Government of **Western Australia**
Department of **Health**

Western Australian 2022 Nutrition Monitoring Survey Series

Technical Paper: Design and methodology

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1. Background

The WA Nutrition Monitoring Survey Series (NMSS) is a series of cross-sectional surveys that have been administered every three to five years in Western Australia (WA) since 1995. It is currently the longest running State-based nutrition survey in Australia and is delivered by the Chronic Disease Prevention Directorate (CDPD) at the WA Department of Health.[1]

The NMSS aims to monitor knowledge, attitudes, behaviours and intentions of Western Australian adults as they relate to nutrition; measure attempts at dietary change, and barriers and enablers to making behaviour changes consistent with dietary recommendations; and knowledge, perceptions and attitudes towards government public health nutrition activities.[1]

Poor diet is one of the top contributors to disease burden in WA and is associated with several disease groups, including coronary heart disease, stroke, type 2 diabetes and cancer.[2] Consuming a poor diet can lead to overweight and obesity, which are major risk factors for illness throughout the life course in children and adults.[2] In WA, almost two in five (38%) adults are obese, and similarly for overweight (38%).[3] This means less than one in four (24%) adults are currently living with a healthy weight. More than one in four (26%) children aged 5 to 15 years are overweight or obese.[4] Monitoring behaviours and intentions related to dietary patterns that have been linked to chronic disease can provide evidence to inform practice, including the development and delivery of tailored public health nutrition interventions.[1]

Data collected through the NMSS contributes to the understanding of knowledge, perceptions, and attitudes toward dietary recommendations at the population level. These data are important when developing evidence-based policy responses to poor nutrition, including guiding the strategic directions for agencies implementing these policy responses.[1] This information also guides implementation of Recommendation 2a of the WA Sustainable Health Review to 'Halt the rise in obesity in WA by July 2024, and have the highest percentage of population with a healthy weight by July 2029'.[5]

2. Methodology

2.1 Questionnaire design

The NMSS has collected data from representative samples of the Western Australian adult population, to provide up-to-date estimates on:

- body mass index (BMI)
- food and drink intake relevant to the Australian Dietary Guidelines
- intentions and influences for behaviour changes to improve diet and weight
- barriers and enablers to healthy choices
- concerns about food environments, availability, access and composition
- knowledge of nutrition and health issues
- attitudes toward public health policy initiatives
- food literacy and security.

In 2017, an independent review commissioned by the CDPD, examined whether data collected in the NMSS (and other state surveys) aligned with current best practice in food and nutrition monitoring and are relevant to stakeholder priorities in WA.

As a result of the review, the 2022 NMSS survey instrument underwent significant revisions to better align with current Department of Health priorities for public health nutrition programs and policy. The length of the NMSS was intentionally reduced from earlier surveys and the questions were specifically designed to reduce fatigue and burden among respondents, and to

maintain high data quality. Where relevant, original survey questions were retained for consistency to ensure integrity of the survey and allow for data trend analyses.

The 2022 survey instrument was designed to assess:

- usual dietary intakes of core and discretionary food and drink
- key dietary behaviours
- behaviour change intentions, influences, and barriers
- attitudes and concerns towards contemporary public health nutrition issues
- perceived enablers and support for public policy.

Targeted stakeholder consultation on the revised survey instrument was conducted in 2021.

Questions on food consumption are based on the Eat for Health Five Food Groups.[6] Food groups included in the NMSS questionnaire were prioritised according to those which have consistent relationships with chronic disease risk[7-11] as well as food groups consumed by adults in the 2011–12 Australian Health Survey (see Table 4 – Proportion of Persons Consuming Foods in AHS 2011).[12] Serve sizes are based on those detailed in the Australian Dietary Guidelines, where possible.[13]

The survey was designed to be completed via Computer-Assisted Telephone Interview (CATI) or independently, online. The CATI survey was initially piloted in May 2021 (n=86) in a sample of adults who recently completed the WA Health and Wellbeing Surveillance System (HWSS) and had agreed to be contacted for future surveys. Following amendments to the survey to improve ease of completion and shorten completion times, a second CATI pilot test was conducted in May 2022 (n=40). The online survey was pilot tested internally in August 2022.

The final survey questionnaire consisted of 124 questions, with both set-option and open-ended questions. The average length of time to complete the survey questionnaire was 30 minutes. A copy of the survey questionnaire is available here:
https://www.health.wa.gov.au/Articles/N_R/Nutrition-Monitoring-Survey-Series

2.2 Sample selection and recruitment

Previous NMSS surveys have selected the survey sample frame based on HWSS respondents who agreed to be contacted for future surveys. Previously, HWSS respondents were selected from a random stratified sample of eligible households with a telephone number listed in the WA White Pages®. This method has become outdated given the number of households that no longer have a landline and are listed in the White Pages®.

The 2022 NMSS was based on HWSS respondents who agreed to be contacted for future surveys, however the HWSS sample frame was a stratified random sample of adults drawn from the WA Electoral Roll linked with an extract from a Sensis consumer database by the WA Health Data Linkage System to append phone numbers. Adults eligible to complete the 2022 NMSS were those aged between 18 and 64 years at the time of completing the HWSS.

All people from the selected sample were sent an invitation letter from the Department of Health. The letter provided participants with the option to complete the survey by CATI or online via QR code or weblink. If the survey was not completed online within 10 days of the letter mail out date, the household was contacted via telephone to conduct the interview via CATI for those who wished to participate.

The 2022 NMSS was granted approval from the WA Department of Health Human Research Ethics Committee.

2.3 Survey administration

The 2022 NMSS was administered from September to November 2022 on a stratified random sample of adults residing in WA aged 18 to 66 years, by the Edith Cowan University (ECU) Survey Research Centre, an accredited (by the International Organisation for Standardisation) social research agency.

A total of 3,344 adults were selected in the initial sample, of which 3,152 (94%) were eligible to participate. Contact was made with 1,614 participants (48%). A total of 1,035 respondents completed CATI interviews, and 466 respondents completed the survey online. The overall response rate was 93%.

Table 1: Survey response rates, NMSS 2022

	Frequency (n)	(%)
Initial sample (CATI and online)	3344	100.0
Ineligible sample*	192	
Eligible sample	3152	94.2
Non-contacts after 6 phone call attempts	1217	
Eligible contacts	1614	48.3
Non-completes^	113	
Completed interviews (total)	1501	
Completed interviews (CATI)	1035	
Completed interviews (online)	466	
Response rate: Completed interview (n=1501) / eligible contacts (n=1614)		92.9

*Reasons for ineligibility include the contact number was disconnected (n=145), or non-residential (n=4), not of an eligible age (n=18), not household owner/resident, or not a WA resident (n=11), respondent was deceased (n=1), incorrect contact details (n=11), or respondent known but no new number (n=2).

^Reasons for non-completes include refusal (n=80), early termination of interview (n=19), incapacitated (too ill) (n=8), or the respondent was unavailable (n=6).

2.4 Weighting

The NMSS is designed to provide information at a population level. However, as the survey only collects data from a sample of the target population, the data are weighted to better represent the population from which the sample was drawn.[3] Weighting the data involves adjusting the proportions of certain demographic characteristics of the respondents so that they match the corresponding proportions in the total WA adult population.[3]

The 2022, NMSS data are weighted using raked weighting. This method allows for adjusting for non-response bias and respondent biases better than weights produced by design and post-stratification weighting methods.[14] Weights were calculated using the RAKE module in SPSS, based on the 2021 estimated resident population for WA aged 18 to 66 years and the 2021 Census proportions for age, sex, area of residence, living arrangements, country of birth, education, and employment status.

2.5 Reporting

Results from the NMSS may be reported as a prevalence estimate along with a 95 per cent confidence interval. The 95 per cent confidence interval is the range within which the true estimate would lie 95 out of 100 times. The wider the confidence interval is around an estimate, the less precise the estimate is, and the more caution that should be applied with using it. Further information on confidence intervals is available here: http://ww2.health.wa.gov.au/~/media/Files/Corporate/Reports%20and%20publications/Population%20surveys/2003-Confidence_intervals_How_they_work.ashx

2.6 Missing and implausible data

Established methods are used by the ECU Survey Research Centre to query spurious or implausible responses and ensure the integrity of the data provided by the respondent. In preparing the dataset for analysis, the Epidemiology Directorate applied established processes to account for outliers. Post-survey adjustments were implemented to account for systematic overestimation of height and underestimation of weight.[15]

3. Demographics

The demographic profile of the 2022 NMSS sample is shown below. The table provides the unweighted number and weighted percentage for selected demographic sub-groupings.

Table 2. Sample demographics, 2022 NMSS

	Unweighted (n)^	Weighted (%)
Total persons (n=1501)	1501	100.0
Gender (n=1501)		
Female	947	52.8
Male	554	47.2
Age (n=1501)		
18 to 34 years	105	28.6
35 to 49 years	237	31.8
50 years and over	1159	39.6
BMI classification category (n=1501)		
Underweight (<18.5)	109	7.6
Healthy weight (18.5-24.9)	423	34.5
Overweight (25-30)	543	36.2
Obese (>30)	426	21.8
Area of residence (n=1501)		
Perth metropolitan	635	77.0
Non-metropolitan	866	23.0
Education level (n=1494)		
Higher education*	1371	97.0
Lower education**	123	3.0

^Numbers may not add up to total sample due to refusal and “don’t know” responses. *Finished Year 11 or 12 with or without a tertiary qualification, finished year 10 and a tertiary qualification or a bachelor's degree. **Finished Year 8 or 9 and does not hold a bachelor's degree.

4. Strengths and limitations

4.1 Strengths

The NMSS is the longest running and most frequent survey in Australia, focussing on nutrition knowledge, attitudes, and behaviours. As a population health survey, it provides information that is critical for planning public health nutrition policy and programs.

The CATI survey mode (which was used by most survey respondents) enables the timing of calls and call-backs to be managed, which may increase the response rate. It may also reduce non-response error, and respondent errors, as each question must be answered before continuing to the next, and unlikely or inconsistent responses can be clarified with respondents at the time of interview.

Utilising the CATI and online modes of survey administration may have contributed to the increased sample size of the 2022 NMSS compared with previous years. The addition of an online platform for survey participants may have enabled an increase in the number of survey participants, particularly those who prefer to complete surveys online in their own time, rather than via the telephone. The online survey method was completed by approximately 30 per cent of the total eligible contacted sample.

The NMSS is designed to examine trends at the population level. The stratified random sampling method and subsequent weighting prior to analysis ensures that the NMSS is representative of the Western Australian adult population.

4.2 Possible limitations

The use of CATI and online surveys are limited to those with a telephone, or access to a reliable internet connection. This will preclude people who do not have access to these technologies.

People of culturally and linguistically diverse (CaLD) backgrounds and Aboriginal people may not find surveys conducted via telephone or online to be culturally appropriate. A lack of infrastructure to support telephone and internet access in remote Aboriginal communities affects recruitment from these populations.

The survey is administered in English. Language barriers may have prevented Aboriginal people and people of CaLD backgrounds from participating in the survey.

The survey may also exclude people with cognitive, intellectual and/or physical disabilities who may not be able to participate without significant assistance and/or a proxy respondent such as a family member or carer.

The NMSS collects self-reported data from participants. Self-reported data may be susceptible to bias such as social desirability bias, whereby the respondent provides a response that is socially desirable which may or may not be true.

The NMSS does not assess achievement of the Australian Dietary Guidelines, as a more comprehensive dietary assessment (for example, multiple 24-hour dietary recalls) is necessary for this purpose. The main use of short questions in the NMSS are to distinguish between respondents with higher and lower intakes, or more and less frequent intakes of selected foods or drinks. Thus, the distribution of responses (by category) is reported rather than the percentage of respondents meeting recommended dietary intakes.

Contact

For more information about the survey, please contact the Chronic Disease Prevention Directorate via email: CDPD.admin@health.wa.gov.au.

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