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WA Health and Wellbeing Surveillance System

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1. Background

As early as 1996, the Australian Health Ministers Advisory Council (AHMAC) created the National Public Health Partnership Group (NPHPG) as a subcommittee whose role was to identify and develop strategic and integrated responses to public health priorities to guide and support governments and service providers; establish two-way exchange with key stakeholders on the development of national public health priorities and strategies; develop better coordination and increased sustainability of public health strategies; and strengthen public health infrastructure and capacity nationally.¹

The Health Administration Review Committee (HARC) report, released in 2001, and the Health Reform Committee of 2004 made a specific recommendation that population health should be a priority areas within the health system.²

On the basis of the HARC report, among other measures, a Population Health Division was formed in the Western Australian Department of Health (DoH). Population based health surveys are important tools to identify, capture and manage a growing evidence base for health policy development and strategic planning. In February 2002, the Minister for Health launched the Western Australia (WA) Health and Wellbeing Surveillance (HWSS) system as an important vehicle for supplying information necessary to monitor population health status.

This report describes the development of the HWSS, the objectives of the data collection system and the methods used to collect, analyse and report on the data.

2. Development of the Health and Wellbeing Surveillance System

The Western Australia Health and Wellbeing System (HWSS) began its development in 2000. As part of an Australian Government Department of Health and Ageing funding initiative, a health and wellbeing survey was conducted collaboratively by

¹ National Public Health Partnership Secretariat, 2000, The National Public Health Partnership, New South Wales Public Health Bulletin, 11(3): 34-37.

² Health Reform Committee, 2004, A Healthy Future for Western Australians, WA Department of Health Perth WA. Available from:

http://ww2.health.wa.gov.au/~media/Files/Corporate/Reports%20and%20publications/PDF/Report_of_the_Health_Reform_Committee.ashx

three jurisdictions: South Australia (SA), Northern Territory (NT), and Western Australia (WA).

There was an opportunity to increase the sample size in WA as the collaborative survey coincided with the next planned state health survey. Accordingly, the WA DoH funded an additional 7,500 interviews.

In addition to providing information about the WA population in its own right, the data from this survey informed many aspects of the development of the surveillance system that came to be known as the Health and Wellbeing Surveillance System. The data was used to:

- establish sample sizes and sample strata
- identify health status indicators and identify gaps
- examine the 'cover' of content areas
- determine which questions were best to capture a particular piece of required information (such as smoking).

3. Questionnaires

People who participate in the HWSS are asked questions on a range of indicators related to health and wellbeing. Topics include chronic health conditions, lifestyle risk factors, protective factors and socio-demographics. The original survey questions were chosen in conjunction with experts both within the WA DoH, the Telethon Institute for Child Health Research and other jurisdictional health bodies, principally NSW Health and the SA Department of Health, to address national and state health guidelines and priority areas. Questions for inclusion in the early stages of the survey development were drawn from a number of sources including publications on national indicators³, specific content area publications⁴ and State based information already available.

³ National Health Performance Committee (NHPC), 2001, *National Health Performance Framework Report*, Queensland Health: Brisbane; Mathers C., Vos T. and Stevenson C., 1999, *The Burden of Disease and Injury in Australia*. cat. no. PHE 17, AIHW: Canberra; Fitzsimmons G., 1999, *Development of National Public Health Indicators: Discussion Paper*. cat. no. AIHW 5204, AIHW: Canberra; Australian Institute of Health and Welfare, 2002, *Chronic diseases and associated risk factors in Australia, 2001*. cat. no. PHE 33, AIHW: Canberra; Australian Institute of Health and Welfare, 2002, *Issues and priorities in the surveillance and monitoring of chronic diseases in Australia: report of a workshop held 9-9 November 2001*, AIHW: Canberra.

⁴ Australian Institute of Health and Welfare, 2003, *Indicators of health risk factors: the AIHW view*. cat. no. PHE 47, AIHW: Canberra; Department of Health and Ageing, 2001, *National Alcohol Strategy: A Plan for Action 2001 to 2003-04*, DoHA:

The HWSS questionnaires are divided into four major age groups and questions change to reflect the life course of individuals. All four questionnaires contain questions in common such as weight and height, for estimating the Body Mass Index, as well as questions that pertain only to that age range. The first questionnaire is for people aged up to fifteen years (child), for whom answers are given by parents or carers. The second questionnaire is for people aged sixteen to twenty-four years (young adult) and ask questions about areas such as physical and mental wellbeing. The third questionnaire is for people aged twenty-five to sixty-four years (adult) and includes questions that place emphasis on psychosocial factors as well as indicators of physical and mental wellbeing. The fourth questionnaire is for people aged sixty-five years and over (older adult). The emphasis in this questionnaire is on chronic diseases, health service utilisation and social isolation as well as indicators of physical and mental wellbeing.

The questions that are included in the HWSS are selected either to provide information about State or national indicators of health and wellbeing, or to provide information about areas of health, lifestyle and demography that are not available elsewhere and are necessary to understand the dynamics of healthy behaviours and outcomes.

As the HWSS is a dynamic system, the topic areas and some questions have changed over time. Amendments in the survey topics or questions are due to changes in health priority areas, changes to national guidelines or in response to research projects. Regular engagement and consultation with stakeholders is undertaken to ensure that the current content of the HWSS is relevant and useful.⁵

A copy of the current questionnaire is available here:

<http://ww2.health.wa.gov.au/Reports-and-publications/Population-surveys>

Canberra; Department of Health and Ageing, 2001, *Alcohol in Australia, Issues and Strategies*, DoHA: Canberra; Department of Health and Ageing, 2004, *National Tobacco Strategy 2004-2009: The Strategy*, DoHA: Canberra; Department of Health and Ageing, 1999, *National Physical Activity Guidelines for Australians*, DoHA: Canberra; National Health and Medical Research Council, 2003, *Dietary Guidelines for Children and Adolescents in Australia* NHMRC: Canberra; National Health and Medical Research Council, 2003, *Dietary Guidelines for Australian Adults*, NHMRC: Canberra; Department of Health and Ageing, 2003, *Healthy Weight 2008*, DoHA: Canberra

⁵ Prior to 2015 engagement with stakeholders was via the HWSS Reference Group with meetings held at the East Perth office every second year (teleconference facilities available). Since 2015 there has been a shift to online consultations which has allowed a broader group of stakeholders across the State to be reached. Another benefit of online consultations is that they can be held on a more frequent basis if necessary, with smaller more focused consultations held as required.

A data dictionary can also be requested for specific modules to provide more detail on historical survey content, current survey content and changes to the data coding in alignment with current guidelines.

4. Survey objectives

Information from the survey is used to monitor the health status of all Western Australians, inform health education programs, evaluate interventions and programs, inform and support health policy development, identify and monitor emerging trends and inform and support health service planning and development.

The general objectives of the HWSS are to:

- monitor the health and wellbeing of Western Australians using validated reliable indicators
- identify health status and lifestyle trends over time
- identify emerging and salient issues in a timely manner
- identify and report on health-enhancing behaviours as well as risk factor behaviours
- ensure that the data collected reflects the need for information within a particular age group.

These broad objectives are further defined into the following aims, which are to provide:

- timely high quality information to inform policy, planning, purchasing and provision of services
- information at health region level, and where possible smaller areas down to SA2 level
- information that is used for population performance indicators
- information that can be used to evaluate long-term effects of programs and interventions
- information about trends over time as well as seasonal trends
- a robust set of baseline health status and lifestyle information for health service managers

- quality data to researchers and health professionals which can be used to support programs, interventions and future initiatives.

These aims have directed the focus of the data collection and the analysis of the data since the survey began its development in 2000.

5. Sample design and selection

5.1. Mode of administration

The HWSS is conducted as a Computer Assisted Telephone Interview (CATI). This type of system has many benefits over other survey techniques, including the traditional telephone interview method.

Advantages of this data collection method include:

- Information can be obtained in a timely manner at the point of interview, negating the need for storage and security of paper forms, transcription/data entry into an electronic format and reminder letters for online or paper forms.
- CATI systems allow for the management of the timing of calls and call-backs.
- Non-response error can be reduced as the next question is not displayed to the interviewer until a valid response has been recorded for the previous question. In addition, respondent error is reduced as responses can be automatically checked against previous questions and seemingly inconsistent responses can be clarified with respondents at the time of interview.
- More detailed and complex information can be collected with appropriate sequencing to define specific populations for questions and to ensure that the questions are appropriate to each respondent's characteristics and prior responses.
- Correct sequencing of questions is possible and, if required, automatic rotation of response categories to minimize response bias.
- Any open-ended responses can also be entered directly and verbatim onto the computer during the interview.

However, it should be noted that a number of potentially important groups are not covered using any CATI or telephone methodology. These include households with no landline telephone or mobile phone, people who are unable to speak the level of

English necessary,⁶ and people who are disabled in a way that precludes response to a telephone survey.⁷ In addition, some Aboriginal Australians may choose not to respond if they don't consider a telephone survey culturally appropriate.

5.2. Sample frame

The sample frame for the HWSS consists of all households listed in the White Pages. The Health Survey Unit received legal advice from the State Solicitor's Office that under s.40 and s.183 (1) of the *Copyright Act 1968* the Department of Health was permitted to extract data from the White Pages.

The decision to use the White Pages rather than a random digit dialling (RDD) procedure or purchased telephone sample was based on several reasons:

- It is a publicly available document which makes it easier to explain to respondents (and more acceptable to them) how their number was obtained.
- It provides geographic information for each phone number which permits the sample to be stratified by region and also allows for approach letters to be sent to the household prior to first telephone contact.
- There are fewer non-operational numbers through the White Pages sample selection, which cut costs considerably.
- Reduces the chance of calling a silent number. This is consistent with research findings.⁸

There are approximately 800,000 records in the 2012-13 White Pages. Over 80 per cent of SA2's in WA had 80 per cent or more coverage when compared with available Census data. In addition, approximately 10 per cent of listed phone numbers in the White Pages are mobile phone numbers.

5.3. Selecting the respondent

The HWSS collects information about people of all ages that are currently resident in WA. Households are selected by a stratified random process⁹ with over-sampling in

⁶ Estimated at 1.6 per cent of the WA population using the 2011 Census of Population and Housing data (ABS)

⁷ Estimated at 3.6 per cent of the WA population using the 2011 Census of Population and Housing data (ABS)

⁸ Wilson D., Starr G., Taylor A. and Dal Grande E., 1999, 'Radom Digit Dialling and Electronic White Pages sampled compared: demographic profiles and health estimates', *Australian and New Zealand Journal of Public Health*, 23(6): 627-33.

⁹ Random sampling methods are well grounded in statistical theory and the theory of probability which allows the results to be projected from the sample to the larger population with known levels of certainty and precision.

rural and remote areas to ensure that valid and reliable estimates can be produced for these areas.

Within each stratum, the sample is randomly extracted from the sample frame on a monthly basis. Once contact has been made with the selected household, an automatic generator will prompt the interviewer to ask if there is a person of a particular age within the house who is available to answer the questionnaire. The generator is weighted to try and obtain a sufficient sample of each of the four age groups – child, young adult, adults and older adult.

If more than one person in the household meets the criteria, the interviewer will ask to speak to the person with the most recent birthday. There is no replacement for people who cannot be contacted or who refuse to participate.

5.4. Summary of sampling methods used for HWSS over time

The sample selection for the HWSS has used a variety of stratified random sampling techniques over time. For example, in 2002 the sample was stratified by metro, rural and remote. From 2003 to 2006, the sample was stratified by health region. Since 2009 the sample has been stratified by metro, Kimberley & Pilbara, and rest of State.

5.4.1 Up to January 2005

Prior to January 2005, the continuous nature of the data collection over the year meant that someone who was not available at first contact was placed back in the queue and repeatedly tried until either contact was made or a proxy refused on behalf of the selected respondent. This method increased the likelihood of getting interviews from people who were away or on holiday when the household was first contacted. At June 30 for the years 2002 to 2004, the sample was allowed to run out completely so that a response rate could be calculated over a twelve month period. A new sample frame was extracted in July of each year and used until the following June. The sample frame was calculated using a 60 per cent contact rate of households, that is, a household where someone answers the telephone. Up to six calls to each household were made to establish initial contact. Once a respondent was selected, up to eight calls were made to obtain an interview.

5.4.2 January 2005 to December 2007

From January 2005 the surveillance system moved to monthly sampling to allow for time series analysis. Monthly samples were extracted using a 55 per cent contact

rate of households. The contact rate decreased by 5 per cent from previous years because the White Pages was no longer available on an updated basis. Up to ten calls were made to establish contact with a household. Once a household has been contacted, up to eight calls were made to obtain an interview unless the selected respondent has refused to participate prior to that.

5.4.3 January 2008 to December 2013

In 2008 permission was granted to transcribe a 10 per cent proportion of the 2008-2009 White Pages to replace the outdated White Pages that was previously used to select sample for the survey. The new sample frame continued to be used on a monthly basis to select the sample on a 51 per cent contact rate. Once a household had been contacted, up to eight calls were made to obtain an interview unless the selected respondent had refused to participate prior to that.

5.4.4 January 2014 onwards

From January 2014 the sample for the HWSS is selected from the 2012-2013 White Pages. The sample frame is used on a monthly basis based on a 45 per cent contact rate. Once a household had been contacted, up to ten calls are made to obtain an interview unless the selected respondent had refused to participate prior to that.

6. Data collection

6.1. Data collection agency

A data collection agency is contracted to conduct the interviews on behalf of the WA Department of Health, Health Survey Unit (HSU).

The data collection agency is responsible for dissemination of the approach letters, conducting the interviews, monitoring call outcomes and providing a complete dataset back to the Department of Health each month. There is regular communication between the data collection agency and the Department of Health when the survey is in the field.

6.2. Interviewers

Experienced interviewers undergo specific training relative to the HWSS and have signed confidentiality agreements in order to conduct the interviews as per our Ethics approval.

As some of the content of the questionnaire has the potential to be upsetting to some respondents, interviewers are provided with telephone numbers that they can give to respondents who either express distress or ask for assistance. Feedback from the interviewers is that few respondents seem overly distressed. However, in the very small percentage of cases where the respondent consistently answered in categories that revealed psychological distress or hardship, the interviewer reads the following sentence:

As some of the questions we have asked may have been distressing or caused some concern for some people, we suggest that you contact Mental Health Emergency Response Line 1300 555 788 (metro) or 1800 552 002 (country) if you feel that you need to discuss some of these concerns with a qualified health professional.

6.3. Quality control

The data collection agency adheres to the National Health and Medical Research Council (NHMRC) guidelines for conducting research with humans and is a member of the Market Research Society of Australia. The data collection agency is also an accredited Australian Market and Social Research Standard (ISO 20252) organisation and undergoes an annual standards audit by an external auditor from

NCS International where a report on audit is provided. Ten per cent of each interviewer's work is randomly selected for validation by the supervisor.

6.4. Approach letter

An introductory letter (Appendix 1), signed by the Director General of the Department of Health, is sent to all selected households with a complete address.¹⁰ It explains the purpose of the survey and alerts the residents that someone in the household will be asked to participate in the survey at some time over the next couple of weeks. The letter provides the contact details (including name and telephone number) of people to contact should they have any concerns or questions about the questionnaire or wish to opt out of the process.

A small brochure providing background to the survey and the interview process is also included with the letter. The brochure (Appendix 2) contains a website address so that people can go online and see what information is being provided from the survey.

6.5. Interview

Interviews are carried out continuously between January and December each year. Collecting data on a monthly basis helps ensure that behaviours influenced by seasonal events or changes caused by intervention initiatives are captured. Where possible, the sample size is similar from month to month but smaller samples sizes are generally provided during time periods with school holidays as it is harder to obtain contact with households.

A personal interview is conducted with the selected adult, and a carer or guardian is asked to respond on behalf of a selected child aged under 16 years. If the person cannot be interviewed immediately, then a rescheduled interview time is made to suit their schedule.

Calls are made between 10:00am and 8:30pm on weekdays and between 10:00am and 4:00pm on weekends unless a special appointment outside these hours is

¹⁰ Due to the lack of a consistent and comprehensive residential mail delivery service, approach letters are not sent to addresses in the Kimberley. Instead, respondents are read out the letter at the beginning of the interview.

requested by the respondent.¹¹ On average, the interview takes approximately 24 minutes to be completed.

In limited circumstances where there are language difficulties, other persons in the household may act as an interpreter if this is suggested by the respondent. If not, arrangements are made where possible for the interview to be conducted by an interviewer fluent in the respondent's own language. However, a formal translation or interpreter process is not pursued due to the high costs.

6.6. Permission to call again

Each respondent is asked whether or not they would agree to being called again on health issues.¹² Those that agree are added to a recall database. The use of this database is strictly controlled and priorities are set to types of usage. The highest priority and main use of the database is for case control studies in emergency situations, such as a food poisoning outbreak; the second priority is for research on surveillance issues (such as the validity and reliability of questions and recruitment for answering extra questions on specific areas); the last priority is for research projects.

6.7. Data linkage

Respondents are also asked whether or not their survey information can be linked with other health data held by the WA DoH. If they agree¹³ they are asked to provide their full name and date of birth for linking purposes. By agreeing to both parts of the request, a double form of consent is obtained. All interviewers are provided with detailed information for any respondent who wishes to know more about the data that will be linked and how the information will be used. To date there have been no complaints about this process.

This specific process is approved under a separate HREC approval.¹⁴

Each data linkage project that requires access to HWSS data for analysis is also required to have separate HREC approval before unit record data is released.

¹¹ This abides with the Telemarketing and Research Calls Industry Standard Variation 11 which are enforceable by the Australian Communications and Media Authority

¹² Approximately 80 per cent of respondents agree to this request and give their first name as a point of contact

¹³ Approximately 70 per cent agree to data linkage

¹⁴ Project number 2013/45: Data linkage of WA Health and Wellbeing Surveillance System

6.8. Response rates

A very important part of any survey is the response rate attained because low response rates may produce estimates that are not representative of the population or that are unreliable or biased. Biases can arise if those people selected for the survey but who do not respond have different characteristics than those who do respond.

Measures taken to encourage respondent participation and maximise response rates include:

- advance notice of a household's selection for the HWSS through the approach letter (see section 6.4)
- highlighting the importance of participation in the survey by outlining key outputs that use the information collected
- acknowledging that all information collected is confidential
- making every effort to contact the household including call-backs and follow-up.

The call results for the HWSS are monitored by the contractor and the Health Survey Unit gets a copy of the call results monthly. Ten calls are made to establish contact to each sample selected for the HWSS. The calls are timed for different hours of the day and days of the week. If there has been no contact made after the tenth call, a non-contact call result code is assigned to that number. The non-contact call result codes are further broken down (e.g. engaged, no answer).

All other numbers are coded as completed, partially completed, refused or unable to participate. If the refusal can't be converted during the initial call, no further attempts are made. No substitutes are interviewed. If the respondent selected is unavailable to interview at any time during the survey period, or unable/unwilling to participate, the call is terminated and coded appropriately.

The eligible sample is calculated in two stages. Table 1 shows an example of a response rate calculation for a typical month of data collection. The first stage is found by subtracting all 'out of scope' numbers from the initial sample frame (line C) and second stage eliminates all numbers that have been called ten times and were not answered at any one of those ten calls (line D). Some researchers recommend

that the number of calls should be 20 before being considered a 'non contact', but research has shown that the prevalence estimates of surveys with very good response rates differ very little from prevalence estimates of surveys with quite low response rates.¹⁵ Similarly, increasing the times a number is called to establish contact does increase the response rate but does not change the prevalence estimates.¹⁶ Given the very high raw response rate, it is not considered necessary to increase contact calls.

The disposition codes used and the different response rates calculated are broadly aligned with the standards outline by the American Association of Public Opinion Research.¹⁷

The willingness of the people of WA to respond to the survey is crucial to the validity of the results. As with any survey, high response rates are important in reducing response bias and ensuring the results from the sample are representative of the population being surveyed. The HWSS consistently maintains a great response rate with a raw response rate around 70 per cent and an eligible sample response rate of approximately 90 per cent. The consistency of the response rates over the year provides an excellent basis for producing reliable estimates. These high response rates are also an indication of the willingness of the people of WA to respond to surveys that they judge to be important.

¹⁵ Keeters S., Miller C., Kohut A., Groves R. and Presser S., 2000, 'Consequences of reducing nonresponse in a national telephone survey', *Public Opin Q*, 64(2): 125-48

¹⁶ Kristal A., White E., Davis J., Corycell G., Raghunathan T., Kinne S. and Lin T., 1993, 'Effects of enhanced calling efforts on response rates, estimates of health behavior, and costs in a telephone health survey using random-digit dialing', *Public Health Rep*, 108(3): 372-79; Davern M., McAlpine D., Beebe T., Ziegenfuss J., Rockwood T. and Call K., 2010, 'Are Lower Response Rates Hazardous to your Health Survey? An Analysis of Three State Telephone Health Surveys', *Health Services Research*, 45(5): 1324-44

¹⁷ The American Association for Public Opinion Research. Standard definitions: final dispositions of case codes and outcome rates for surveys. Revised 2016. AAPOR, 2016.

Table 1: Response rate for a typical month from the WA Health and Wellbeing Surveillance System

A. INITIAL SAMPLE	1,760
UNUSED NUMBERS: A-(B+D+E)	0
B. OUT OF SCOPE	676
B1. Not Connected	557
B2. Not Residential	48
B3. Fax/modem	27
B4. Not household owner/resident	24
B5. Mobile not on at end	20
C. ELIGIBLE SAMPLE: A-B	1,084
D. NON-CONTACTS AFTER 10 ATTEMPTS	102
E. ELIGIBLE CONTACTS	982
E1. Refusals	103
E2. Terminated	0
E3. Foreign Language	19
E4. Incapacitated	48
E5. Respondent Unavailable	6
E6. Answered phone but out of scope	0
E7. Completed interviews	806
F. RESPONSE RATE: $E7/(E+D)*100$	74.4%
G. CONTACTED RESPONSE RATE: $E7/E*100$	82.1%
G. PARTICIPATION RATE: $E7/(E7+E1)*100$	88.7%

7. Survey instrument

7.1. Field testing

The original questionnaire was field tested to ensure that:

- data was obtained in an efficient and effective way
- there was minimum respondent concern about the sensitivity or privacy aspects of the information sought
- there was effective respondent/interviewer interaction and acceptable levels of respondent burden
- operational aspects of the survey were satisfactory e.g. flow of questions, suitability of response options.

When new questions or modules are added to the HWSS, a scaled down version of the field testing is performed to pilot the questions before they are formally added to the data collection. This helps ensure that the questions are not misleading or ambiguous.

After field testing, modifications may be made to question design, wording, ordering or interviewer instructions.

7.2. Reliability testing

In 2000, over 500 people who agreed to be re-contacted (see section 6.6) were called back and given parts of the HWSS interview again. The purpose of re-interviewing people was to test the reliability of the estimates produced. The questions were analysed using Kappa, Weighted Kappa and Interclass Correlations as appropriate. All questions met the minimum reliability standard of 'good' (.6) and most were in the 'excellent' range (.8 or better).

In addition, three field tests were conducted as part of the National Computer Assisted Telephone Interview Technical Reference Group (NCATI TRG). The first two were done collaboratively by WA and SA specifically examining reliability and validity of selected questions typically used on surveillance systems.¹⁸ The third was conducted by the NSW Department of Health on other areas identified as important for producing national indicators.¹⁹ The HWSS uses the information provided by these field tests to refine questions where necessary.

8. Ethics and confidentiality

Prior to 2008, the HWSS was considered by the Department of Health Confidentiality of Health Information Committee (CHIC) and the National Health and Medical

¹⁸ CATI Technical Reference Group, 2003, *Field Test 1 Report: Asthma, Demographic Characteristics and Diabetes* Australian Institute of Health and Welfare: Canberra. Available from:

<http://www.nphp.gov.au/catitrg/documents/fieldtest01rpt.pdf>; CATI Technical Reference Group, 2004, *Field Test 2 Report: Alcohol Consumption, Cardiovascular Disease and Tobacco Consumption* Australian Institute of Health and Welfare: Canberra. Available from:

<http://www.nphp.gov.au/catitrg/documents/fieldtest02rpt.pdf>

¹⁹ Irvine K., Baker D. and Eyeson-Annan M., 2004, *Field Test 3 Report: Cancer – Sun Protection, Injury and Injury Prevention, Musculo-skeletal Disorders, Nutrition & Physical Activity*, NSW Department of Health: Sydney. Available from:

http://www0.health.nsw.gov.au/pubs/2004/pdf/field_testreport.pdf.

Research Council (NHMRC) to be surveillance rather than research. As such, approval from an ethics committee was not necessary.

In 2008 a decision was made to apply for Ethics consideration and approval for the ongoing project was granted by the WA Department of Health Human Research Ethics Committee (Project #2008/11). Current ethics approval is until 9th August 2018 and every year an annual report detailing progress of the program is submitted to the Committee.

The program follows NHMRC guidelines²⁰ and there are strict protocols in place regarding access to the HWSS database and other information necessary for conducting the survey. All information is held in a secure area of the Epidemiology Branch server and access to this area is restricted to those working on HWSS and the Principal Epidemiologist.

With over 90,000 people surveyed since 2002, less than 1 per cent has contacted either the Department of Health or the data collection agency with a concern.²¹ Ensuring the privacy of survey respondents is an ongoing priority. Procedures put in place to ensure the privacy of survey respondents include:

- Only information required to conduct the survey (name and address) are provided to the data collection contractor.
- All mailing lists supplied by Department of Health to the contractor are required to be destroyed upon completion of the survey. Written confirmation that this has happened is provided to the Department and held on file.
- The data collection contractor's personnel are trained in issues related to ethics and respondent confidentiality. Personnel sign a confidentiality agreement that is binding even after they cease employment with the contractor. New personnel are required to sign confidentiality agreements when they start work on the HWSS and these are kept on file.

²⁰ National Health and Medical Research Council, 2007, *National Statement on Ethical Conduct in Human Research*, NHMRC: Canberra

²¹ A contact register is maintained which lists all queries, complaints and other contacts made with the Department of Health in relation to the HWSS. The reason for the call and the action taken are both documented and all callers and concerns are responded to promptly.

- No individual level data is included in reports. Data is not provided at the individual level without appropriate ethics approval.

9. Data analysis

Routine analysis of the HWSS data occurs monthly. The main focus of the monthly analysis is cleaning and coding the data and the calculation of derived variables. Once a full year of data is collected (January to December) the focus of the analysis shifts to obtaining the prevalence or frequency of key variables, cross-tabulations and significance tests and time series analysis.

9.1. Weighting

Prior to analysis, the HWSS data is weighted to compensate for the sampling methods and then standardised to the age and sex structure of the most recent Estimated Resident Population (ERP) for the year of the survey. The details of how the weights are calculated and used in analysis are explained in the Technical Paper Series No. 2: Weighting of data.

9.2. Design effect

The HWSS employs a stratified random sampling technique, with unequal selection probabilities, in order to be cost-effective, efficient and representative. As respondents in the same strata are likely to be similar to each other, selecting an additional respondent from the same groups adds less new information than if the new person had been completely independently selected. Therefore, stratification reduces sampling variation and the more homogenous the strata are, then the greater the gain in precision from stratifying.

The design effect is known as the ratio of the variance of the estimator based on the stratified (or other complex) sample design actually used to the variance of the estimator based on a simple random sample design. Therefore, stratified samples will all have a design effect that is less than one. As a result, the sampling errors (variance) of the survey estimates cannot be computed using the formula found in standard statistical texts, which are based on simple random samples.

To account for the design effect during data analysis, complex survey modules in SAS software are used.²²

9.3. Percentage and prevalence

The information from the HWSS is often presented either as a percentage of the population who have a particular risk factor/demographic characteristic or as prevalence of the population who have a particular health condition. Prevalence is the description of the number or proportion of individuals in a community with a given condition and is usually expressed as a percentage. Prevalence is distinct from incidence, which is a measure of the number of new cases of a condition. Prevalence involves all affected individuals, regardless of the date of contraction, whereas incidence only involves individuals who have newly contracted the disease during a specified time interval. Surveys generally do not collect or report incidence of disease.

There are three main types of prevalence that are typically reported. Lifetime prevalence represents the proportion of the population that have ever had a condition, period prevalence represents the proportion of the population who have a condition within a specified period of time, e.g. twelve months, and point prevalence represents the proportion of the population who have a condition at the time of the survey. With the HWSS, most of the prevalence estimates presented are examples of period prevalence. With some conditions, such as asthma, both lifetime and point prevalence are reported. This is because a person may have had asthma at some point in their life but not have it currently.

9.4. Confidence intervals

Survey results are estimates of population values and will always contain some error because they are based on samples and not the entire population. Therefore, HWSS data is generally presented as the best estimate of the prevalence along with the 95 per cent confidence interval around that estimate.

The 95 per cent confidence interval provides the range of likely estimates within which the true estimate would lie 95 out of 100 times. The wider the confidence

²² Regular statistical software will analyse survey data as if the data were collected using a simple random sampling method. If the design effect is not accounted for in the analysis, the standard errors will be underestimated, possibly leading to results that seem to be statistically significant but aren't really

interval is around an estimate the less precise that estimate is and the more caution that should be applied with using it.

9.5. Sampling error, standard error and relative standard error

Sampling error refers to the measure of variability that occurs by chance because a sample, rather than the entire population, is surveyed. One measure of the likely difference from the figures that would have been produced if all households in WA had been included is given by the standard error (SE). About 95 per cent of the time the difference will be less than two SEs.

Another measure of the extent to which the survey estimate is likely to be different from the actual population result is the relative standard error (RSE). The RSE is a useful measure because it is obtained by expressing the SE as a percentage of the estimate and therefore avoids the need to also refer to the size of the estimate. The smaller the estimate the higher the RSE is.

When using the HWSS data, wide confidence intervals and high RSEs can be present for young age groups (16-44 years) for certain chronic health conditions, due to the fact that they are less likely to be present and detectable at younger ages. It is also possible to see wide confidence intervals and high RSEs for some variables that have multiple response options (4 or more), for example self-reported level of physical activity and fast food intake.

When HWSS data is presented, estimates between 25 per cent and 50 per cent are annotated by an asterisk and should be used with caution. Estimates with RSEs above 50 per cent are withheld as they are considered too unreliable for general use.

9.6. Non-sampling error

As well as sampling error (section 9.5), there may be sources of non-sampling error when using HWSS data. This type of error is not specific to sample surveys and cannot generally be quantified. It can include the following:

- errors related to scope and coverage e.g. if someone was inadvertently included or excluded
- response errors including inaccurate reporting by the respondent
- non-response bias
- processing errors.

The relative importance of these factors can vary between topics, questions and respondents. While some of these errors may occur in an individual respondent's record, they are unlikely to have an impact on survey estimates unless they are repeated commonly throughout the sample. Comments around significant issues that are likely to affect the interpretation of results due to non-sampling error are always provided when HWSS data is reported.

9.7. Comparisons between estimates

To compare estimates between surveys or between populations within a survey, it is useful to determine whether apparent differences are 'real' differences between the corresponding population characteristics or simply the product of differences between the survey samples. One way to examine this is to determine whether the difference between the estimates is statistically significant. Statistical significance is a statement about the likelihood of findings being due to chance.

Confidence intervals are often used to determine if there is a statistically significant difference between two estimates. If the confidence intervals do not overlap, then the estimates are considered to be significantly different.

If the confidence intervals overlap, for general reporting purposes the two estimates are deemed to not be significantly different. However, it should be noted that this is a conservative test of significance that is appropriate when reporting multiple comparisons²³ but that the rates may still be significantly different at the 0.05 significance level. When investigating a single (*a priori*) hypothesis, formal statistical testing (e.g. Chi-square, ANOVA etc.) should be undertaken.

Further information on how to determine whether or not a difference is statistically significant can be found at:

[http://ww2.health.wa.gov.au/~media/Files/Corporate/Reports%20and%20publications/Population%20surveys/2003-Confidence intervals How they work.ashx](http://ww2.health.wa.gov.au/~media/Files/Corporate/Reports%20and%20publications/Population%20surveys/2003-Confidence%20intervals%20How%20they%20work.ashx)

Direct comparison between the HWSS and other national health surveys is, at this stage, not possible due to methodological differences.

²³ When undertaking multiple comparisons, it is more likely that a statistically significant result will occur by chance

9.8. Comparisons over time

One of the strengths of the HWSS is its ability to show changes over time and some data has been collected since 2002. In some instances, the wording of a question may have varied over time. In most cases, however, if a question change was required the previous question was asked for a time to ensure consistency of responses. Some information on chronic health conditions and risk behaviours have not always been asked for all years or all ages which may limit the type of analysis that can be undertaken.

To guarantee any changes in prevalence estimates are not the result of changes in the age and sex distribution of the population, all years presented in trend tables are standardised by weighting them to the 2011 Estimated Resident Population. As a result, estimates presented in trend tables may differ slightly from estimates presented in prevalence tables due to the standardising of estimates to different populations.

Small changes in estimates from those presented in previous reports may also occur due to the standardisation of the estimates using updated population estimates.

9.9. Interpretation of HWSS data

While different reference periods may be used throughout the survey for different topics (e.g. last four weeks, last 12 months), the HWSS provides a 'point in time' snapshot of the health of Western Australians.

The data which forms the HWSS has been collected since 2002 with responses from people of all ages, both sexes and across all of WA. An advantage of continuous data collection is the statistical power obtained as the data set increases over time. This means that health and wellbeing data can also be provided for a defined demographic with analysis of indicators by geography, sociodemographic variables and time series analysis. However, it is important to consider that the power of a survey's results is strengthened through increasing the number of responses. Based on this, when requesting information from the HWSS, users are encouraged to consider a balance between age, sex, time and geography as a means of getting the most useful results for their purpose.

It is also important to note that while major sociodemographic group estimates are possible, it is not the primary purpose of the system. The HWSS is designed to provide information and statistics at the population level.

Therefore while any information based on the HWSS data is representative of the Western Australian population as a whole it is unlikely to be reliably representative of small minority groups within the population such as Aboriginal people, the homeless, those from non-English speaking backgrounds or those without telephones. People requiring information about Aboriginal health are recommended to consult the results of the 2011-13 Australian Aboriginal and Torres Strait Islander Health Survey or the 2014-15 National Aboriginal and Torres Strait Islander Social Survey (source: Australian Bureau of Statistics), which are more representative of that population.

All data is self-reported or reported via proxy and may differ from data sources which use a different methodology (e.g. administrative datasets such as the Hospital Morbidity System). However, a fundamental strength of a population based survey, such as the HWSS, is the ability to use the data to assess the interactions between health related behaviours. Health is influenced by a range of determinants including the social and economic environment, the physical environment as well as a person's individual characteristics and behaviours.²⁴ An information rich surveillance system such as the HWSS can inform policy makers and researchers about interactions in health determinants within the WA population (e.g. smoking status by education or alcohol risk level by psychological distress) which may not be possible only using administrative data.

10. Reporting

10.1. Annual reports

Annual reports presenting information collected from children (0 to 15 years) and adults (16+ years) have been produced by the Health Survey Unit since 2008. These reports are made publicly available on the Department of Health website as well as the intranet. There is usually media interest in their release with a Media Release prepared in collaboration with the Communications Directorate. The Assistant Director General of the Public Health Division is typically the spokesperson for any

²⁴ World Health Organisation, 2013. Health Impact Assessment – the determinants of health. WHO: Geneva.

media requests relating to these two reports. Additional reports are produced on an ad hoc basis.²⁵

10.2. Health profiles

Health profiles for adults aged 16 years and over are made available via the HealthTracks Reporting tool on the Epidemiology intranet and are updated on an annual basis.²⁶ Profiles are produced for health regions, health services, health districts, metro and country, and the State.

10.3. Data requests

For information not contained within the annual reports or health profiles, customised analysis of the HWSS can be undertaken to meet a data request.²⁷

10.4. Performance indicators

Data from the HWSS is also used to report against performance indicators for the Department of Health and other government agencies. Currently, HWSS data is used to produce two quarterly indicators for the Mental Health Commission.²⁸ Information from the HWSS is also presented in the 'WA at a glance' section of the Department of Health Annual Report.

In the past, indicators including the prevalence of smoking and the prevalence of type 2 diabetes have been published in the Department of Health annual report, and indicators on physical activity, obesity and tobacco were used to measure progress against the National Partnership Agreement for Preventive Health.

10.5. Peer reviewed research

A publication register is maintained to monitor peer-reviewed publications that have used HWSS data. Twenty publications have been recorded in the register since 2007.

There have been several applications from academic institutions to access unit record data from the HWSS over the years, sometimes in collaboration with the Health Survey Unit.

²⁵ In 2010 and 2013, a Health Profile of Children and Adolescents in Western Australia was produced and in 2013, a Young Adults Report was produced.

²⁶ Aggregated data over four years are used to produce these profiles. This allows profiles to be generated for the majority of health districts

²⁷ A data request form, available on the Epidemiology Branch intranet or from branch staff, should be completed and emailed to epi@health.wa.gov.au

²⁸ Statewide prevalence of short term and long term risky drinking and prevalence of high or very high psychological distress

10.6. Other

HWSS information is also used for other purposes. For example, prevalence of alcohol consumption is used to inform aetiological fractions calculated by the Epidemiology Branch. The prevalence of risk factors such as physical activity, obesity, nutrition and smoking are also used to inform burden of disease estimates for WA.

Appendix 1: Approach letter

Dear <<Name of householder>>

The WA Health and Wellbeing Surveillance Survey System

I am writing to ask you to take part in an important Department of Health initiative, the WA Health and Wellbeing Surveillance System Survey. The <<data collection agency>> conducts the survey on our behalf. We randomly select households to be part of the survey by using the White Pages. Your household has been chosen to take part.

In the next few weeks, an interviewer from the <<data collection agency>> will telephone your house. The interviewer will ask to speak with one of the people who live in the house. We choose people within age groups, so it may be anyone living in the house from the youngest person to the oldest person.

The interviewer will ask the chosen person to take part in an interview over the telephone. If the person is under 16 years, the interviewer will ask the parent/guardian to answer on his/her behalf. The interview will last about fifteen minutes. All information collected will be strictly confidential. While you do not have to participate, I hope that you do.

We use the results from the survey to keep an eye on the health and wellbeing of all Western Australians. This survey ensures that we have really up-to-date information, which we use to better plan and develop our health services. We want to be more responsive to local needs and it is your response that will help us form a picture about the health of your local community.

If you have any queries about the survey, please call <<manager of data collection agency>> or the supervisor on duty on (08) XXXX XXXX if you are calling from Perth, or on 1800 XXXXXX if you are calling from outside Perth. They will be happy to answer your questions. There is also a contact number on the brochure if you want to speak to someone in the Department of Health.

I would like to thank you in advance for your support and participation in this important initiative.

Yours sincerely

Dr D J Russell-Weisz
DIRECTOR GENERAL

Appendix 2: HWSS brochure

Does it matter who takes part in the survey?

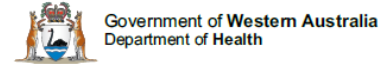
The HWSS is about everybody in WA. This means that we need everyone to help us to build an accurate picture of the health needs of the state. If you have been contacted to take part in the survey, please do. While the survey is voluntary, by taking part you are helping us to plan and provide the best possible health services for our state.

Further information

For more information about the survey visit: www.health.wa.gov.au/publications/popsurveys.cfm or call Department of Health on 9222 4222 and ask for the Epidemiology Branch.

Further information about linking health records can be found on the internet site: www.datalinkage-wa.org or call the Department of Health on 9222 4222 and ask for the Data Linkage Branch.

This project has been approved by the Department of Health Human Research Ethics Committee.



Western Australian Health and Wellbeing Surveillance System



This document can be made available in alternative formats on request for a person with disability.

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ESP-003455 AUG'17

health.wa.gov.au

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Why does WA need a Health and Wellbeing Surveillance System?

In 2002, a Health and Wellbeing Surveillance System (HWSS) began monitoring the health status of all Western Australians.

Every month more than 500 people of all ages are asked to take part in a telephone interview. Those who agree are asked a range of questions about their health and way of life.

The information from the HWSS is very important for identifying the health needs of Western Australians across the State.

How is the information from the HWSS used?

The information from the HWSS is used to:

- monitor the health status of all Western Australians
- identify important relationships between lifestyle choices and health
- identify groups who are at risk of developing health problems
- plan and develop health services to ensure the provision of effective, safe and high-quality health care
- inform health education programs
- evaluate what is already being done in health care
- inform health policy development.



What you will be asked about

Question topics in the survey include:

- health status
- smoking
- physical activity
- nutrition
- alcohol consumption
- use of health services
- sociodemographic information such as age, sex and geographic location.



Other possible uses of information collected in the survey

At the end of the survey, we will ask you if you would agree to be telephoned again at some time to take part in other important health studies. You do not have to participate in the future even if you say yes at this time.

We will also ask for your consent to have the information you provide on the survey linked to other health-related data collections, such as hospitalisation or midwives data. This type of research helps us to identify emerging issues and to plan our services more effectively and efficiently.

All research projects would have approval from a qualified ethics committee and would only use and report on information that was not individually identifiable.

You can request to have a brochure about data linkage sent to you at the time of the interview.



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