Proceedings of the Nutrition Society (2022), **81 (OCE4)**, E106 doi:10.1017/S0029665122001355

Irish Section Conference 2022, 15–17 June 2022, Impact of nutrition science to human health: past perspectives and future directions

Development of a first-generation Food Cloud for data, tools and services related to the nutrition, health and agri-food sciences–contributions from UCD to the Food Nutrition Security Cloud (FNS-Cloud) project

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Existing data, tools and services in the nutrition, health and agri-food domains are fragmented and lack critical mass. FNS-Cloud aims to federate existing and emerging tools and datasets in addition to developing new services into a single 'Cloud' to support their re-use. Work undertaken by UCD comprises 3 objectives, to develop: i) a framework for mapping dietary intake data; ii) a quality assessment framework; iii) novel dietary intake tool for use in diverse populations. A framework to support the mapping of data from differing FFQs is required to facilitate re-use of data and enable merging of datasets. A framework mapping existing FFQs was created. Individual foods, food groups and frequency of consumption categories were mapped by visually aligning similar options and creating harmonized groupings for those that didn't align. The feasibility of this mapping system was tested through a comparison exercise using data derived from Food4Me [(1)] and NHANES [(2)]. A quality assessment framework is needed in FNS-Cloud to support researchers in the decision- making process to assess whether data is fit for the intended purpose and maintain scientific quality. Markers of quality were identified within literature considering data collection, data management and data analysis.

Foodbook24 is a web-based dietary assessment tool originally developed for use in the Irish adult population[(3)]. The tool has been further developed to enable use among diverse ethnic groups; specifically Brazilian, Chinese and Polish. A sub-sample of baseline Food4Me data (N = 210) was re-entered into the NHANES FFQ using the developed harmonised mapping guidelines. Good similarity was observed between mean food group intakes for most food groups. Reasons for differences observed in other food groups arose from: variation between frequency of consumption response categories, variations between food items listed within specific food groups across FFQs, presence of non-comparable food items which were only captured in 1 FFQ. Quality markers were used to develop a series of flow charts for dietary intake data which comprise questions relating to aspects of quality. Individualised messages specific to the answers given were developed. The design requires researchers to answer a series of questions producing a personalized feedback report with additional considerations to support the researcher in their decision of whether the dataset(s) selected are appropriate for their research question. Foodbook24's food list has been expanded to include ethnically diverse foods using relevant national food composition tables and additional languages added. The appropriateness of the expanded food list has been tested and the tool has been validated against traditional assessment methods. Going forward, the frameworks will be translated into online tools and implemented into the Cloud solution. These tools alongside Foodbook24 will be available on FNS Cloud for future use by researchers to support re-use of existing datasets and collection of new data.

Acknowledgments

Food Nutrition Security Cloud (FNS-Cloud) has received funding from the European Union's Horizon 2020 Research and Innovation programme (H2020-EU.3.2.2.3. – A sustainable and competitive agri-food industry) under Grant Agreement No. 863059 – www.fns-cloud.eu

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