should be adapted and updated for use in NDNS. Following development and pilot work, fieldwork using the new tool is expected to begin in autumn 2019, replacing the paper-based diary and collecting data from each participant for four non-consecutive days.

### **4 . Additional analyses to better understand under-reporting of calorie intake**

#### **Analysis of doubly labelled water (DLW) data**

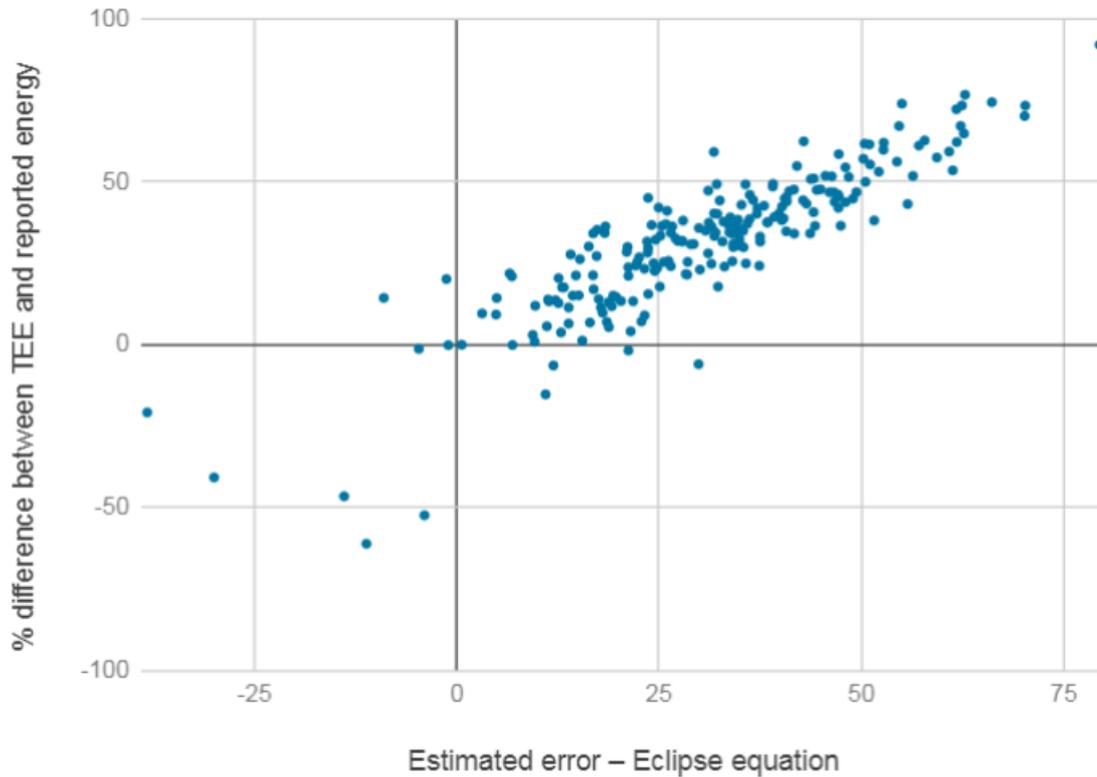
The Office for National Statistics published analysis of doubly labelled water (DLW) data from the National Diet and Nutrition Survey (NDNS) years 1 and 3 in the [Eclipse report](#) in January 2018. The aim was to understand the relationship between diary-recorded and true energy intake and to estimate levels of under-recording and the factors that influence under-recording.

Using regression analysis it was found that the factors that affected under-reporting of calorie intake were recorded calorie intake, sex, age and weight.

Since that report was published, DLW for years 6 and 7 of the NDNS has become available. The regression equation from the Eclipse analysis has been applied to this new data in order to assess the validity of the model for predicting under-reporting and hence true calorie intake.

Figure 1 shows a scatter plot of the actual percentage difference between total energy expended (TEE) and recorded intake for individuals with a valid DLW record for year 6 or year 7 compared with the predicted error generated from the Eclipse equation. There is a strong positive association with a Pearson correlation coefficient of 0.88.

**Figure 1: Actual percentage difference between total energy expended and recorded intake for individuals with a valid doubly labelled water record**



Source: Public Health England - National Diet and Nutrition Survey

## Use of the Henry equations to estimate calorie intake

In March 2018, Public Health England published an [evidence report relating to calorie consumption](#). This report included a detailed technical appendix, which describes the use of the Henry equations to derive true calorie intake estimates from survey data. This method was applied to Health Survey for England data for children and the results are presented in the report.