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PERSPECTIVE

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Strengthening the reporting of diet item details in feeding studies measuring the dietary metabolome: The DID-METAB core outcome set statement

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1 | INTRODUCTION

Nutrition research and diet–disease relationships historically rely on self-reported data assessed via dietary assessment instruments such as 24-h dietary recalls, food records, food frequency questionnaires, etc.,[1] which are prone to inherent bias and errors.[1,2] While these methods provide detailed information on what, how much, and when individuals eat, involvement from dietitians or nutritionists can help to minimise errors.[3] However, misreporting remains inherent and can lead to misinterpretation of diet–disease relationships.[2] Controlled human feeding studies provide known amounts of foods/beverages and aim to mitigate inherent biases associated with self-reported dietary assessment while observing individual responses and enhancing adherence; however, they are also highly resource-intensive. The reliability and accuracy of dietary assessment methods have been shown to be increased by substituting or complementing dietary assessment instruments with objective biomarkers of food intake.[4–8] Currently, there are few valid dietary biomarkers routinely applied, for example, 24-h urinary sodium for salt,[9] plasma carotenoids for fruit and vegetables,[10] proline betaine for citrus fruits[11]; however, their application can be limited to a specific nutrient or food/food group.[11] Human feeding studies utilising metabolomics as an adjunct objective dietary assessment method are gaining traction.[12–14] However, the methodology of dietary feeding interventions can vary in their approach,[15] making cross-comparison between studies and synthesising dietary evidence difficult (see Box 1). Beyond the discovery of metabolites identified from biospecimens for qualifying and quantifying dietary intake of specific foods, nutrients and/or dietary patterns, metabolomics may also reflect the impact of diets on endogenous metabolism, accounting for individual variation driven by factors such

For affiliations refer to page 10.

See Appendix for DID-METAB Delphi Working Group Authors.

BOX 1 Human feeding studies.

The DID-METAB Checklist can be used by researchers reporting metabolomic data obtained from biospecimens (saliva, urine, blood, stool, etc) collected within human feeding studies in which the dietary intervention involves any of the following:

1. Provision of a single food
2. Partial diet provision—only some food/beverages are provided
3. Whole diet provision—all foods/beverages are provided
4. Dietary prescription *—nutrition counselling and/or educational material provided to support self-implementation of a dietary intervention.

Consumption of food(s)/beverage(s) may be conducted under the surveillance of researchers and/or consumed away from researchers/research facilities, for example, as part of the participant's usual routine.

*While dietary prescription may not be considered a 'feeding' intervention, especially in the absence of food provision, these recommendations may still apply to reporting when metabolome data are being collected.

as genetics and gut microbiome composition. For example, metabolites derived from the gut microbiome[16,17] or produced through microbial conversion,[18,19] contribute to the diverse metabolic responses to dietary interventions.[16] Therefore, metabolomics offers promise for future incorporation within precision and personalised nutrition interventions, ultimately advancing the broader field of nutrition research.[16]

While metabolomics is being rapidly integrated as a biological assessment technique in nutrition research,[20] it is still in its infancy and therefore improved quality of reporting is required to facilitate consistency, reproducibility of findings, and advancement of the field long-term.

We previously demonstrated that there is extensive variability in the reporting of dietary intervention methodologies (e.g. design, delivery, implementation and interpretation) currently used in human feeding studies measuring the metabolome.[15] Commonly, insufficient detail is reported, hindering replication, which limits evidence synthesis in the field of metabolomics.[15] For example, information about included/restricted foods, the timing of biospecimen collection in relation to dietary assessment instruments used, or methods used to account for the consumption of nonstudy foods. Detailed information on these items is vital for the interpretation of the metabolome data. While reporting guidelines exist for human intervention studies more broadly,[21–23] including the developing CONSORT-Nut,[24,25] a nutrition extension of the CONSORT statement, no reporting guidance currently considers the specific nuances in dietary intervention research in which the metabolome is also measured. Therefore, there is a need for formal consensus on the minimum core set of items required for reporting, along with examples and recommendations for reporting in research papers to guide researchers and the review process. The primary aim was to gain consensus on core diet item details (DID) and standard reporting recommendations for each DID (i.e. a core outcome set, COS) in human feeding studies measuring the metabolome. The secondary aim was to develop a reporting guideline for use by researchers conducting such studies when reporting information in papers, and to assist journal reviewers and editors when critically appraising the papers (see Box 2). The purpose of this paper (i.e. the DID-METAB Statement) is to provide a short overview of the development of the COS and reporting guideline, including the Delphi process, and present the final reporting guideline (i.e. DID-METAB Checklist) to support usability and dissemination.

2 | DEVELOPMENT OF THE DID-METAB STATEMENT

The DID-METAB Statement was developed by the Precision and Personalised Nutrition (PPN) Team (JJAF, EDC, JS, MGM, TJ and CC) in consultation with the DID-METAB Delphi Working Group under the iterative process of an online Delphi. Development of the core outcome set using the Delphi process was conducted in accordance with the Core Outcome Set-STAndards for Development: The COS-STAD recommendations.[27] The development of the reporting guideline was based on guidelines for developers of health research reporting guidelines and modelled off similar efforts.[22,28–30] The PPN Team has collective expertise in human clinical and experimental research design, conduct and implementation of human feeding interventions, dietary assessment methodology, human biospecimen collection and analysis, and design and management of Delphi processes. The DID-METAB Delphi Working Group experts were identified based on their extensive experience and contributions to the field, such as peer-reviewed publications, involvement in key professional organisations, and their recognised expertise and contributions to the field of metabolomics and nutrition research.

BOX 2 Implementation of the reporting guideline of diet item details in feeding studies measuring the dietary metabolome: The DID-METAB Statement.

The DID-METAB statement encompasses a COS, including recommendations in the form of a 29-item checklist to improve reporting of dietary intervention methodology in human studies examining the metabolome. The DID-METAB Statement can be used by authors reporting information from both protocols and outcomes from original research. While the DID-METAB Checklist has been developed with a focus on information relating to dietary intervention methodologies, it is strongly encouraged that researchers undertaking dietary research also refer to existing reporting tools such as integration at item 5 of the CONSORT 2010 Statement checklist,[23] or item 11 of the SPIRIT 2013 checklist,[26] where relevant.

The checklist should report where the relevant item information is located, including citations of protocol papers and/or primary/original papers. When the primary paper lacks the recommended reporting details, this information should be provided.

The primary audiences for the DID-METAB Statement are researchers reporting the metabolome from human feeding studies and peer reviewers and editors evaluating their potential. We anticipate the statement, which encompasses the 29-item checklist and accompanying examples and recommendations on the minimum amount of information to be reported, will be a useful and practical tool that improves reporting and replicability, and overall, aids the advancement of the field of nutritional metabolomics.

International experts were invited by the PPN Team and encompassed expertise across clinical and experimental trial design of dietary interventions, feeding study intervention implementation, nutritional metabolomics and/or diet-related biospecimen analyses and interpretation. The two-stage Delphi process comprised five survey rounds, which were implemented online using QuestionPro Survey Software (QuestionPro Inc., Austin Tx). The Delphi was conducted between February 2024 and July 2024 to gain consensus on a core set of DIDs, DID phrasing, reporting recommendations including examples, and acceptance of the final checklist. A total of 67 experts were invited, with 25 providing input in stage 1, and 22 experts retained throughout all three rounds of stage 2.

All DID-METAB Delphi Working Group experts agreed with the PPN Team's recommendation that the checklist should be used alongside existing tools (e.g. as an extension of item 5 in CONSORT 2010 Statement updated guidelines for reporting parallel group randomised trials,[23] or item 11 in SPIRIT 2013 Statement: Defining standard protocol items for clinical trials[26]) and that relevant journals should recommend use of the DID-METAB Checklist for relevant studies. This study was approved by the University of Newcastle's Human Research Ethics Committee (H-2023-0405) and has been registered on the Core Outcome Measures in Effectiveness Trials (COMET Initiative) database (https://www.comet-initiative.org/Studies/Details/3292). The methodology for the development of the reporting guideline, including findings of the Delphi have been thoroughly reported in the more comprehensive Explanation and Elaboration report, available at: [https://advances.nutrition.org/].

3 | DID-METAB CHECKLIST SCOPE AND COMPONENTS

The final list of DIDs (29 items), plus examples and recommendations are categorised across five domains: (1) Dietary Intervention—Modelling (items 1 through 8), (2) Dietary Intervention—Implementation (items 9 through 11), (3) Dietary Assessment (items 12 through 20), (4) Adherence and Compliance Monitoring (items 21 through 24) and (5) Bias (items 25 through 29). The recommendations are presented in a checklist (Table 1) to aid users in completing it. The COS recommendations within the DID-METAB Checklist are guidelines for reporting research and do not prescribe how to design feeding studies. Examples are provided for each DID within the checklist, including reporting recommendations for each DID. The hierarchy of reporting recommendations was based on a vote count of the experts' responses and synthesis of their commentary regarding the level of detail to be provided. Reporting recommendations labelled as 'consider' and 'optional' are nonmandatory reporting items. Those labelled as 'consider' guide users to include this detail if possible, as it will likely benefit other researchers/the field, whereas 'optional' means given this data may or may not be relevant to report in this manner for a particular study or it may not be of benefit to other researchers, it is not necessary to provide it. To assist the application of the recommendations, we encourage readers to access and utilise the Explanation and Elaboration report.[31]

TABLE 1 Diet item details: reporting checklist for feeding studies measuring the human dietary metabolome (DID-METAB checklist).

Details to include when describing the methodology of feeding studies and the appropriate sections for reporting this information.

The DID-METAB Checklist is for reporting dietary details used in intervention and control groups in human feeding studies related to the dietary metabolome. The aim is to ensure adequate reporting of dietary methodology and to facilitate replication. Other study components are covered by existing reporting statements and checklists. Further information is included in the DID-METAB guide paper and should be used alongside the DID-METAB Checklist.

Grouped under five Domains, are 29 diet item details (DIDs) with a hierarchy of reporting recommendations. Those labelled as 'consider' or 'optional' are additional suggested recommendations that may guide the methodology choices of study design. Examples of content to report for each DID are also provided in the table.

For each DID reporting recommendation, please specify where it is documented by indicating the manuscript page number, supplementary materials or other resources (e.g. protocol paper or pre-print) in the last (where reported) column. If a DID is not applicable to the intervention or study design, please use 'N/A'.

It is strongly recommended that this checklist is used in conjunction with the CONSORT 2010 Statement1, as an extension of Item 5 when a randomised clinical feeding trial is being reported, or in conjunction with the SPIRIT 2013 Statement2 as an extension of Item 11 for clinical feeding trial protocols. DID-METAB Checklist can also be used in conjunction with checklists relevant to other study designs (see www.equator-network.org). While the DID-METAB checklist is intended for the methods section of a paper (unless explicitly stated as 'supplementary file'), in some cases specific items may be more relevant to be reported in other sections, for example, results or discussion.

			Where reported[a]
DID no.	**Diet item detail (DID)**	**Recommendations for reporting item**	**Page no. or supplementary no.**
Domain 1—Dietary Intervention—Modelling			
1	Methods and/or tools used to design the nutritional/dietary characteristics of the dietary intervention(s) and control diet(s) employed. • Detailed methods reported to replicate a published position or well-established therapeutic diet or dietary trend such as DASH, Mediterranean Diet, for example, <X mg sodium, X% sat fat (X serves of fruits and vegetables) etc, including references. • Software used including version number, for example, ProNutra ver 1.0	Detailed description (up to ~250 words) Detailed description for novel or nonstandard method and/or tools and/or if journal is nonnutrition/dietetic in a supplementary file. Provide an example of method/tools in a supplementary file. Optional: describe in a table	
2	References to population-based dietary guidelines, survey data and/or published therapeutic diets (where possible) that inform the design of dietary interventions. • National or International population-based dietary guidelines • National survey data	Brief description (couple of sentences) Consider: detailed description in a supplementary table.	
3	Method(s) used for personalising and/or modifying the dietary intervention(s) and control diet(s). This may include implementing dietary substitutions to accommodate specific diet or nutritional needs; individual preferences; anthropometric, biochemical or clinical profile; and/or product availability/seasonality. • Energy matching dietary intervention by upscaling or downscaling food items according to participant's basal energy intake OR calculated energy requirements • Food/meal substitutes due to food allergies, intolerances, aversions or specific nutritional requirements	Brief description (couple of sentences) Detailed description in a supplementary table(s), figure(s) and/or provide examples. Optional: describe in a table	
4	(a) Food composition database and/or reference material used to analyse the nutritional content of the dietary intervention(s) and control diet(s), including references. • Australian Food Composition Database (e.g. AUSNUT 2013 formerly NUTTAB) • Software programs used including reference to version number, for example, FoodWorks and ProNutra	Brief description (couple of sentences) Consider: detailed description in supplementary table.	

TABLE 1 (Continued)

DID no.	Diet item detail (DID)	Recommendations for reporting item	Where reported[a] Page no. or supplementary no.
5	(b) Details of the applicability of the food composition database and/or reference material to the population being studied. Explanation of how the food composition database is representative of the population being studied, including references. Or, if the database used is not representative of the population, explain why it was used and/or why it was considered the best available or an appropriate substitute.	Brief description (couple of sentences)	
6	Method(s) used to standardise dietary intake within groups. • Food library reference with pre-determined food/meal substitutes for each dietary intervention. • Full (or at least partial) provision of foods, meals and/or raw ingredients. • Where food is supplied, the following may be relevant: grocery order placed by study investigators, meals made in test/commercial kitchen, participants required to consume X number of meals at research facility under supervision, participants to collect foods from research site X times per week, minimal food preparation or cooking required. • Identical meal plans provided to participants • Support resources, for example, foods/meals to choose when eating out, takeaway for each dietary intervention • Description of food form, for example, mashed, pieces and powder	Detailed description (up to ~250 words) Detailed description in a supplementary table(s)	
7	Qualitative and quantitative characteristics of all dietary intervention(s) described in a reproducible manner. • Portion sizes, required serves per food group, food choices/ characteristics, for example, beta-carotene-rich fruits and vegetables, wholegrain versus refined grain products etc • Nutrient targets • Example meal plan, or rotating menu • Timing of food intake, food/meal patterns	Detailed description in a separate paragraph under its own subheading Provide example meal plan or rotating menu in a supplementary file Consider: detailed description in table for each diet group	
8	Personnel responsible for designing and developing the dietary intervention(s) and control diet(s); including who developed menu/ meal plans; provided dietary education; and any documents/resources provided to the participants clearly identified along with their relevant qualifications. • Research Dietitian, Registered Nutritionist/Dietitian, Accredited Practising Dietitian, research team member in liaison with any of the aforementioned. • Or list relevant qualifications, certifications, training undertaken and/ or experience for personnel involved.	Brief description (couple of sentences) Detailed description and/ or provide documentation of participant resources in supplementary file	
Domain 2—Dietary Intervention—Implementation			
9	The proportion of food and/or beverages provided for each dietary intervention. • All or full provision of diet should be stated or inferred • Partial or expressed as a % or proportion of total food intake, for example, 80% or 90% of all foods and beverages needed for individual consumption were provided to participants • Provision of any key food items relevant to the dietary intervention(s), for example, provision of olive oil for a Mediterranean diet • If relevant, provide specific weight of food(s) provided, for example, 100 g berries • Description of any food allowances, for example, condiments, spices, seasonings, water, noncaloric beverages etc	Brief description (couple of sentences) Consider: detailed description in a supplementary table(s) for each diet group and/ or examples of participant handouts/resources provided	

(Continues)

TABLE 1 (Continued)

DID no.	Diet item detail (DID)	Recommendations for reporting item	Where reported[a] Page no. or supplementary no.
10	Nature of the food and/or beverages provided (e.g. recipe of test food/meal, raw ingredients, cooking instructions, pre-prepared meals, combination etc), storage conditions, and how this was provided to participants (e.g. delivered to their home, fed onsite and collected from supermarket). • Raw ingredients provided which participants used to assemble/cook own meals; only pre-prepared/cooked meals provided; combination or raw ingredients and pre-prepared meals. • Participants collected grocery order from supermarket or research facility, or study food was delivered to participants' house, or participants were provided with a gift card to purchase groceries etc. • Foods prepared by a research test kitchen, third-party quality-controlled kitchen or commercial kitchen to ensure standardisation	Brief description (couple of sentences) Detailed description in a supplementary table(s) and/or figure(s) where applicable and/or examples of participant handouts/resources provided	
11	Contingency strategies to ensure food provision remained as close to the original protocol. Researchers performed quality control checks by placing/confirming grocery orders with participants, keeping food stock on hand of essential menu items for participants to collect if required, use of a pre-developed food library/substitutes food list for out-of-stock items	Brief description (couple of sentences) Detailed description in supplementary file	
Domain 3—Dietary Assessment			
12	Dietary assessment method(s) used (strengths, limitations, reliability and validity, including whether it has been validated in the population being studied) or reason(s) why a dietary assessment method was not used. • Stating the name of tools, whether it was validated and in what population including references (where relevant) • Stating if calibrated against weighed food records (e.g. ASA-24®, Intake-24) and/or validated using strategies such as direct observation, an objective measure (e.g. doubly labelled water), recovery biomarkers, etc. • Stating whether participants were asked to return all uneaten food, whether this was weighed/recorded against food provided, etc • Stating whether all food was eaten at research facility under supervision	Brief description (couple of sentences) including statement on validation and relevant references	
13	(a) Description of the dietary assessment method(s) used to examine food items recorded (or consumed) and estimate (or quantify) portion size. • Serves of each food group, grams of each food or food group via 24-h recalls etc • If validated, reference the validation paper relating to the method/tool	Brief description (couple of sentences) Detailed description in supplementary file and/or example of method/tool used if applicable	
14	(b) Description of the frequency of conducting the dietary assessment method(s), including number of days (if applicable). Serial 24-h recalls 4 times per study period, or two 3-day food records at baseline and post-intervention, FFQs, weighed food records weekly, direct meal observation etc	Described in one sentence or very briefly	
15	(c) Description of the timing of the dietary assessment method(s) used in relation to the timing of biospecimen data collection. Dietary intake collected 24 h prior to blood collection, or dietary intake collected at time of biospecimen (urine, blood, faecal and saliva) sample collection	Described in one sentence or very briefly Optional: report in a figure	

TABLE 1 (Continued)

DID no.	Diet item detail (DID)	Recommendations for reporting item	Where reported[a] Page no. or supplementary no.
16	(d) Description of how the dietary assessment method(s) were administered and by whom. Interviewer administered (study investigators) or self-administered (participant via e-form, survey etc)	Described in one sentence or very briefly	
17	(e) Description of how the quality and accuracy of the administration of the dietary assessment method(s) was assured. Quality control checks, for example, results reviewed by study investigators and clarified with participant where relevant, random phone call audits etc	Described in one sentence or very briefly	
18	Qualitative and quantitative dietary intake data for all dietary intervention(s) and control diet(s) and whether data presented is for reported intake or based on foods/beverages provided/prescribed only. • Tabulated servings of foods by food groups for each feeding arm (and whether this is reflective of provision/prescription, reported intake or both). • Tabulated nutritional information for each feeding arm (and whether this is reflective of provision/prescription, reported intake or both). • Incorporating deviations to dietary protocol, either incorporated as part of dietary assessment method (for actual intake reporting) or retrofitted/overlaid on dietary protocol (for intake presented as food provided).	Detailed description (up to ~250 words) Detailed tabulation for each diet group Detailed description in supplementary table(s) and/or figure(s)	
19	Methods used to assess and account for consumption of nonstudy food and/or beverage items, that is, foods that were consumed but not provided or prescribed as part of diet protocol. • Log of nonstudy food/beverage items consumption documented in an online or paper-based proforma list • Captured in dietary assessment method	Brief description (couple of sentences) Detailed description in supplementary file	
20	Procedure used to match food composition of dietary intervention items provided with actual consumption data, reporting conversion factors or assumptions made (if applicable). • Food composition databases, for example, Australian Food Composition Database (formerly NUTTAB) used to analyse nutrient intake • Sensitivity analysis to adjust for prescribed v actual dietary intake	Brief description (couple of sentences)	
Domain 4—Adherence and Compliance Monitoring			
21	Method(s), tools, and/or resources used to optimise engagement and adherence to diet intervention(s), and whether this was the same for all diet interventions (where applicable). • Energy-matched/tailoring to food preferences (where possible) and how, for example, unit foods • Itemised meal plan with portion sizes • Nonstudy food consumption guide, for example, takeout • Provide a meal box/lunch box to support out-of-home consumption • Meal box reminder cards of what to pack • Check-in phone calls • Variability in repeated menus to prevent fatigue (where applicable to research question) • Rotating menu with cycle length that prevents fatigue, for example, 7 day • Reminders, for example, automated email reminders/texts or phone calls. • Examining satiety (VAS) and/or food acceptability questionnaire • Consultation with research team, for example, email, phone, study interval check-in appts/communication	Brief description (couple of sentences) Detailed description in supplementary table(s), figure(s) and/or include examples	

(Continues)

TABLE 1 (Continued)

DID no.	Diet item detail (DID)	Recommendations for reporting item	Where reported[a] Page no. or supplementary no.
22	Method(s) used to monitor adherence to dietary intervention(s), stating whether this involved objective methods (e.g. biomarkers or known metabolites), and whether the method(s) used was the same for all dietary interventions (where applicable) and control diet(s). • Use of 'marker foods' with known metabolites that are measured in biospecimen. • Objective measures such as PABA to examine sample collection completeness • Where biospecimens are used, state type of biospecimen, for example, plasma, urine, and the nature of collection, for example, spot urine, 24 h collection etc. • Dietary assessment methods, for example, 24 h recalls, food records/diaries and direct meal observation. • Weighing of uneaten portions and/or uneaten food (including spilled food) returned or photographed • Specific compliance questionnaire and/or checklist • Full (or at least partial) diet provision • Supporting resources, for example, itemised meal plan, meal box reminders and takeout meal ideas • Check-in phone calls/regular consultation with researchers	Detailed description (up to ~250 words). Consider: detailed description in supplementary file	
23	How nonadherence and/or outliers were managed. • Consumption of nonprescribed food, nonconsumption of prescribed foods, describe cutoffs that identify nonadherence. • Describe procedures that identified outliers to the dietary protocol, for example, excessive metabolite concentrations that can't be reasonably explained. Include description of cutoffs.	Brief description (couple of sentences) Consider: detailed description in supplementary file	
24	Detailed description of how unforeseen circumstances (e.g. acute illness and personal circumstances) that required deviation or adjustment to dietary protocol were managed (e.g. temporary pause in dietary intervention with recommencement after a suitable washout period, adjustments in nutritional requirements or rescheduling of clinic appointments). • Temporarily pause feeding intervention periods and/or reschedule clinic appointments with a suitable washout period for recovery of illness • Ceasing dietary intervention followed by suitable washout period before recommencing dietary intervention • Adjustment in nutritional requirements (if relevant)	Brief description (couple of sentences) Detailed description in supplementary file	
Domain 5—Bias			
25	How selection bias in dietary intervention allocation were mitigated or addressed. • Randomised order of dietary intervention (cross-over study) or allocation to dietary intervention (parallel study). • Stratified random sampling (individuals stratified for sex and any other characteristics known to influence the dietary metabolome and/or other key outcomes). • If and how blinding was implemented, for example, single, double etc	Brief description (couple of sentences)	
26	Whether a washout period was employed, and if so, what the conditions were, and duration justified. Washout period between dietary interventions such as return to habitual dietary intake or standardised feeding protocol.	Brief description (couple of sentences) Consider: description in a figure	

TABLE 1 (Continued)

DID no.	Diet item detail (DID)	Recommendations for reporting item	Where reported[a] Page no. or supplementary no.
27	How potential bias in dietary reporting (i.e. misreporting, recall bias, changing habits as a result of being assessed) were mitigated. • Use of validated dietary assessment methods with visual aids to support accurate recall, for example, ASA-24®, Intake-24, Australian Eating Survey (AES) • Use of image-based and/or sensor-based dietary assessment methods • Interviewer-administered dietary assessment methods • Strategies to control for over- and under-reporting, for example, Goldberg equation[32]	Brief description (couple of sentences) Consider: detailed description in supplementary file	
28	Measures taken to control for potential confounding factors that could influence inter- and intra-individual variations outside the scope of the study protocol. • Cross-over study design so that participants serve as their own controls. • Cross-over study design in random order so that there is no order effect. • Provide a standardised dietary run-in phase (e.g. 1–2 weeks) prior to randomisation, for example, whole diet feeding, partial diet feeding, highly prescriptive meal plan. • In a parallel study design, standardised test meals or foods administered at various time points throughout the study. These meals/foods would be provided before concurrently testing metabolomic or other metabolic measures to evaluate individual responses. • Provision of partial or whole diet to reduce variability in food preparation or cooking practices.	Brief description (couple of sentences)	
29	Acknowledgement of the generalisability of the population being studied. Comment on the generalisability of population being studied.	Described in one sentence or very briefly	

[a]Provide details of where this information is available if it is not provided in the paper. For example, citations for published papers or protocol papers, website URL and/or catalogue or report citations. We strongly recommend using this checklist in conjunction with the DID-METAB Explanation and Elaboration Report[31] which provides further information.

4 | DISCUSSION

The quality of reporting in published research describing details of dietary intervention methods (e.g. design, delivery, implementation and interpretation) used in human feeding studies measuring the metabolome is considered poor.[15] Currently, reporting of dietary characteristics and compositions of implemented interventions are highly variable with some studies reporting diets only in terms of macronutrient composition, others reporting foods provided or nutrient targets, while some provide example meal plans and portion sizes.[15] The variability spans across several features of dietary intervention methods used in feeding studies.[15] Therefore, without detailed and replicable reporting of core information relating to dietary intervention methods, particularly those that concern the validity and interpretation of the metabolome, it remains challenging to replicate research or synthesise the evidence base.

The explicit aim of this COS was to improve the quality of reporting of feeding studies measuring the metabolome by identifying a minimum set of information to be reported in order to provide details about how the diet intervention was designed, delivered and interpreted. The DID-METAB statement was developed to standardise reporting, enhance the peer review process of papers and assist researchers in critically appraising and synthesising published articles. We recommend submitting the checklist as an additional file with the research article. The supporting Explanation and Elaboration report presents published examples of best practice reporting for each item as well as highlighting potential limitations of some approaches. The DID-METAB Statement can be used to enhance the design of feeding studies and ensure all aspects of feeding study interventions are adequately reported with sufficient detail and clarity.

The structured and formal consultation process, high response rate (88%), retention of all 22 international experts in the final three rounds of stage 2 across a broad range of research expertise totalling >200 years, and unanimous consensus on the final checklist are key strengths of the DID-METAB Statement. Implementation of the DID-METAB Statement in research will strengthen the evidence base on nutritional metabolomics and potential application to precision and personalised nutrition strategies.

To encourage dissemination and use of this standard for reporting, we have simultaneously submitted for publication the Explanation and Elaboration report in *Advances in Nutrition*. The Enhancing the QUAlity and Transparency Of health Research (EQUATOR) Network (www.equator-network.org) will assist in disseminating and promoting the downloadable DID-METAB statement. Announcements, updates, details for contacting the PPN Team and supporting information relating to the DID-METAB Statement, including the downloadable checklist, can be found at the DID-METAB website (https://australianeatingsurvey.com.au/did-metab-statement). We will continue to approach journals identified as being widely read by the medical and research community that are conducting relevant studies to endorse the use of the DID-METAB Statement. The DID-METAB Statement will be periodically reappraised by the PPN Team, and if necessary, modified and/or updated to reflect comments, criticisms and any new evidence.

In conclusion, we recommend that authors publishing articles on human feeding studies where metabolomic samples are collected include a completed checklist in their paper submissions to aid the editorial process, facilitate critical appraisal by the readers and contribute towards advancing the field of metabolomics (available at: https://australianeatingsurvey.com.au/did-metab-statement).

AUTHOR CONTRIBUTIONS

JJAF, EDC, JS, MGM, TJ and CC conceptualised and designed the research. JJAF and TJ collected and assembled the data. JJAF analysed and collated the data, presenting it to EDC, JS and MGM after each stage of the Delphi process to incorporate expert feedback. TJ provided administrative and technical support for the Delphi. JJAF wrote the paper. EDC, JS, MGM, TJ and CC were involved in the critical revision of the paper. All members of the DID-METAB Delphi Working Group were participants in the entire two-stage Delphi process and thus contributed to data collection, the development of the checklist, and reviewed this paper. JJAF had primary responsibility for final content. All authors have read and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

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DATA AVAILABILITY STATEMENT

Research data are not shared.

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