Living well in the ACT region survey

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1.0 Overview of the User Guide

This document provides information on the methods used to sample and recruit survey participants for the *Living well in the ACT* survey (*Living well* survey), samples achieved, and weighting used. It also includes information for the second instance of the *Living well in the ACT with a changing climate* survey (Wave 7).

In addition to this User Guide, the following documents are important references to examine when using this dataset:

- Survey questionnaire. The questionnaires administered in each wave of the survey are available as separate documents. Each is available in two versions: a general document with questions provided in easy to read format; and a second that documnts how questions were presented online in Qualtrics for survey participants, and includes information on display and piping logic used in the online survey.
- Metadata. The metadata file provides a list of all variables in the data set for each wave of the survey, and information about measurement. This includes variables constructed based on the data reported by respondents, which are not identified in the survey questionnaires.
- Reports. Reports produced by the University of Canberra from this survey are available at https://www.regionalwellbeing.org.au/reports-to-date/

This User Guide provides an overview of:

- Survey objectives and scope (Section 2.0)
- Questionnaire design and survey platforms (Section 3.0)
- Survey sampling and participant recruitment (Section 4.0)
- Sample weighting process (5.0)
- Timing, recruitment and sample achieved by survey wave (Section 6.0)
- Appendices providing further information on
    - Definitions of ACT regions (Appendix 1)
    - Definitions of indicators produced for the ACT Wellbeing Framework (Appendix 2)
    - Detailed information on sampling, statistical weighting, and the choice of approach to sample recruitment (Appendices 3, 4 and 5).

The User Guide is a living document that is updated regularly. The edition and date identify when this version of the User Guide was produced.

2.0 Survey objectives and scope

2.1 Survey objectives

The objectives of the *Living well* survey are to understand the wellbeing of adult residents living in the Australian Capital Territory (ACT) region of Australia, and factors known to affect this wellbeing that occur at individual, household, community and regional scale.

2.2 Survey scope

The *Living well* survey samples adults aged 18 and older living in the 'ACT region'. The survey is conducted annually during a 4 to 6 week period occurring between October and January, with the exact timing within these four months varying depending on circumstances. In addition, in some years a mid-year survey, or surveys at other times, may be conducted if there is a key reason or compelling needs to collect shorter term data on changes in wellbeing and liveability.

2.2.1 Scope criteria - Participant age

The *Living well* survey examines adult residents only, defined as a person aged 18 or older. Any survey participants who indicated they are younger than 18 are not included in the dataset.

Participants are able to complete the survey without providing their age if they choose, with age being a voluntary question. The start of the survey explains that the survey is restricted to adults, and those who are eligible are asked to click 'next' to start the survey online. Participants are subsequently asked to identify their age. Those who opt not to provide information on their age at this point are retained in the data set. This is to enable dataset users to examine potential response bias associated with the decision to answer questions on age.

Information for users of the metadata & dataset

The variable 'AGEKNOWN' indicates whether the respondent provided information on their age.

When using the dataset, dataset users should identify whether they will restrict the data analysed to only those who have provided information on their age in years, or will also include those who have not provided their age. This decision should be documented when reporting how the dataset was analysed.

2.2.2 Definition of the 'ACT region'

The study region the survey covers is defined as the 'ACT region'. For the purposes of this survey, the ACT region is defined as the Australian Capital Territory (ACT) and surrounding parts of NSW that have high levels of interaction with the ACT, specifically a higher likelihood of accessing services in the ACT (health, education, retail) and of relying on the ACT for employment. The NSW regions included were selected based on those local government areas (LGAs) in which 10% of more of the workforce was recorded in the 2016 ABS *Census of Population and Housing* as working in the ACT were included in the 'ACT region'. This resulted in the study region being defined as the following LGAs/parts of LGAs, and sampling being based on these LGAs:

- Australian Capital Territory (the ACT is a single LGA; sampling within the ACT is typically then stratified based on suburbs, with specific sampling methods described for each wave subsequently in this document)
- Queanbeyan Palerang Regional Council
- Yass Valley Council
- Upper Lachlan

- Hilltops Council
- Snowy Monaro Council (part only), defined as the part covered by postcodes 2620, 2621 and 2622, which are postcodes closest to Canberra and shared by parts of Queanbeyan Palerang Regional Council.

The geographic scope of the survey is explained at the start of the survey, and participants are asked to complete the survey only if they live within the study region. Those who opt to start the survey are subsequently asked to provide information about the geographic location of their home. They are given the option of providing their full address, using an autocomplete address function (the AddressFinder autocomplete service is used for this). If they are not willing to provide their full address, they are then given the option of providing either (i) the nearest street intersection to their home address, or (ii) their suburb/locality name, postcode, and state/territory of residence. This information is then geocoded to various geographic boundaries including:

- Local government area (Australian Bureau of Statistics; refer to metadata file for specific edition of the ASGS used to geocode location)
- State Suburb Code (Australian Bureau of Statistics; refer to metadata file for specific edition of the ASGS used to geocode location)
- Statistical Area 2 (Australian Bureau of Statistics; refer to metadata file for specific edition of the ASGS used to geocode location)

Those people who complete the survey but indicate they live outside the region defined above are removed as invalid respondents, and not retained in the dataset. Those participants who opt not to provide information about their place of residence are retained in the dataset. These respondents are retained as retention both (i) enables some response bias analysis when undertaking analysis of the geocoded sample: this means data set users can opt to analyse this information to identify whether there are systematic biases between those who opt to provide geographic information and those who do not, and (ii) these responses may be useable for some analyses that do not rely on having information the geographic location of the survey participant.

Information for users of the metadata & dataset

The variable GEOGKNOWN identifies whether respondent provided geographic information sufficient to identify whether they were in the study region or not. This can be used as a flag to include or exclude respondents based on whether they provided sufficient geographic information to identify their place of residence, together with other variables that identify the level of specificity of knowledge of the location of the person's place of residence. For example, some participants provided sufficient information to identify that they lived in the ACT but did not provide sufficient information to identify the suburb, SA2 or postcode in which they lived.

Dataset users should identify whether they will restrict the data analysed to only those who have provided information on their place of residence sufficient to geocode them as living within the region, or living within a specific subregion of the study region such as a particular SSC or SA2 region. This decision should be documented when reporting how the dataset was analysed.

2.2.3 Proportion of survey items completed

The final criterion used to define a valid survey participant is the proportion of survey items completed. Similar to the age and geography criteria, participants who have not completed all survey items are retained in the dataset if they have completed more than 10 items. Those who completed only a small proportion of survey items above the minimum valid completion limit of 10 items are retained in the dataset, primarily to enable identification of non-response bias between those who opted to complete all or almost all survey items, and those who did not.

2.2.4 Valid sample definition

For each wave, the confirmed valid sample size is defined as those who met the following criteria:

- Answered question about age and were aged 18 or older AND
- Answered sufficient questions about geographic location of residence to determine person resided within the study region AND
- Completed a minimum of 10 survey items.

Information for users of the metadata & dataset

When using the dataset, dataset users should identify whether they will restrict the data analysed to only those who have completed a specified proportion of survey items, or specific survey items. This decision should be documented when reporting how the dataset was analysed.

The variable VALIDWAVEX identifies whether the respondent met all three criteria for inclusion in the valid sample (age, geographic location and completion of a minimum of 10 survey items), with '1' indicating they met all criteria, and '0' meaning they met some but not all criteria.

3.0 Questionnaire design and survey platforms

3.1 Questionnaire design

The survey is designed to collect data on a range of topics, all focused on constructs commonly associated with different aspects (or domains) of wellbeing. The initial survey items included in Wave 1 were selected based on a review of Australian and international wellbeing frameworks. These helped to identify the most relevant wellbeing domains for inclusion. In subsequent waves, a core set of items was repeated in all surveys, while in each wave additional questions were included to either test approaches to measuring different aspects of wellbeing, or to examine specific topics in greater detail.

Previously validated survey items are used where possible. Where there are no existing validated items, or none that were compatible with the mode of survey delivery, new items are designed. Following development of initial draft content, the survey is finalised in an iterative process in which the draft questionnaire is reviewed by research group members and a small group of people from ACT Government, specific agencies and community groups, who provide comment. New items are pilot tested by a small group of randomly selected previous survey participants (between 10 and 20 people), who are asked to complete the items and provide feedback on whether any of the items are confusing, difficult to understand, sensitive, or otherwise hard to answer. The initial launch of the survey in each wave is then used as a further pilot test, with responses inspected after the first 20, 50 and 100 responses to identify if any adjustments are required to survey items.

3.2 Questionnaire length

The *Living well* survey often contains a large number of questions, and completion of the full survey can take up to one hour. This is the case for the 'long surveys' undertaken at the end of each year; surveys conducted at other times are sometimes significantly shorter (see questionnaires for each wave to see length of questions for each, and the description of each survey wave). As many people are not able to commit this amount of time to completing a survey, a shorter version of the survey is offered as an option online, with all participants asked to choose if they wish to complete the shorter or the longer version of the survey. Those who opt to complete the longer version receive more entries into the prize draw (four) as an incentive to complete the long version, and are also clearly informed of the length of the survey.

Subsequent sections describing each survey wave identify the proportion of survey participants who opted to complete the short versus long version of the survey in that wave.

3.3 Survey platforms

Surveys can be conducted in a range of ways, and the most appropriate will depend on the type of data required to address the research question. These include those administered by a survey collector, and often done face-to-face or by phone, and those that are self-administered, usually on paper, or electronically (e.g. through a website or an app). In the case of the *Living Well in the ACT* survey, participants are able to complete the survey either online or on a paper form.

The online survey is hosted on the website *qualtrics.com*, which provides a platform for designing and administering online surveys. Participants are also given the option of completing a survey on paper. Online surveys work well in areas like the ACT, where internet access is widespread and available to people from most demographics, but the inclusion of a paper survey option recognises that, as de Leeuw and Berzelaz (2016) state, 'the single-mode paradigm, which implies that one data

collection method fits all respondents equally well, no longer applies in the twenty-first century' (De Leeuw & Berzelak, 2016).

The online and opt-in paper options were cost effective (partly due to the relatively small number of requests for paper surveys), and can provide an acceptable level of accuracy (Goel et al., 2015). Online and paper surveys can also help to minimise 'social desirability effects', where a respondent answers survey items based on what they think is the most acceptable rather than how they feel (Heerwegh, 2009; Krumpal, 2013), as they do not require a person to interact with another person when answering survey questions. This approach also minimises 'mode effects', where different surveys delivered in different ways produce different results (Grandcolas et al., 2003; Hennigan et al., 2002): both online and paper surveys involve self-completion without direct interaction with another person.

4.0 Survey sampling and participant recruitment

This section explains the overall sampling strategy of the *Living well* survey, and the methods used to recruit survey participants. Subsequent parts of the User Guide describe the specific participant recruitment methods used in each wave of the survey.

4.1 Overall survey sampling objectives

The *Living well* survey sample is designed to achieve the following goals:

- **A sample of adult residents of the ACT region.** The survey is open only to those aged 18 and older, and participants recruited from the 'ACT region'.
- **Enable comparison of different 'suburb groups' when analysing the sample.** A group of suburbs means a contiguous group of two to four suburbs (two where suburbs have relatively large populations; four for groups of suburbs with relatively small populations).
- **Enable comparison of key groups.** The survey seeks to achieve a sample that enables analysis of a range of groups, including some with relatively small populations relatively to the total ACT region adult population. For these small groups, sampling strategies sometimes require specific sampling amongst a group to ensure sufficient sample, with stratification from existing address databases not sufficient to achieve an adequate sample for those identifying as being, for example, LGBTIQ+, having a disability, or being a carer – all groups for whom the *Living well* survey seeks to report information.
- **Enable use of statistical weighting while reducing risk of error amplification resulting from weighting.** This requires achieving sufficient sample within different identified groups of people to support statistical weighting.

The objectives specified above enable both (i) analysis of specific subgroups and (ii) with use of appropriate statistical weighting, estimates that are representative of the adult population of the ACT region.

Sampling to achieve ability to compare suburb groups

The relative size of the adult population in different ACT suburbs was compared to identify whether simple random sampling would be sufficient to achieve a reasonable sample that was likely to enable analysis of suburb groups (defined as contiguous groups of two to four suburbs). This initial exploration identified that the large differences in size of the adult population of individual suburbs, and of contiguous groups of suburbs, meant that a simple random sample would likely result in some suburban areas having too few responses. Given this, a stratified random sample was initially selected in Wave 1 when selecting the sample to be recruited by direct invitation letter, which over-sampled suburbs with smaller populations, and identified suburbs likely to be grouped together in subsequent analyses. The specific sample sent invitations is described by suburb subsequently in this document, enabling identification of sampling intensities in the initial survey sample. In subsequent waves, the recruitment by region has been designed to maintain sufficient sample of those living in each ACT district, and to ensure that new suburbs being developed are sampled as they grow to enable their inclusion in the survey sample.

Sampling to achieve sufficient sample of key groups

A long-term objective of the survey is to ensure sufficient sample of the following groups to enable analysis of each as an individual group:

- Different age groups, defined as those in differing life stages (no specific age ranges identified). Only one age group was identified as a having a high risk of a sample being achieved that was too small for analysis: those aged under 30. This was considered a high risk due to (i) known under-representation of younger adults in available sample frames, and (ii) the well documented lower participation of younger adults in surveys relative to older adults, which impacts all surveys with voluntary completion.
- Those with a disability. It was considered likely existing sampling methods would achieve a sufficient sample to enable analysis, given that one in five adult Australians has a disability (AIHW 2019). Most people with disabilities are likely to have similar likelihood of participating in a survey to others, however people with specific forms of disability – particularly those reducing ability to read, write and comprehend survey questions – will be under-represented in the survey responses.
- Those in households with lower income or lower education. A common response bias in surveys is bias towards those with higher education. Those on lower incomes may be experiencing stresses that reduce likelihood of participation. However, in a large sample it was considered likely these groups would be sufficiently represented to enable analysis, based on samples achieved in past surveys in the ACT. To increase likelihood of response by these groups, who may have lower interest in completing a survey, a prize draw incentive was included.
- ACT residents who are Aboriginal and/or Torres Strait Islander. It was considered unlikely that a sufficiently large sample of this group would be achieved to enable reporting. Specific investment is needed, and consultation with Elders, to identify appropriate ways to ensure a sample of Aboriginal and Torres Strait Islanders, and to report findings for Aboriginal and Torres Strait Islander people who are living in the ACT. As of the time of this edition of the User Guide, this was an area for which funding was being sought to enable achievement of this objective.

4.2 Survey platforms used and support provided

The *Living well* survey can be self-completed by participants either using an online form (using the Qualtrics survey platform) or a paper form. A computer assisted telephone interview (CATI) method was considered and rejected due to its higher cost, more limited length options, and difficulty achieving sufficient sample of younger people in CATI telephone surveys even when using random digit dialling of mobile phone numbers. In this study, the budget available and survey sample size required to meet objectives meant it was not feasible to achieve desired sample size via CATI or face to face surveys.

The use of online and paper self-complete questionnaires was selected as there is very high internet access and use in the ACT region, with >95% of residents living in households which have good access to high speed internet connection. However, a small proportion will find it difficult to complete online surveys, and for these a paper survey option is provided.

To ensure the sample is not biased to those with online access, the recruitment methods (described in detail in subsequent sections) used are designed to reach people irrespective of whether they have online access – in other words, many of the recruitment methods used invite people to

participate in the survey using methods that do not assume they have internet access and ability to complete surveys online. Specifically, many participants are recruited through mailing letters and/or flyers to their home; they can choose to do the survey online, or to call a Freecall number to ask for a survey pack to be mailed to them. Others are recruited using methods that do assume online access, including social media advertising (see subsequent sections).

A 1800 Freecall number is provided to enable participants who received a letter or flyer to call and request a paper survey, or to ask for other assistance to complete the survey. A long-term objective is to test use of translation of the survey into different languages, and or some options for easier completion of the survey by participants with language, literacy or difficulty interacting with online or paper surveys. Achieving this long-term objective requires increasing funding availability for the survey, to provide the resources required for these efforts.

4.3 Use of refreshing panel survey to achieve cross-sectional and longitudinal sample

As the *Living well* survey seeks to track change in the wellbeing of the ACT population as a whole, and the ACT population is changing over time with both in-migration and out-migration and births and deaths, collecting cross-sectional data over time is best suited to measuring change in the wellbeing of the ACT population.

However, the project also seeks to track not just whether there is change in the population, but also whether this is likely to be a result of (i) changes in characteristics of the population are a whole, resulting from in-migration and out-migration patterns, and/or (ii) changes in the wellbeing of individual residents over time. Analysing this type of question requires at least part of the sample over time to be longitudinal – meaning the same people are asked to continue completing the survey, with their survey responses able to be analysed over time to see how their wellbeing is changing.

Given these two needs, the survey is conducted as a refreshing panel survey. In these surveys, some people are tracked over time but new participants are recruited into each survey to maintain representation of all types of groups in the population. This is more appropriate than a longitudinal approach in which the same people are tracked over time without adding further people into the sample as the population changes.

4.4 Developing recruitment strategies – 2019-2023 testing phase

To conduct a refreshing panel survey, a methodology needs to be developed to guide the selection and recruitment of new participants into the panel, and identify how regularly and how many new participants need to be recruited.

When the *Living well* survey was started in 2019, relatively little was known about the likely willingness of ACT adult residents to participate long-term in surveys, or the types of ACT residents who are more and less likely to drop out of surveys over time. There was also little data available to guide which sampling frames can be used successfully over time to recruit participants: limited sampling frames are available, each with differing known limitations.

Given this lack of knowledge, through the initial waves of the survey a range of participant recruitment methods are being trialled, and types of drop out of existing participants monitored. During the initial waves of the survey, the effectiveness of different recruitment methods in recruiting a sample of ACT adults is being trialled. This enables identification of any groups underrepresented in samples recruited using differing sample frames, which can in turn be used to identify the optimal blend of sample frames to achieve representation of all groups, and to identify

whether recruitment of additional sample in future waves is likely to need to focus on specific groups who are more likely than others to 'drop out' of the longitudinal sample. This will be accompanied by analysis of Census of Population and Housing data to identify longer term trends in the types of people who are more and less likely to in-migrate and out-migrate from the ACT region, which can also inform the long-term sampling strategy for ensuring an appropriate sample over time in a refreshing panel.

4.5 Recruitment strategies – use of blended sampling

A blended sampling approach is used to achieve the *Living well* survey sample in each wave, meaning that more than one recruitment method and sampling frame is used. This is done as no single available sampling frame is sufficient to achieve the desired overall sample. As a result, blended sampling – in which participants are recruited using more than one method, with different methods designed to complement each other – is necessary. This is consistent with growing use of blended samples to ensure all parts of target populations are reached: in particular, blending online survey panels with more traditional recruitment is being used to overcome known limitations in both types of survey sampling (see for example Blom et al. 2016).

Blended samples in and of themselves do not necessarily improve or worsen the quality of survey participation or of the sample achieved. Their effect will vary depending on how well the specific sampling is designed. To design our blended sampling, we evaluated what was known from recent studies on typical response biases when using different sampling approaches. We identified that there was no single recruitment technique that could adequately achieve the full sample needed. For example:

- The best available database of contacts for adults living in the ACT region – the Electoral Roll – even if able to be accessed, at best has coverage of approximately 80% to 85% of ACT adults. It excludes those who are not Australian citizens (as of 2016, this was 12.2% of all adult ACT residents[1]), and is known to have lower representation of younger people who are less likely to enrol to vote, as well as under-representing those who have shifted in recent years (as of 2016, 16.6% of ACT adults reported they lived outside the Australian Capital Territory 12 months prior to the Census[1]; while some of these will have updated electoral roll details, many will not have).
- Several commercial postal databases are available that include a large number of ACT residential addresses. The largest of these identified was the Australian Marketing List *National Residential List*. For the ACT region, it contains contacts for 54,558 ACT households. With the ACT estimated to have 163,539 households as of the 2016 Census, this represents a 33.4% coverage of the ACT population. This list was examined and found to be representative by suburb (having very similar proportions of households by suburb to that indicated in Census data), with the exception of suburbs currently being developed and having first residents move in, where representation was lower. Databases of this type are often biased to those who have lived longer in a region, which typically means a bias to older residents and those who own their home rather than renting. This commercial database was used in initial survey waves, but subsequently replaced by use of the Geoscape Geocoded National Address File (G-NAF) (discussed in subsequent sections).

[1] Data source: ABS 2026 *Census of Population and Housing* data, sourced from TableBuilderPro, examining ACT residents by Australian citizenship and place of residence one year prior to the Census.

Some groups we needed to reach could not be reached using traditional sample frame databases that include a person's name and address (and in some cases other information such as age and gender). In particular, the following groups were very likely to be underrepresented if survey recruitment was based solely on use of the Electoral Roll and/or commercial postal databases: younger people, those who were not Australian citizens, and renters. Given this, other recruitment methods were explored in initial waves of the survey, to identify which would be best suited to identified which could be used to achieve representation of these groups in particular. The recruitment methods tested in initial waves of the survey were unaddressed flyers, stratified selection of names and addresses from a commercial database; stratified selection of addresses (no names) from a geographic address database; social media advertising; bespoke invitation via specific mailing lists; and other advertisement. Each is briefly described below. The description of each survey wave specifies which recruitment methods were used.

Unaddressed flyers

Sending unaddressed flyers to all residences can be a useful way of ensuring equal probability of selection while not having to use a specific sampling frame. Effectively, this approach says the sampling frame is all private address mailing points in a given region. This method has an equal probability of *reaching* all households, whereas the sample frames identified all had large under-representation of key groups, or specific exclusion of some key groups in the case of the Electoral Roll.

As with all methods in a voluntary survey, there is not equal probability of a person living in a household that receives a flyer responding – however past use of flyers to recruit participants in the ACT found the response had good characteristics in terms of representation of key demographics in responses (Schirmer and Mylek 2016).

A key issue with use of flyers is that they cannot be targeted to specific residents in the household. Flyers were trialled in Wave 1 and 2 and encouraged all adult residents of households to participate. Flyers were distributed by Australia Post in Wave 1, and by a commercial advertising mail company in Wave 2. In both waves, the flyers achieved a very low response and were unsuccessful overall in achieving a significant number of responses; younger residents were less likely than older residents to respond to flyer recruitment. Significant incidence of non-delivery of flyers was identified across the study region, meaning there was also low reliability of flyer delivery and it was not possible to assess exact rates of delivery versus non-delivery. Given these issues, the use of flyers as a recruitment method was discontinued after Wave 2.

Commercial postal database

The commercial Australian Marketing List *National Residential List* was used in Wave 1 and 2 to recruit participants. A random sample was selected (see description of sampling in individual waves), and a letter inviting participation followed by a single reminder sent to those selected. This method, as expected, achieved a sample that was significantly biased to older residents and home owners, and to longer term residents of the ACT. It also had many out of date addresses, and multiple people invited to participate were unaware they had been listed in this database and requested to be removed (these requests were passed to the management of the database). Multiple complaints received from those sent letters who advised they had not given permission to be included in the database or wished to be removed from it meant its use was discontinued after Wave 2.

Geoscape Geocoded National Address File (G-NAF) address database

The G-NAF is a database of all addresses in Australia. While it contains the address, it does not contain any information about who resides at an address, meaning it is only possible to send a generic invitation to participate in the survey to an address selected from this database, addressed to 'the resident'. From Wave 3 onwards, one of the primary methods used to recruit new participants was selecting a stratified random sample of addresses from the G-NAF database, after first excluding from the database addresses that were commercial or otherwise not residential addresses. Those addresses selected were sent a letter inviting adult residents residing at the address to participate in the survey. The letters were unaddressed, and invited adult members of the household to participate in the survey. They clearly identified that the names and identifying information of residents of the household were not known to the researchers. This achieved a sample more representative of the ACT adult population compared to the AML *National Residential List*, including greater participation of renters, more recently arrived residents, and younger adults. Use of this method significantly reduced complaints received by phone and concerns about recruitment. This method was also more successful in sampling those living in recently established suburbs, compared to the commercial postal database. This method will continue to be used in future waves.

Social media and media advertising

Social media advertising can reach large numbers of people, with more adult ACT residents likely to be checking at least one major social media platform daily than are included in most commercial mailing, phone or email databases traditionally used for survey recruitment.

With 83% of Australians aged 14 and over (17.1 million) visiting Facebook at least once every month as of early 2019 (shortly after the survey was undertaken), and 8 million visiting Instagram in an average 4 weeks (a majority of whom also access Facebook), these platforms have high coverage of Australian adults (Roy Morgan 2019). However, as with all other methods, there is a portion of the adult population not likely to be reached through recruiting participants by advertising on these platforms. These sites are more often used by Generation X (87%), Gen Y (86%) and Baby Boomers (86%). Pre-Baby Boomers (born 1944 or earlier) had only 65% use of Facebook as of 2019, and Gen Z (born 1997 onwards) had 82% usage (Roy Morgan 2019). Instagram, meanwhile, is largely skewed to Gen Z and Gen Y.

Social media advertising can provide a way to reach some of the groups who would otherwise be under-represented in the survey sample. These ads can be targeted to display to a 'quasi-random' group of people by specifying the regions and demographics of people to whom ads should be displayed, which can reduce any skewing effects from the algorithms used by social media companies to display.

Social media advertising was hypothesised to be more likely to achieve survey participation amongst younger adult cohorts, even when advertising specifications specified ads should be displayed to adults of all ages and not specifically used to recruit younger participants. This was confirmed in testing of social media advertising. Social media advertising on Facebook and Instagram was used to recruit participants in Waves 1, 2 and 3, but not in Wave 4. Those who responded on social media were on average younger, and were more likely to be female, compared to those who responded to other survey recruitment efforts. The sample in Wave 4 – when social media advertising was not used - had a noticeable decline in younger participants, due both to survey drop out and some previous participants shifting away from the study region, with younger residents more likely to shift to a new region. In Wave 5, specific advertising on Facebook community groups was tested as a

different way to recruit participants, with a goal of identifying the demographics most likely to be reached by specifically placing notices about the survey on suburb/ACT region specific community Facebook pages which have high membership amongst the resident population. For example, the 'Weston Creek Community Noticeboard' Facebook group as of January 2023 had 6,300 members resident in Weston Creek suburbs – a large number. This advertising was successful in achieving some survey participation, however not as successful as advertising to individual social media feeds.

In Wave 2 and Wave 7, a combination of media and social media advertising by the RiotAct was also tested. This similarly achieved an increase in the sample of young people, with most achieved through social media advertising and click throughs from social media posts by the RiotAct.

Overall, the findings suggest a need to continue use of social media advertising for recruiting new participants in each wave as part of the refreshing panel approach. However, a dynamic strategy will be needed in which additional social media platforms are considered for advertising as popularity of different platforms changes. In addition, changes in algorithms used to display ads on different platform are not generally transparent and their effect difficult to track as a result.

Specific mailing lists and recruitment methods

Some key groups remain insufficiently represented in the sample when using the whole of population methods identified above. In particular, some groups need to be deliberately oversampled in order to ensure a sufficient sample to be able to report on wellbeing of these groups. These include:

- Young adults who have moved recently to the ACT – many of whom are university students
- ACT residents who are Aboriginal and/or Torres Strait Islander
- Some of those who speak English as a second language, particularly if English literacy is limited
- People living with some types of disability, particularly those affecting communication and ability to complete a written survey (whether online or on paper).

To achieve an improved sample of these groups, bespoke recruitment methods are being trialled as part of the *Living Well* survey.

In some waves, university students have been recruited via items in weekly newsletters emailed to all students by the University of Canberra, as well as items included in CIT and the Australian National University. This was successful in increasing sample of often transient university students who make up a significant proportion of younger adults living in the ACT region, and will be continued given this.

Tracking how survey participants were recruited

In every wave, participants are asked to identify which ways they heard about the survey when completing the survey. Additionally, when using mailouts to specific addresses, a unique code is provided on the individual invitations that participants are asked to enter when completing the survey. Not all survey participants choose to answer these questions: some participants opt not to identify how they heard about the survey. For example, in Wave 1, those who were invited to participate using a letter were provided a unique code to enter when completing the survey online. In total, 2,068 respondents did this, enabling identification of response. A further 334 indicated they

had heard about the survey via being sent a direct invitation letter, but did not enter the letter code. These participants are retained in the master data file, for the following reasons:

- For some analyses that do not require weighting of responses, it may not be necessary to know the recruitment method – hence these participants can be considered valid participants for some forms of analysis
- If weighting uses weights against benchmark population only (rather than a two-stage weighting process of weighting by recruitment probability followed by post-hoc sample bias correction), it is possible to include many of these respondents as many provided sufficient information to enable weighting against benchmark target population data.
- Many of those who did not indicate how they heard about the survey did provide an email address and permission to be contacted for follow-up waves, and thus can form an important part of longitudinal data sets going forward
- Retaining these participants enables subsequent analysis of potential bias in those who opt to identify how they were recruited or not, which can be used to inform design of model-based weighting.

4.6 Other methods implemented to increase participation in the survey

Methods used to increase likelihood of survey response from those who received invitations to participate include specific design of wording in invitation letters, use of survey reminders, provision of a prize incentive, and media promotion to increase familiarity with the survey and likelihood of response to invitation.

5.0 Sample weights

The *Living Well* survey is used to generate insights into the adult population living in the ACT, as well as to conduct broader analyses that include all respondents (including those living in NSW parts of the region). When generating data for the ACT, statistical weighting is used to address differences between the sample of people who respond to the survey, and the characteristics of the ACT adult population.

The *Living well* survey recruitment methods result in a sample that is not representative of the ACT adult population, both by design and due to response bias. Model-based statistical weighting is used to weight the sample achieved in each wave, using a single step weighting process. Weights are calculated in a single stage that adjusts the sample to match known population benchmarks. This addresses both sampling design – some regions are sampled more intensively than others – and differences in the distribution of responses obtained (e.g. the sample achieved typically has a higher proportion of women than the ACT population). This is an appropriate method for reducing bias in non-probability and blended samples (such as this) where the probability of an individual being selected into the survey may not be known (Baker et al., 2013). The dataset is weighted as a blended sample, in which the weighting process is applied to the pooled sample achieved across all recruitment techniques, rather than to each individual sample recruited in different ways. This approach is used as assessment of responses suggests that, after correcting for the variables included in the superpopulation, there is sufficient similarity in responses of participants recruited in different ways to support weighting the sample as a pooled sample. Weighting a pooled sample reduced risk of introducing error due to weighting small groups of people. See Appendix 4 for a more detailed description of the weighting approach used, and why a single step superpopulation model-based weighting approach is used.

Survey weights are developed using a raking/rim weighting approach where weights are developed iteratively using one weighting variable at a time. For Waves 1 to 4, the STATA rake weight function was used. From Wave 5, the SPSS rake weight function was used. This approach was chosen because it provides a good compromise between accuracy of the weights and avoiding issues that can occur in cell weighting where the sample is 'spread too thin' (Battaglia et al., 2009), causing some cells to have very low counts, which results in unrealistically high weights for some respondents.

The benchmark data set used is the Australian Bureau of Statistics (ABS) *Census of Population and Housing* and, from Wave 5, the ABS *Estimated Resident Population* data series. For Waves 1 to 4, the 2016 Census of population and housing was used for benchmark information, as it was the most recent data available. From Wave 5, the 2021 *Census of population and Housing* was used, together with the most recent estimates of total population by age from the *Estimated Resident Population* data series.

To select appropriate benchmarks, an initial analysis was undertaken that examined the extent to which the sample from Waves 1 and 2 differed to the adult population of the region in terms of (i) region lived in, (ii) gender, (iii) age group, (iv) whether English was the main language spoken at home, (v) highest level of educational attainment, defined as whether a person had a tertiary level qualification or not. This comparison, shown in the table below for the 2016 Census of Population and Housing and the first two waves, shows that the sample achieved differed to some extent to the distribution of the adult population, although in many cases by a relatively small amount. The largest bias was related to (i) age, with younger people significantly less likely to respond to the survey compared to older people relative to their distribution in the population, and (ii) educational attainment, with those with higher educational attainment more likely to respond.

Comparison of Wave 1 and 2 Living well survey respondents to the ACT adult population, based on the 2016 ABS Census of Population and Housing

Region	Wave 1 - n	Wave 1 - %	Wave 2 - n	Wave 2 - %	ACT adult population[a], 2016 n	ACT adult population[a], 2016 %
Belconnen E.	197	6.3%	107	6.6%	14537	4.8%
Gungahlin	395	12.6%	219	13.5%	46523	15.3%
Inner Belconnen	346	11.0%	210	12.9%	31157	10.3%
Inner North	166	5.3%	83	5.1%	24847	8.2%
Inner South	181	5.8%	88	5.4%	22069	7.3%
Molonglo	36	1.1%	26	1.6%	3537	1.2%
North	221	7.0%	118	7.3%	20375	6.7%
Others parts of the ACT	10	0.3%	3	0.2%	1828	0.6%
Outer Belconnen	310	9.9%	179	11.0%	29335	9.7%
Tuggeranong Nth	361	11.5%	178	10.9%	30124	9.9%
Tuggeranong Sth	371	11.8%	178	10.9%	34810	11.5%
Weston Creek	233	7.4%	106	6.5%	17589	5.8%
Woden Valley	314	10.0%	132	8.1%	27347	9.0%
Gender						
Female	1,991	54.2%	1,123	60.8%	156398	51.4%
Male	1,675	45.6%	709	38.4%	147675	48.6%
Other	8	0.2%	16	0.9%	N/A	
Age group						
18-29	191	5.3%	201	11.0%	73375	24.1%

30-39	337	9.3%	227	12.4%	62411	20.5%
40-49	449	12.4%	234	12.8%	53735	17.7%
50-59	645	17.8%	343	18.8%	46055	15.2%
60-69	942	26.0%	409	22.4%	36020	11.9%
70-79	791	21.8%	325	17.8%	20536	6.8%
80-89	242	6.7%	85	4.7%	9597	3.2%
90-100	32	0.9%	3	0.2%	2315	0.8%
CALD						
Speaks English at home	3,307	90.0%	1,676	91.1%	219024	72.0%
Speaks another language at home	367	10.0%	164	8.9%	85049	28.0%
Education						
Bachelor's degree or higher	2,171	59.1%	1,175	63.9%	117919	38.8%
No degree	1511	41.1%	673	36.6%	186154	61.2%

[a] The benchmark data were all based on data for the adult population of the ACT in the 2016 ABS Census of Population and Housing. Data for the ACT adult population were accessed via ABS TableBuilderPro through construction of custom tables.

Based on this initial examination, weights were developed based on sex, age, region, education and cultural background. These benchmarks were chosen because there were considerable differences between the sample proportions and those from the census, and the numbers of survey respondents in each categories were sufficient to reduce the risk of extremely high weights being calculated for individuals with uncommon demographic characteristics. Benchmarks were subsequently updated when data were released for the 2021 Census of Population and Housing.

Education was assessed using university qualification, where there was considerable difference between the *Living well* survey sample and the ACT population as a whole, rather than Year 12 completion, due to the high rate of high school completion in the ACT.

A number of potential sources of bias cannot be weighted for as no suitable benchmark data were available, including subjective wellbeing, mental health, personality type, etc. This is an issue in all surveys of this type.

In each wave, the rake weights developed are tested to identify whether any outlier survey responses cause significant bias when weighted. Winsorising of weights is used to address any outlier effects identified, in which the weight assigned to any individual respondents is cut off at a specified maximum value to reduce risk of outlier effects. This value is set at a maximum weight of 5 unless otherwise specified.

6.0 Description of data collection by survey wave

This section describes the specific survey timing, participant recruitment, sample achieved, and weighting for each wave of the survey. It is updated as each wave is conducted. On occasion, information for an earlier wave may be updated if an issue is identified or a method changes. For example if new weights are generated for a wave of the survey, information about the generation of statistical weights will be updated.

6.1 Wave 1 (data collected November and December 2019)

Survey timing

The survey was open from November 11th 2019 to December 20th 2019. The first week was used for pilot testing with little active recruitment of participants occurring during this time.

Survey platforms

The survey could be completed either online or as a paper survey. In total, 181 people opted to complete a paper survey; all other participants completed the survey online.

Survey length

Participants who completed the survey online could opt to complete a short version of the survey or a long version. The paper version of the survey contain the questions included on the short survey.

In total, of the online participants in Wave 1, 2912 chose to complete the long survey, 805 chose to complete the long survey, and 12 people did not answer the question about survey length (those who did not choose to answer this question were displayed all questions in the long version of the survey).

Participant recruitment

Addressed mailout

This was stratified by suburb and town to ensure responses were received from across the ACT region. Potential participants were sent a letter inviting them to participate that included a unique code used to identify them. A reminder letter was sent approximately 2-3 weeks after the first invitation

Unaddressed flyer

Australia Post can deliver unaddressed flyers to all mailing point in a region, including all postal boxes and letter boxes. Australia Post were contracted to deliver flyers to all addresses in the study region (the ACT and all LGAs in the ACT region as defined earlier). The majority of flyers were delivered, however, flyers were not delivered to addresses with a 'no junk mail' sign on the letterbox (around 20-25% of letterboxes) due to an error (survey mail from an educational institution may be delivered to these letterboxes). Additionally, up to a further estimated 10-20% of eligible letterboxes did not successfully receive flyers, which were sent in December during what is traditionally a very busy postal period. This is estimated based on feedback from a group of residents who were used to track success of delivery. This group of approx. 35 people, living in different parts of the study region, was asked to report whether they successfully received a flyer or not. Based on their feedback, together with flyers not being delivered to 'no junk mail' addresses, flyers reached an estimated 55-70% of households in the study region. It is not possible to identify the bias introduced by the lack of delivery to some households. There were no specific patterns of suburbs in which deliveries were poorer with lack of delivery tending to occur more on specific postal runs within suburbs, for example when a postal worker had run out of flyers and did not collect more. There is no available evidence on whether those with 'no junk mail' signs are more likely to have particular demographic characteristics. Flyers did successfully reach more recent residents of the ACT and renters in addition to the homeowners and longer-term residents the addressed mailing reached, thus reducing bias towards these groups in the sample achieved. However, they were not as effective as intended due to the large number of households who did not receive a flyer.

Social media advertising

Social media recruitment involved placing advertisements on the *Facebook* and *Instagram* social media networks. Two criteria were specified for the ads: they were displayed to people located in the study region, and stratified to be displayed around twice as often to those aged 40 or younger as to older age groups. This was done specifically to address the expected bias to older respondents in responses achieved using flyers and direct mailing. The social media advertising was displayed for a period of two weeks only, as an initial test to identify whether any sample could be recruited using this approach.

Strategies to increase response

The use of multiple sampling strategies was also done to enable overall improvement in response rates through the reinforcing effects of being invited to participate in the survey using multiple methods. Flyers acted as an additional reminder to participate in the survey for those who had already received a direct letter inviting them to participate, for example. A person who saw an ad on social media may have subsequently received a flyer. This may have had a reinforcing effect, such that had they been exposed to only one form of survey promotion they would not have completed the survey, but exposure to two or more may have encouraged them to participate (Schirmer, 2009).

Prize draw

A prize draw of $6,000 was offered, with winners having a choice of a Flight Centre, Coles-Myer, WISH or Bunnings gift cards, and prizes as follows: first prize $2,000; second prize $1,000; third to sixth prize $500, 10 runner up prizes of $100.

Sample

The total valid sample achieved was 3,910.

The large majority of participants were recruited via addressed postal letter (2402) and unaddressed flyer (1183, of which 1040 were recruited solely via the flyer and did not hear about the survey via other methods). Only 164 participants were recruited using other methods such as social media advertising. These 164 represent a non-probability sample for which it is not possible to identify probability of selection: depending on the type of analysis used, they may be removed from or included in the sample. The table on the next page summarises responses by recruitment method. Appendix 3 provides a detailed summary of survey recruitment by addressed invitation letter mail out and unaddressed flyer.

					Recruitment method										
					Letter			Flyer				Other			
	Group	Total valid respondents[1]	Respondents who provided no information on how recruited to survey	Total respondents with valid recruitment data	Direct letter - total	Provided valid code from letter	Did not provide code	Flyer total	Flyer only	Flyer + other methods	Other - total	Email from UC	Email from other	Social media	Radio/ TV/ news-paper
	All respondents[1]	4027	408	3619	**2,402**	2,068	334	**1,183**	1,043	140	**233**	72	16	53	24
Gender	Females	1,984	32	1952	**1,204**	1,037	167	**729**	649	80	**120**	27	13	33	15
	Male	1,665	31	1634	**1,175**	1012	163	**446**	387	59	**110**	45	3	19	9
Age group	Aged 18-29	191	5	186	**47**	41	6	**114**	111	3	**29**	2	2	19	1
	Aged 30-49	785	17	768	**338**	310	28	**400**	379	21	**55**	9	3	22	1
	Aged 50-64	1,087	19	1068	**735**	640	95	**339**	305	34	**43**	17	2	8	5
	Aged 65+	1,561	19	1542	**1,248**	1051	197	**312**	231	81	**102**	43	7	4	17
Local government area	Unincorporated ACT	3,206	160	3046	**1,986**	1713	273	**1,028**	908	120	**199**	56	15	48	23
	Queanbeyan-Palerang Regional (A)	320	23	297	**224**	194	30	**71**	62	9	**18**	8	1	2	0
	Yass Valley (A)	153	5	148	**114**	98	16	**38**	33	5	**3**	3	0	0	0
	Hilltops (A)	33	1	32	**27**	25	2	**6**	5	1	**1**	0	0	0	0
	Upper Lachlan Shire (A)	40	2	38	**35**	32	3	**6**	3	3	**1**	1	0	0	0
	Snowy Monaro Regional (A)	23	1	22	**5**	4	1	**17**	15	2	**3**	1	0	0	0
	Other LGA	6	0	6	**4**	2	2	**0**	0	0	**2**	0	0	1	0
Region within Unincorporated ACT	Belconnen E.	199	10	189	**117**	107	10	**67**	61	6	**17**	5	1	4	1
	Gungahlin	395	27	368	**191**	158	33	**173**	160	13	**19**	7	2	6	2
	Inner Belconnen	355	15	340	**254**	226	28	**84**	68	16	**21**	2	1	6	5
	Inner North	170	10	160	**96**	81	15	**58**	51	7	**20**	9	2	5	1
	Inner South	187	5	182	**130**	106	24	**55**	46	9	**9**	2	0	2	1
	Molonglo	36	4	32	**11**	8	3	**17**	17	0	**4**	1	0	1	1
	North	225	10	215	**120**	109	11	**92**	86	6	**12**	4	0	1	0
	Others - ACT	12	0	12	**10**	9	1	**3**	2	1	**0**	0	0	0	0
	Outer Belconnen	322	9	313	**225**	200	25	**86**	72	14	**17**	4	3	7	2
	Tuggeranong Nth	368	11	357	**241**	199	42	**117**	104	13	**17**	2	3	4	2
	Tuggeranong Sth	381	33	348	**233**	201	32	**108**	97	11	**19**	2	2	6	1
	Weston Creek	240	13	227	**157**	133	24	**73**	59	14	**18**	7	1	0	3
	Woden Valley	316	13	303	**201**	176	25	**95**	85	10	**26**	11	1	6	4

[1] This includes all respondents who answered at least 10 items on the survey. Some of these did not provide information on their geographic location, age or gender, and hence totals in the subcategories provided below add up to a smaller numbe total number of respondents. As multiple analyses are expected to be undertaken with the dataset, and not all will rely on having data on a person's geographic location, gender, or age, these responses are retained in the master dataset. Anyone undertaking analysis should identify which of the respondents are considered valid respondents for purposes of their analysis, and create a specific dataset containing only those respondents who have valid responses for purposes of the specific an being undertaken. Additionally, retaining respondents who have not provided complete responses enables better examination of likely patterns of missingness in the dataset that would not be possible if these respondents were removed. As patte missingness will vary depending on the subset of survey variables a person is examining, it is recommended that for any specific analysis of a subset of variables a unique investigation of patterns of missingness be undertaken.

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2016 ABS Census of Population and Housing for the adult population of the ACT. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and country of birth, described in detail below.

Weights were based on the following benchmarks from the 2016 Australian Bureau of Statistics Census of Population and Housing.

Region allocation

ACT regions (a description of suburbs included in each region is provided in Appendix 1)

- Belconnen E.
- Gungahlin
- Inner Belconnen
- Inner North
- Inner South
- North
- Outer Belconnen
- Tuggeranong Nth
- Tuggeranong Sth
- Weston Creek and Molonglo
- Woden Valley

To weight data, respondents were allocated to regions based on the locational information provided in the following order:

- Where a valid full address was provided respondents were allocated to a region using the geographic coordinates of their address.
- When a respondent declined to provide their full address, but did provide the closest street intersection to their house, their location was imputed as the address nearest the intersection. This was then allocated to a region using the coordinates of that address.
- When a respondent provided a suburb only this was matched to a region using a list.

The very small number of ACT survey respondents who were not in one of these suburbs were allocated to their nearest region.

Gender

The survey allowed respondents to report their gender in four categories: female, male, other (e.g. gender-fluid, inter-gender, no gender), or they could decline to answer by selecting 'prefer not to answer'. Benchmark data available from the ABS only allowed us to weight by male or female, and those who did not select either of these could not be weighted using the standard method. Weights were allocated to these participants by assuming a weight of '1' for gender and weighting based on all other criteria.

Age

Respondents were asked to provide their age in single years. Ages were coded to four age groups for weighting: 18-34, 35-54, 55-74, and 75 to oldest.

Education

Two groups were identified:

- Does not have tertiary qualification
- Has one or more tertiary qualifications.

Respondents were asked to state if they had attained an undergraduate or postgraduate university qualification. Those who had either one of these were assumed to have attained a bachelor's degree or higher. Those who neither of these were assumed not to have.

Country of birth

Respondents were asked if they were born in Australia, and, if not, which country they were born in. These were coded to two groups for weighting: Australia and other main English-speaking countries and non-English speaking countries. Main English-speaking countries other than Australia are the UK, Ireland, New Zealand, Canada, the United States, and South Africa.

All benchmarks are based on ACT residents aged 18 to the oldest age in the Census.

As discussed earlier, weights were calculated using an iterative 'raking' approach. An example of this is provided below.

The first variable to be adjusted by was gender. The benchmark population was 51.54% female and 48.46% male, while the sample population in wave 1a was 53.77% female and 46.23% male. To adjust for this, the following formulae were applied:

$$Female\ gender\ weight\ 1 = (.5154/.5377)$$

$$Male\ gender\ weight\ 1 = (.4846/\ .4623)$$

After applying this weight, the proportion of male and female respondents in the sample matched the benchmark, but there were still differences in the other variables. The next variable to be adjusted for was age. To do this, proportions in each age group were calculated *with the gender weight applied*. The benchmark population was 34.97% 18-34, 35.27% 35-54, 23.04% 55-74, and 6.71% 75-100. The weighted sample population was 9.28% 18-34, 25.35% 35-54, 49.20% 55-74, and 6.71% 75-100. To adjust for this, the following formulae were applied:

$$18\text{-}34\ age\ weight\ 1 = gender\ weight\ 1 * (\frac{.3497}{.0928})$$

$$35\text{-}54\ age\ weight\ 1 = gender\ weight\ 1 * (\frac{.3527}{.2535})$$

$$55\text{-}74\ age\ weight\ 1 = gender\ weight\ 1 * (\frac{.2304}{.4920})$$

$$75\text{-}100\ age\ weight\ 1 = gender\ weight\ 1 * (\frac{.0671}{.1617})$$

The age weight now adjusts the sample by age and gender. The above process is repeated for the next variable, region, then education, then background. Once the sample has been adjusted, the distribution of each weighted is compared to the benchmark and if it is not acceptably close the process is repeated. In Wave 1 of the ACT survey, four iterations were required to obtain the weights shown in the two tables on the next pages.

Benchmark and sample populations for weighting – Wave 1 – all ACT respondents

	Benchmark		Wave 1 - all ACT respondents				
	n	%	n	%	Weighted n	Weighted %	Diff.
Gender							
Female	155775	51.54%	1590	53.77%	1525	51.57%	-0.03%
Male	146475	48.46%	1367	46.23%	1432	48.43%	0.03%
Age							
18-34	105692	34.97%	278	9.40%	1034	34.96%	0.01%
35-54	106593	35.27%	756	25.57%	1043	35.26%	0.01%
55-74	69631	23.04%	1449	49.00%	682	23.05%	-0.01%
75-100	20285	6.71%	474	16.03%	199	6.72%	-0.01%
Region							
Belconnen E.	14537	4.81%	188	6.36%	142	4.80%	0.01%
Gungahlin	46523	15.39%	358	12.11%	455	15.39%	0.00%
Inner Belconnen	31157	10.31%	332	11.23%	305	10.30%	0.01%
Inner North	24847	8.22%	157	5.31%	243	8.22%	0.00%
Inner South	22069	7.30%	182	6.15%	216	7.30%	0.00%
North	20375	6.74%	210	7.10%	199	6.74%	0.00%
Outer Belconnen	29335	9.71%	302	10.21%	287	9.71%	0.00%
Tuggeranong Nth	30124	9.97%	342	11.57%	295	9.97%	0.00%
Tuggeranong Sth	34810	11.52%	341	11.53%	341	11.52%	0.00%
Weston Creek and Molonglo	21126	6.99%	249	8.42%	207	6.99%	0.00%
Woden Valley	27347	9.05%	296	10.01%	267	9.05%	0.00%
Education							
No degree	184550	61.07%	1147	38.79%	1806	61.06%	0.01%
Has degree	117667	38.93%	1810	61.21%	1151	38.94%	-0.01%
Background							
Born in English-speaking country	216067	71.49%	2618	88.54%	2114	71.49%	0.00%
Born in non-English speaking country	86150	28.51%	339	11.46%	843	28.51%	0.00%

6.2 Wave 2 (data collected March-April 2020)

Survey timing

The survey was open from February 21st to April 30th 2020. The first week was used for pilot testing with little active recruitment of participants occurring during this time. The data collection occurred during the first COVID-19 lockdown in Australia, and also occurred after the Black Summer bushfires, which caused significant smoke pollution in the ACT for extended periods of time during late 2019 and early 2020, and after the significant hailstorm that caused widespread damage in many parts of the ACT on January 20th 2022.

Survey platforms

The survey could be completed either online or as a paper survey. No paper surveys were completed with all participants completing the survey online.

Survey length

Participants who completed the survey online could opt to complete one of three lengths of survey: short, long or 'extra long'. The extra long version included all questions from Wave 1 as well as all those from Wave 2, while the other versions did not include all questions that had been asked in Wave 1. Those who were 'repeat' participants who had completed Wave 1 were asked to complete the short version of the survey.

Participant recruitment

Previous participants

Participants who had taken part in Wave 1 and given permission to be contacted for future surveys were contacted and invited to take part in the survey. These invitations were sent by email via Qualtrics, unless a person had indicated a preference to receive a paper copy of the survey. Paper copies were mailed to the small number of people who opted for this, with all of these also informed of how they could complete the survey online if they wished. Up to three email reminders were sent to those who had not yet responded to the survey.

Addressed mailout

No addressed mailout was used for Wave 2, due to significant delays in addressed post during the first COVID-19 lockdown. Instead, unaddressed flyers, social media advertising, and online advertising were trialled to achieved survey responses.

Unaddressed flyer

For Wave 2, a different method for distributing unaddressed flyers was used, with a commercial unaddressed mail company contracted to deliver flyers to all letterboxes in the study region, excluding those with a 'no junk mail' or similar notice. However, similar issues were identified, with fewer successful deliveries compared to the Wave 1 flyer delivery undertaken using Australia Post. The flyer delivery was not as cost effective in achieving responses as the addressed mailout, and did not achieved a more representative sample. Based on the experience of low success in achieving response to unaddressed flyers in both Wave 1 and 2, the use of unaddressed flyers was discontinued from this point.

Social media advertising

Two types of social media and media advertising were undertaken:

- Advertising via the RiotACT, an ACT focused media platform with a strong online and social media presence. A banner advertisement on the RiotACT website was used together with

ads targeted to RiotACT social media followers. This was successful in achieving a sample of younger participants and a larger sample of those from non-English speaking background compared to other methods.

- Directly placed social media advertisements on the *Facebook* and *Instagram* social media networks, displayed to those aged 18 and older. This resulted in a sample that was somewhat biased to older and female respondents.

Strategies to increase response

The use of multiple sampling strategies was also done to enable overall improvement in response rates through the reinforcing effects of being invited to participate in the survey using multiple methods. Flyers acted as an additional reminder to participate in the survey for those who had already received a direct letter inviting them to participate, for example. A person who saw an ad on social media may have subsequently received a flyer. This may have had a reinforcing effect, such that had they been exposed to only one form of survey promotion they would not have completed the survey, but exposure to two or more may have encouraged them to participate (Schirmer, 2009). Additionally, an article in the RiotACT increased public awareness of the survey.

Prize draw

A prize draw of $3,000 was offered, with winners having a choice of a Flight Centre, Coles-Myer, WISH or Bunnings gift cards or of donating their winnings to charities focused on bushfire recovery (with a choice of WIRES, Australian Red Cross, NSW Rural Fire Service, or BlazeAid). Prizes had the following values: first prize $1,000; second prize $500; third to sixth prize $200, seven runner up prizes of $100. A Flight Centre gift voucher was not offered due to restrictions on travel during the COVID-19 pandemic.

Sample

The total valid sample achieved was 1,991. Of these, 1,193 were participants who had completed Wave 1 and opted to complete Wave 2 when invited to do so. Of the remainder, 313 were recruited via social media/online media, 245 via unaddressed flyers, and the remainder by other methods such as hearing about the survey via word of mouth, or through unknown methods as the respondent did not indicate how they heard about the survey.

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2016 ABS Census of Population and Housing for the adult population of the ACT. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and country of birth. The specific weighting benchmarks were the same as those described in detail for Wave 1, with details for Wave 2 shown in the table below.

Benchmark and sample populations for weighting – Wave 2 – all ACT respondents

	Benchmark		**Wave 2 - all ACT respondents**				
	n	**%**	**n**	**%**	**Weighted n**	**Weighted %**	**Diff.**
Gender							
Female	155775	51.54%	902	62.04%	749	51.54%	0.00%
Male	146475	48.46%	552	37.96%	705	48.46%	0.00%

Age							
18-34	105692	34.97%	253	17.40%	508	34.97%	0.00%
35-54	106593	35.27%	396	27.24%	513	35.27%	0.00%
55-74	69631	23.04%	654	44.98%	335	23.04%	0.00%
75-100	20285	6.71%	151	10.39%	98	6.72%	-0.01%
Region							
Belconnen E.	14537	4.81%	97	6.67%	70	4.81%	0.00%
Gungahlin	46523	15.39%	189	13.00%	224	15.39%	0.00%
Inner Belconnen	31157	10.31%	197	13.55%	150	10.31%	0.00%
Inner North	24847	8.22%	71	4.88%	119	8.22%	0.00%
Inner South	22069	7.30%	76	5.23%	106	7.30%	0.00%
North	20375	6.74%	104	7.15%	98	6.74%	0.00%
Outer Belconnen	29335	9.71%	159	10.94%	141	9.71%	0.00%
Tuggeranong Nth	30124	9.97%	165	11.35%	145	9.97%	0.00%
Tuggeranong Sth	34810	11.52%	162	11.14%	167	11.52%	0.00%
Weston Creek and Molonglo	21126	6.99%	117	8.05%	102	6.99%	0.00%
Woden Valley	27347	9.05%	117	8.05%	132	9.05%	0.00%
Education							
No degree	184550	61.07%	514	35.35%	888	61.07%	0.00%
Has degree	117667	38.93%	940	64.65%	566	38.93%	0.00%
Background							
Born in English-speaking country	216067	71.49%	1320	90.78%	1040	71.49%	0.00%
Born in non-English speaking country	86150	28.51%	134	9.22%	414	28.51%	0.00%

6.3 Wave 3 (data collected December 2020)

Survey timing

The survey was open from December 1st 2020 to January 21st 2021. The majority of data were collected in the first three weeks of data collection. At the time data were collected, the COVID-19 pandemic was ongoing, however there was no active lockdown in the ACT (while there were restrictions on travel to some other states).

Survey platforms

The survey could be completed either online or as a paper survey. No paper surveys were completed.

Survey length

Survey length was managed in a different way in Wave 3 compared to the two previous waves. Rather than asking participants at the start of the survey whether they chose to do the shorter or longer version of the survey, participants were asked to complete all questions for which a large sample was needed first (Part 1 of the survey). They were then asked if they were willing to answer any further questions, and offered an additional entry into the prize draw if they did. This was done for five additional panels of questions for which a small sample could suffice for analysis purposes (Parts 2 to 6 of the survey). The maximum number of entries into the prize draw possible was 6 if the participant opted to complete all six parts of the survey.

Additionally, those who had participated in a previous wave were asked if they were willing to have their previous survey responses linked to the current survey responses, in order to reduce the number of questions they were asked. Those who gave permission were then asked if any of a number of aspects of their life had changed in the last 12 months, including their residential address, employment status, and others (see questionnaire for details). Those who indicated no changes and gave permission for linking were not asked to provide this information again, with the information instead obtained from their previous survey response. If they indicated change had occurred, they were asked for updated information regarding those aspects that had changed.

Participant recruitment

Previous participants

Participants who had taken part in Wave 1 and/or Wave 2 and given permission to be contacted for future surveys were contacted and invited to take part in the survey. These invitations were sent by email via Qualtrics, unless a person had indicated a preference to receive a paper copy of the survey. Paper copies were mailed to the small number of people who opted for this, with all of these also informed of how they could complete the survey online if they wished. Up to three email reminders were sent to those who had not yet responded to the survey.

Addressed mailout (not personally addressed)

An addressed mailout was sent to a random stratified sample of ACT region households. However, the database used changed: instead of using a commercial database that included the name of a household resident, the Global National Address File (GNAF) was used. The GNAF provides details of mailing addresses, but does not include any information about the residents living there. A sample of addresses was selected at random after removing addresses likely to be non-residential from the GNAF database for the ACT. These addresses were then sent a letter inviting participation in the survey, and explaining that the household had been selected at random to participate, and that any adult resident of the household who wished to was invited to participate. The invitation letter

provided a unique code for the household to be entered on the survey form if they opted to participate.

This approach to a random selection of addresses was then evaluated to identify the types of responses achieved, and compared them to the use of the commercial postal database used in Wave 1. It was found that while a slightly lower response rate was achieved, the responses were more representative of the ACT adult population compared to those when using the commercial postal database, including more renters, and a higher proportion of younger residents (although younger residents were still under-represented in responses achieved via this recruitment method compared to others such as social media advertising). A decision was made to continue using this recruitment method to achieve survey responses.

Unaddressed flyer

No unaddressed flyers were used.

Social media advertising

No social media advertising were used.

Strategies to increase response

In this wave, multiple sampling strategies were not used to reinforce each other. The effect of this on responses was then observed to better understand the effect of using multiple promotion strategies to recruit participants. It was found that there was lower response to each recruitment strategy used when not accompanied by promotion on social and/or traditional media.

Prize draw

A prize draw of $3,000 was offered, with winners having a choice of a Coles-Myer, WISH or Bunnings gift cards. Prizes had the following values: first prize $1,000; second and third prize $500; nine runner up prizes of $100. A Flight Centre gift voucher was not offered due to restrictions on travel during the COVID-19 pandemic.

Sample

The total valid sample achieved was 2,381. Of these, 1,079 were participants who had completed Wave 1 and/or Wave 2. A total of 1,285 were recruited via the addressed mail out. The remaining 28 participants did not provide sufficient information to enable identification of whether they were a previous participant, had heard about the survey via word of mouth, or had received an invitation letter in the post.

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2016 ABS Census of Population and Housing for the adult population of the ACT. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and country of birth. The specific weighting benchmarks were the same as those described in detail for Wave 1 and 2.

6.4 Wave 4 (data collected Oct-Nov 2021)

Survey timing

The survey was open from 16th September 2021 to November 11th 2021. The first two weeks were used for pilot testing with little active recruitment of participants occurring during this time. The data collection occurred when the ACT was in a COVID-19 lockdown in 2021.

Survey platforms

The survey could be completed either online or as a paper survey. Eleven paper surveys were completed.

Survey length

Survey length was managed in the same way as that described for Wave 3. The survey had seven parts, three of which were considered critical to achieve a large sample for, while the remaining four could be analysed with a small sample. From Part 4 onwards, participants were asked if they were willing to answer any further questions, and offered an additional entry into the prize draw if they did. The maximum number of entries into the prize draw possible was 5 if the participant opted to complete all seven parts of the survey.

Additionally, those who had participated in a previous wave were asked if they were willing to have their previous survey responses linked to the current survey responses, in order to reduce the number of questions they were asked. Those who gave permission were then asked if any of a number of aspects of their life had changed in the last 12 months, including their residential address, employment status, and others (see questionnaire for details). Those who indicated no changes and gave permission for linking were not asked to provide this information again, with the information instead obtained from their previous survey response. If they indicated change had occurred, they were asked for updated information regarding those aspects that had changed.

Participant recruitment

Previous participants

Participants who had taken part in Wave 1, 2 and/or 3 and given permission to be contacted for future surveys were contacted and invited to take part in the survey. These invitations were sent by email via Qualtrics. Paper surveys were not sent due to difficulties achieving postal surveys during the second lockdown.

Addressed mailout (not personally addressed)

An addressed mailout was sent to a random stratified sample of ACT region households using the GNAF database and the same method described for Wave 3.

Unaddressed flyer

No unaddressed flyers were distributed.

Social media advertising

A small amount of promotion on social media was used, using two boosted posts on Facebook and Instagram.

Strategies to increase response

In this wave, multiple sampling strategies were not used to reinforce each other. The effect of this on responses was then observed to better understand the effect of using multiple promotion strategies to recruit participants. It was found that there was lower response to each recruitment strategy used when not accompanied by promotion on social and/or traditional media.

Prize draw

A prize draw of $3,000 was offered, with winners having a choice of a, Coles-Myer, WISH or Bunnings gift cards. Prizes had the following values: first prize $1,000; second and third prize $500; nine runner up prizes of $100. A Flight Centre gift voucher was not offered due to restrictions on travel during the COVID-19 pandemic.

Sample

The total valid sample achieved was 2,351. Of these, 1,273 were participants who had completed Wave 1, 2, and/or 3. A total of 903 were recruited via the addressed mail out. The remaining 174 participants included those recruited by social media boosted post, word of mouth, or unknown means.

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2016 ABS Census of Population and Housing for the adult population of the ACT. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and country of birth. The specific weighting benchmarks were the same as those described in detail for Wave 1.

6.5 Wave 5 (data collected August-September 2022)

Survey timing

Data were collected between 29th July and 4th September 2022, with the majority of responses (>90%) collected between August 3 and August 30th.

Survey platforms

The survey could be completed online only.

Survey length

Wave 5 was a 'check in' survey and was short in length. Given this, all participants were asked to complete all questions on the survey.

Participant recruitment

Previous participants

Participants who had taken part in Wave 1, 2, 3 and/or 4 and given permission to be contacted for future surveys were contacted and invited to take part in the survey. These invitations were sent by email via Qualtrics. Paper surveys were not sent.

Addressed mailout (not personally addressed)

No address mailout was used.

Unaddressed flyer

No unaddressed flyer was used.

Social media advertising

In this wave, a new approach to social media advertising was used. Rather than use boosted posts or paid advertising via a known media outlet, researchers shared posts about the survey on community Facebook group noticeboards for Canberra regions. The groups that agreed to share posts were:

- Canberra community noticeboard
- Weston Creek community noticeboard
- Tuggeranong Community Notice Board
- ACT and surrounds noticeboard
- Inner South Canberra Community Council

In addition, the following Facebook groups were asked to share notices about the survey, but did not confirm with researchers whether the posts were shared:

- Gungahlin community noticeboard group
- Molonglo Valley Community Forum
- Canberra Inner North Community Group.

Prize draw

A prize draw of $1,000 was offered, with five winners each having a choice of a $200 Coles-Myer, WISH, Bunnings, iTunes or Amazon AU only gift cards.

Sample

A total of 1840 survey responses were received. Invalid survey responses were then removed, with a final valid survey size (including respondents located in both the ACT and NSW parts of the study region) of 1753. The 87 survey responses deemed invalid were removed based on the following

criteria (some responses met more than one criteria for removal; as a result, the total adds up to more than the 87 removed):

- Declined to answer survey questions – 17 responses
- Duplicate responses – 16 responses removed
- Answered less than 10 survey items – 52 responses
- Respondent located outside study region – 4 responses
- Likely fraudulent answer, as indicated by Recaptcha and fraud scores generated in online survey and inconsistency of survey responses – 4

Not all respondents retained in the valid data set will be valid for all analyses conducted, and any analysis of data using this data set should begin by assessing suitability of each response for inclusion in the analysis. In particular, many survey responses have some missing data.

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2021 ABS Census of Population and Housing for the adult population of the ACT, and the ABS Estimated Resident Population data series. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and whether English was the main language spoken at home.

The benchmark datasets used and criteria are specified in the table below.

Benchmark	Benchmark data source	Distribution in population (based on benchmark data)	Distribution of survey responses	Benchmark specification used for weighting purposes	Variable names and coding in dataset
Gender	ABS. 3101.0 National, state and territory population. Reference period March 2022, released 21/9/2022. Data table used: Table 58, Estimated Resident Population by Single Year of Age, Australian Capital Territory.	Female 51.2% Male 48.8%	Female 57.2% Male 38.4% Other/not specified 4.4%	Female 49.0% Male 46.6% Other/n.s. 4.4%	Variable: GenderWT Female = 1, Male = 2, other = 3
Age		Aged 18-29 25.0% Aged 30-44 30.8% Aged 45-64 28.4% Aged 65+ 15.8%	Aged 18-29 5.8% Aged 30-44 16.8% Aged 45-64 35.5% Aged 65+ 38.4% Not specified 3.5%	Aged 18-29 24.0% Aged 30-44 29.8% Aged 45-64 27.4% Aged 65+ 15.3% Not specified 3.5%	Variable – AgeWT Aged 18-29 = 1 etc until 4 = 65+ Not specified = -999
Residential location	ABS 2021 Census of Population and Housing. TableBuilder Pro.	Belconnen East 4.9% Gungahlin 18.0% Inner Belconnen 9.6% Inner North 8.1% Inner South 7.7% North 6.6% Outer Belconnen 8.9%	Belconnen East 6.1% Gungahlin 12.3% Inner Belconnen 12.4% Inner North 6.3% Inner South 6.3% North 6.6%	1 Belconnen East 4.9% 2 Gungahlin 18.0% 3 Inner Belconnen 9.6% 4 Inner North 8.1% 5 Inner South 7.7% 6 North 6.6%	

		Tuggeranong North 9.3% Tuggeranong South 10.1% Weston Creek & Molonglo 7.7% Woden Valley 8.8% Rural ACT 0.3%	Outer Belconnen 9.4% Tuggeranong North 10.8% Tuggeranong South 10.9% Weston Creek & Molonglo 10.0% Woden Valley 8.0% Rural ACT 0.4%	7 Outer Belconnen 8.9% 8 Tuggeranong North 9.3% 9 Tuggeranong South 10.1% 10 Weston Creek & Molonglo 7.7% 11 Woden Valley 8.8% 12 Rural and unspecified 0.3%	
Language at home		Speaks English at home 70.6% Speaks another language at home 29.4%[1]	Speaks English at home 89.8% Speaks another language at home 7.5% Not specified 2.7%	English 69.3% LOTE 28.0% N.S. 2.7%	LOTEwt 0 = English 1 = LOTE 2 = n.s.
Educational attainment		Completed year 12 or equivalent 80.7%. Did not complete year 12 or equivalent 19.3%[1].			
[1] In Census data, those who did not answer the question were excluded when calculating percentages. All data calculated for people aged 18 and over.					

Weighting specifications for SPSS

Gender - 1 .490 2 .466 3 .044

Age - 1 .240 2 .298 3 .274 4 .153 -999 .035

LOTE – 0 .693 1 .280 2 .027

Region - 1 0.049 2 0.180 3 0.096 4 0.081 5 .077 6 .066 7 .089 8 .093 9 .101 10 .077 11 .088 12 .003

6.6 Wave 6 (data collected Jan-Feb 2023)

Survey timing

Data were collected between February 5th and March 31st 2023, with a small number of pilot survey responses also collected between January 6th and January 31st to test the survey instrument (a total of 13 valid survey responses were retained in the survey data set from the pilot phase), and a small number of responses received after the closing date of March 31st that were retained in the data set (a total of 21 responses received April 1, 2 and 3).

Survey platforms

The survey could be completed online or on paper. A total of 20 paper surveys were requested and posted, and a total of 19 completed paper surveys were received.

Survey length

The Wave 6 survey had a single survey length for all participants, with no option for participants to select to do a shorter versus longer version of the survey. A number of questions were applicable only to participants who had been personally impacted by extreme weather events, or only to those who had specific experiences such as discrimination or engaged in specific activities such as volunteering. As questions asking about these experiences/events/activities were displayed only to those who identified they were relevant to them, some participants completed a larger number of questions than others.

Participant recruitment

Previous participants

Participants who had taken part in Wave 1, 2, 3, 4 and/or 5 and given permission to be contacted for future surveys were contacted and invited to take part in the survey. These invitations were sent by email via Qualtrics.

Addressed mailout (not personally addressed)

An addressed mailout was sent. The November 2022 edition of Geoscope's Geocoded National Address File Core (G-NAF Core) product was used. This product was downloaded, and addresses located within the *Living Well in the ACT* study region identified and saved in a file. Addresses known to be non-residential were then removed, using the following rules:

- Any address identified as a 'shop', 'suite', 'room', 'office' or 'kiosk' in the 'Flat_type' field was removed
    - The 'Building name' field was inspected and those buildings clearly named as business, government or other non-residential buildings removed.

The remaining addresses formed the sample frame for the mailout.

A random stratified sample was selected from the G-NAF Core, with stratification based on the following principles:

- ACT suburbs that are currently under construction or experiencing substantial growth in population size were over-sampled relative to others, to ensure representation of newer suburb areas in the survey sample
- ACT suburbs known to have lower representation in Wave 1 to 5 survey samples, particularly the longitudinal sample of retained survey respondents, were over-sampled relative to others

- ACT suburbs known to have higher representation in Wave 1 to 5 survey samples, particularly the longitudinal sample of retained survey respondents, were under-sampled relative to others

A total of 13,000 addresses were sent an invitation to participate in the survey. The table below summarises the number of addresses to which invitations were sent, by suburb or locality name.

Wave 6, number of invitations to participate in survey sent, by suburb/locality

	ACT	STE	ACT region
BOOTH	1	ACT	Other and rural
COREE	1	ACT	Other and rural
KOWEN	1	ACT	Other and rural
MAJURA	1	ACT	Other and rural
MOLONGLO VALLEY	1	ACT	Other and rural
STROMLO	1	ACT	Other and rural
KENNY	2	ACT	Gungahlin
URIARRA VILLAGE	2	ACT	Other and rural
THARWA	3	ACT	Other and rural
PIALLIGO	4	ACT	Other and rural
CANBERRA AIRPORT	6	ACT	Other and rural
CITY	7	ACT	Inner North
HALL	9	ACT	Other and rural
OAKS ESTATE	9	ACT	Other and rural
PARKES	11	ACT	Inner South
MACARTHUR	12	ACT	Tuggeranong North
ACTON	32	ACT	Inner North
AINSLIE	75	ACT	Inner North
AMAROO	72	ACT	Gungahlin
ARANDA	31	ACT	Inner Belconnen
BANKS	57	ACT	Tuggeranong South
BARTON	92	ACT	Inner South
BEARD	32	ACT	Other and rural
BONYTHON	52	ACT	Tuggeranong South
CAMPBELL	87	ACT	Inner North
CHAPMAN	30	ACT	Weston Creek
CHARNWOOD	62	ACT	Outer Belconnen
CHIFLEY	28	ACT	Woden Valley
CHISHOLM	65	ACT	Tuggeranong South
CONDER	68	ACT	Tuggeranong South
COOK	40	ACT	Inner Belconnen
CRACE	64	ACT	Gungahlin
CURTIN	65	ACT	Woden Valley
DEAKIN	65	ACT	Inner South
DOWNER	42	ACT	North
DUFFY	47	ACT	Weston Creek
EVATT	70	ACT	Belconnen East
FADDEN	29	ACT	Tuggeranong North
FISHER	37	ACT	Weston Creek
FLOREY	55	ACT	Inner Belconnen
FLYNN	42	ACT	Outer Belconnen
FORREST	37	ACT	Inner South
FRASER	19	ACT	Outer Belconnen
FYSHWICK	82	ACT	Other and rural
GARRAN	55	ACT	Woden Valley
GILMORE	44	ACT	Tuggeranong South
GIRALANG	47	ACT	Belconnen East
GOWRIE	24	ACT	Tuggeranong North
HACKETT	47	ACT	North

HAWKER	42	ACT	Inner Belconnen
HIGGINS	46	ACT	Outer Belconnen
HOLDER	42	ACT	Weston Creek
HOLT	86	ACT	Outer Belconnen
HUGHES	43	ACT	Woden Valley
HUME	13	ACT	Other and rural
ISAACS	35	ACT	Woden Valley
ISABELLA PLAINS	92	ACT	Tuggeranong South
JACKA	37	ACT	Gungahlin
LATHAM	41	ACT	Outer Belconnen
LAWSON	27	ACT	Belconnen East
LYNEHAM	96	ACT	North
LYONS	76	ACT	Woden Valley
MACQUARIE	57	ACT	Inner Belconnen
MAWSON	71	ACT	Woden Valley
MCKELLAR	28	ACT	Belconnen East
MELBA	47	ACT	Outer Belconnen
MITCHELL	33	ACT	Gungahlin
MONASH	81	ACT	Tuggeranong North
NARRABUNDAH	94	ACT	Inner South
NICHOLLS	82	ACT	Gungahlin
O'CONNOR	88	ACT	North
O'MALLEY	28	ACT	Woden Valley
OXLEY	14	ACT	Tuggeranong North
PAGE	47	ACT	Inner Belconnen
PALMERSTON	67	ACT	Gungahlin
PEARCE	41	ACT	Woden Valley
RED HILL	70	ACT	Inner South
REID	62	ACT	Inner North
RICHARDSON	58	ACT	Tuggeranong South
RIVETT	41	ACT	Weston Creek
SCULLIN	71	ACT	Inner Belconnen
SPENCE	36	ACT	Outer Belconnen
STIRLING	41	ACT	Weston Creek
STRATHNAIRN	93	ACT	Outer Belconnen
SYMONSTON	25	ACT	Other and rural
THEODORE	79	ACT	Tuggeranong South
TORRENS	31	ACT	Woden Valley
WANNIASSA	85	ACT	Tuggeranong North
WARAMANGA	41	ACT	Weston Creek
WEETANGERA	26	ACT	Inner Belconnen
WESTON	69	ACT	Weston Creek
WRIGHT	72	ACT	Molonglo
YARRALUMLA	54	ACT	Inner South
KALEEN	102	ACT	Belconnen East
WATSON	102	ACT	North
TURNER	115	ACT	Inner North
FARRER	116	ACT	Woden Valley
CALWELL	117	ACT	Tuggeranong South
BRUCE	118	ACT	Inner Belconnen
DUNLOP	125	ACT	Outer Belconnen
WHITLAM	125	ACT	Molonglo
GRIFFITH	130	ACT	Inner South
THROSBY	136	ACT	Gungahlin
CANBERRA	142	ACT	Inner North
DICKSON	142	ACT	North
NGUNNAWAL	142	ACT	Gungahlin
MACGREGOR	152	ACT	Outer Belconnen
KINGSTON	172	ACT	Inner South

PHILLIP	173	ACT	Woden Valley
GORDON	174	ACT	Tuggeranong South
FORDE	178	ACT	Gungahlin
HARRISON	186	ACT	Gungahlin
BELCONNEN	206	ACT	Inner Belconnen
MONCRIEFF	207	ACT	Gungahlin
KAMBAH	214	ACT	Tuggeranong North
GREENWAY	229	ACT	Tuggeranong North
DENMAN PROSPECT	259	ACT	Molonglo
COOMBS	280	ACT	Molonglo
BONNER	285	ACT	Gungahlin
TAYLOR	301	ACT	Gungahlin
CASEY	316	ACT	Gungahlin
BRADDON	373	ACT	Inner North
FRANKLIN	386	ACT	Gungahlin
GUNGAHLIN	557	ACT	Gungahlin
QUEANBEYAN	232	NSW	
KARABAR	218	NSW	
QUEANBEYAN EAST	194	NSW	
YASS	193	NSW	
CRESTWOOD	167	NSW	
GOOGONG	159	NSW	
BUNGENDORE	116	NSW	
CROOKWELL	111	NSW	
QUEANBEYAN WEST	101	NSW	
BRAIDWOOD	90	NSW	
MURRUMBATEMAN	74	NSW	
BOOROWA	57	NSW	
GUNDAROO	44	NSW	
BYWONG	42	NSW	
SUTTON	37	NSW	
WAMBOIN	36	NSW	
GUNNING	30	NSW	
BINALONG	25	NSW	
CARWOOLA	24	NSW	
BOWNING	22	NSW	
TRALEE	22	NSW	
BURRA	21	NSW	
CAPTAINS FLAT	21	NSW	
LAGGAN	20	NSW	
BIGGA	17	NSW	
DALTON	17	NSW	
ROYALLA	16	NSW	
GRABBEN GULLEN	15	NSW	
MAJORS CREEK	15	NSW	
YASS RIVER	15	NSW	
BINDA	14	NSW	
WEE JASPER	13	NSW	
OALLEN	12	NSW	
ARALUEN	11	NSW	
GREENLEIGH	11	NSW	
MICHELAGO	11	NSW	
Other NSW localities	344	NSW	

Unaddressed flyer

No unaddressed flyer was used.

Social media advertising

In this wave, social media advertising on Facebook and Instagram was used to promote the survey.

Prize draw

A prize draw of $3,000 was offered, with eight winners to the following values: first prize $1,000; second and third prize $500, five runner up prizes of $200. Each winner had their choice of a Coles-Myer, WISH, Bunnings, iTunes or Amazon AU only gift card.

Sample

To be completed when data collection complete

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2021 ABS Census of Population and Housing for the adult population of the ACT, and the ABS Estimated Resident Population data series. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and whether English was the main language spoken at home.

The benchmark datasets used and criteria are specified in the table below.

Benchmark	Benchmark data source	Distribution in population (based on benchmark data)	Benchmark specification used for weighting purposes
Gender	ABS. 3101.0 National, state and territory population. Reference period March 2022, released 21/9/2022. Data table used: Table 58, Estimated Resident Population by Single Year of Age, Australian Capital Territory.	Female 51.2% Male 48.8%	Female 49.0% Male 46.6% Other/n.s. 4.4%
Age		Aged 18-29 25.0% Aged 30-44 30.8% Aged 45-64 28.4% Aged 65+ 15.8%	Aged 18-29 24.0% Aged 30-44 29.8% Aged 45-64 27.4% Aged 65+ 15.3% Not specified 3.5%
Residential location	ABS 2021 Census of Population and Housing. TableBuilder Pro.	Belconnen East 4.9% Gungahlin 18.0% Inner Belconnen 9.6% Inner North 8.1% Inner South 7.7% North 6.6% Outer Belconnen 8.9% Tuggeranong North 9.3% Tuggeranong South 10.1% Weston Creek & Molonglo 7.7% Woden Valley 8.8% Rural ACT 0.3%	Belconnen East 4.9% Gungahlin 18.0% Inner Belconnen 9.6% Inner North 8.1% Inner South 7.7% North 6.6% Outer Belconnen 8.9% Tuggeranong North 9.3% Tuggeranong South 10.1% Weston Creek & Molonglo 7.7% Woden Valley 8.8% Rural ACT 0.3%
Language at home		Speaks English at home 70.6%	English 69.3% LOTE 28.0% N.S. 2.7%

		Speaks another language at home 29.4%[1]	
Educational attainment		Completed year 12 or equivalent 80.7%. Did not complete year 12 or equivalent 19.3%[1].	
[1] In Census data, those who did not answer the question were excluded when calculating percentages. All data calculated for people aged 18 and over.			

Weighting specifications used in SPSS:

Gender - 1 .490 2 .466 3 .044

Age - 1 .240 2 .298 3 .274 4 .153 -999 .035

LOTE – 0 .693 1 .280 2 .027

Region - 1 5 .077 6 .066 7 .089 8 .093 9 .101 10 .077 11 .088 12 .003

6.7 Wave 7 (2023 Living well in the ACT with a changing climate)

Wave 7 was not a standard wave of the *Living well* survey, but included a subset of the standard indicators collected in most waves *Living well* survey. This wave focused on understanding resilience and adaptation to the effects of climate change amongst ACT residents. The survey was the second wave of the *Living well in the ACT with a changing climate* survey, which was first conducted in 2018 (see Schirmer and Yabsley 2018 for a detailed description of the first wave of the survey, including methods). While not a standard wave of the *Living well* survey, this is considered Wave 7 as (i) the survey monitored key aspects of wellbeing and several wellbeing indicators in addition to including more detailed measures of climate change resilience; and (ii) all *Living well* survey participants who had given permission to be contacted about future surveys were invited to take part in the survey.

Survey timing

Data were collected between 29 June 2023 and 01 August 2023.

Survey platforms

The survey could be completed online or via a paper survey. A 1800 free call number and email were prominently displayed on all survey invitations and promotions together with an invitation to call the number or send an email to request a paper survey if this was preferred to completing an online survey. In total, three participants requested paper questionnaires to complete.

Survey length

Participants who completed the survey online could opt to complete one of two lengths of survey: short (~30 min) or long (~60 min).

Participant recruitment

Previous participants

Previous participants in the 2018 *Living well in a changing climate* survey (who had indicated that recontact for future survey was acceptable) were contacted and invited to take part in the survey. These invitations were sent by email via Qualtrics. Previous participants in the *Living well in the ACT region survey* (who had indicated that recontact for future survey was acceptable) were also invited to take part in the survey. Of valid respondents, 1,481 indicated that they heard about the survey via a direct email from University of Canberra researchers (some of these also heard about the survey via other sources such as social media).

Addressed mailout (not personally addressed)

No mailed invitation to participate in the survey was used.

Unaddressed flyer

No unaddressed flyer was used.

Social and online media

The following promotions were used on social and online media:

- RiotACT promotion (integrated campaign including social media and online media, and email campaign)
- Social media advertising on Facebook and Instagram
- Sharing of posts on community Facebook sites
- University of Canberra online student newsletter.

RiotACT promotion

A regional media organisation that has a strong focus on the ACT region (RiotACT) was contracted to promote the survey via its online news, social media and email platforms. This campaign included the following elements:

- Two articles published online on the 'RiotACT' news website (one available in Mandarin Chinese), with a total of 2,159 views
- Direct email marketing to 10,960 email addresses in the RiotACT database located in the ACT
- Three days of promotion of the survey via the main banner on the RiotACT's homepage (receiving 22,643 impressions/reach)
- RiotACT social media postings across Facebook, Instagram and WeChat (reaching 38,186 accounts, with 532 active Facebook engagements, and 1290 WeChat views), and
- An interactive quiz on the subject of extreme weather in the ACT (1,507 views).

As this promotion involved multiple methods, it is difficult to identify the precise number of survey completions likely to have resulted from the promotion. In total, 62 survey participants indicated they completed the survey after hearing about it via an email from RiotACT, while 377 heard about the survey on social media (which could be via RiotACT social media advertising or the other paid social media advertising described below), 41 heard about it via online media articles run by RiotACT, and 111 indicated they heard about the survey in other ways, which could also include some elements of RiotACT promotions.

Social media advertising

The survey was promoted via three social media ads promoted on Facebook and Instagram to those in the geographic area targeted by the survey. This promotion achieved a total of 1,888 link clicks. Not all of these clicks resulted in survey completions. It is estimated approximately one in ten resulted in a survey completion (with 377 survey participants indicating they heard about the survey via social media, but some of these hearing about it via the RiotACT promotion and some via the other paid social media ads run directly by the research team). It is also difficult to identify the precise result as some participants indicated both hearing about the survey via a direct email from UC *and* social media ads, indicating that the ads helped reinforce and remind about the invitation to participate in the survey, with some participants recruited through a blend of direct email and social media.

Community Facebook groups

A total of 26 Facebook groups were asked to share a post inviting participation in the survey, focusing on (i) community noticeboard groups covering different regions of Canberra, and (ii) those with members from groups who typically have lower participation in the survey, such as those in younger age groups, Aboriginal and/or Torres Strait Islander peoples living in the ACT region, LGBTIQ+ residents, and those from linguistically diverse backgrounds. Of the 26 groups contacted, seven confirmed they shared the post. It is possible some others did, however as all groups contacted have closed membership, it was not possible to confirm whether any group shared a post unless a moderator of the group confirmed it had been shared.

Online newsletter

The University of Canberra included an invitation to participate in the survey in its newsletter to university students.

Prize draw

A prize draw of $2,500 was offered, with ten winners each having a choice of a Coles-Myer, WISH, Bunnings, iTunes or Amazon AU only gift cards. First place received a card to the value of $1,000, second place received a card to the value of $500, third place received a card to the value of $300, and fourth through tenth places each received a card to the value of $100.

Sample

A total of 3203 survey responses were received. Invalid survey responses were then removed, with a final valid survey size (including respondents located in both the ACT and NSW parts of the study region) of 2471. The 732 survey responses deemed invalid were removed based on the following criteria (many responses met more than one criteria for removal; as a result, the total adds up to more than the 732 removed):

- Test survey responses (i.e., system tests on the live survey) – 7 responses
- Declined to answer survey questions – 47 responses
- Duplicate responses – 26 responses removed
- Answered less than 10 survey items – 628 responses
- Respondent located outside study region – 18 responses
- Likely fraudulent answer, as indicated by inconsistency of survey text field responses – 41 responses
- Respondents below the minimum age threshold (under 18 years of age) – 3 responses
- Responses below the minimum time threshold of 120 seconds (note, this criterion overlaps almost completely with the 'answered less than 10 survey items' exclusion criterion) – 505 responses

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2021 ABS Census of Population and Housing for the adult population of the ACT, and the ABS Estimated Resident Population data series. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and whether English was the main language spoken at home.

The benchmark datasets used and criteria are specified in the table below.

Benchmark	Benchmark data source	Distribution in population (based on benchmark data)	Distribution of survey responses	Benchmark specification used for weighting purposes	Variable names and coding in dataset
Gender	ABS. 3101.0 National, state and territory population. Reference period March 2022,	Female 51.2% Male 48.8%	Female 59.8% Male 38.3% Other/not specified 1.9%	Female 49.0% Male 46.6% Other/n.s. 4.4%	Variable: WT_GENDER Female = 1, Male = 2, other = 3
Age		Aged 18-29 25.0% Aged 30-44 30.8%	Aged 18-29 4.3%	Aged 18-29 24.0%	Variable – WT_AGE

	released 21/9/2022. Data table used: Table 58, Estimated Resident Population by Single Year of Age, Australian Capital Territory.	Aged 45-64 28.4% Aged 65+ 15.8%	Aged 30-44 19.9% Aged 45-64 36.5% Aged 65+ 36.7% Not specified 2.6%	Aged 30-44 29.8% Aged 45-64 27.4% Aged 65+ 15.3% Not specified 3.5%	Aged 18-29 = 1 etc until 4 = 65+ Not specified = -999
Residential location	ABS 2021 Census of Population and Housing. TableBuilder Pro.	Belconnen East 4.9% Gungahlin 18.0% Inner Belconnen 9.6% Inner North 8.1% Inner South 7.7% North 6.6% Outer Belconnen 8.9% Tuggeranong North 9.3% Tuggeranong South 10.1% Weston Creek & Molonglo 7.7% Woden Valley 8.8% Rural ACT 0.3%	Belconnen East 5.3% Gungahlin 12.4% Inner Belconnen 11.1% Inner North 6.8% Inner South 6.5% North 8.3% Outer Belconnen 11.1% Tuggeranong North 11.0% Tuggeranong South 9.8% Weston Creek & Molonglo 8.6% Woden Valley 8.9% Rural ACT 0.2% NSW – not included in distribution (default weight of 1 for geographic component of weighting)	1 Belconnen East 4.9% 2 Gungahlin 18.0% 3 Inner Belconnen 9.6% 4 Inner North 8.1% 5 Inner South 7.7% 6 North 6.6% 7 Outer Belconnen 8.9% 8 Tuggeranong North 9.3% 9 Tuggeranong South 10.1% 10 Weston Creek & Molonglo 7.7% 11 Woden Valley 8.8% 12 Rural and unspecified 0.3% NSW participants given a default weight of 1 for geographic component of weighting.	WT_REGION
Language at home		Speaks English at home 70.6% Speaks another language at home 29.4%[1]	Speaks English at home 76.6% Speaks another language at home 7.7% Not specified 15.7%	English 69.3% LOTE 28.0% N.S. 2.7%	WT_CALD 0 = English 1 = LOTE 2 = n.s.
Educational attainment		Completed year 12 or equivalent 80.7%. Did not complete year 12 or equivalent 19.3%[1].	Not used in weighting; weighted data checked to identify whether weighted data corrected for over-sampling of those with higher levels of education and this was confirmed.		

[1] In Census data, those who did not answer the question were excluded when calculating percentages. All data calculated for people aged 18 and over.

Weighting specifications for SPSS:

Gender - 1 .490 2 .466 3 .044

Age - 1 .240 2 .298 3 .274 4 .153 -999 .035

LOTE – 0 .693 1 .280 2 .027

Region - 1 0.049 2 0.180 3 0.096 4 0.081 5 .077 6 .066 7 .089 8 .093 9 .101 10 .077 11 .088 12 .003

6.8 Wave 8 – (data collected November 2024 – January 2025)

Survey timing

Data were collected between 19 November 2024 and 21 January 2025. However, 99% of responses were collected between 19 November 2024 and December 20, 2024, with only 20 responses recorded between January 1 and January 21 (including some surveys completed by mail in December which were received during this period). As almost all surveys were completed in 2024, the survey is described as collecting data in Nov/Dec 2024.

Survey platforms

The survey could be completed online or via a paper survey. A 1800 free call number and email were prominently displayed on all survey invitations and promotions together with an invitation to call the number or send an email to request a paper survey if this was preferred to completing an online survey. In total, 16 participants requested paper questionnaires to complete.

Survey length

The Wave 8 survey had a single survey length for all participants, with no option for participants to select to do a shorter versus longer version of the survey.

Participant recruitment

Previous participants

Previous participants in the *Living well in the ACT region survey* (who had indicated that recontact for future survey was acceptable) were invited to take part in the survey. Of valid respondents, 1,324 indicated that they heard about the survey via a direct email from University of Canberra researchers (some of these also heard about the survey via other sources such as social media).

Addressed mailout (not personally addressed)

A mailed invitation to participate in the survey was used. This mailout initially targeted 9000 households within the survey geographic footprint, with a follow-up of 4000 households, randomly sampled from the portion of the original sample that had not been confirmed as having completed the survey at the time of the reminder.

Unaddressed flyer

No unaddressed flyer was used.

Social and online media

The following promotions were used on social and online media:

- Social media advertising on Facebook and Instagram: 2 weeks using 8 ‘region specific’ (Gungahlin, Inner and Outer Belconnen, Woden Valley, Weston Creek, Molonglo, North and South Tuggeranong) Facebook ads. This was followed by 2 weeks of promotion using 1 ‘disability population specific’ advertisement. Thereafter, a ‘whole of Canberra’ advertisement was used for 1 week.
- Sharing of posts on community Facebook sites. 31 community Facebook sites were contacted: 3 responded that they had shared the promotion.
- 10 Disability support groups (Facebook) were contacted. Only one responded, and this group did not permit sharing of posts.
- University of Canberra online student newsletter.

Social media advertising

The survey was promoted via social media ads promoted on Facebook and Instagram to those in the geographic area targeted by the survey. These ads included the following (numbers in brackets indicate number of ad clicks):

- Two week promotion using 8 'region specific' Facebook ads targeting the following regions: Gungahlin (1051 clicks), Inner and Outer Belconnen (1040 clicks), Woden Valley (843 clicks), Weston Creek (897 clicks), Molonglo (610 clicks), North Tuggeranong (1,238 clicks) and South Tuggeranong (746 clicks)
- Two week promotion using ads focused on people with disability, encouraging this population cohort to participate in the survey (7,749 clicks)
- One week promotion to all of the ACT with no differentiation by region or group (1,334 clicks).

These promotions achieved a total of 7,759 for Canberra/region ads and 7,749 clicks for ads focused on people with disability. Not all of these clicks resulted in survey completions. It is estimated approximately 7.5% of clicks resulted in a survey completion, with 587 survey participants indicating they heard about the survey via social media. It is also difficult to identify the precise result as some participants indicated both hearing about the survey via a direct email from UC *and* social media ads, indicating that the ads helped reinforce and remind about the invitation to participate in the survey, with some participants recruited through a blend of direct email and social media.

Community Facebook groups

A total of 31 Facebook groups were asked to share a post inviting participation in the survey, focusing on (i) community noticeboard groups covering different regions of Canberra, and (ii) those with members from groups who typically have lower participation in the survey, such as those in younger age groups, Aboriginal and/or Torres Strait Islander peoples living in the ACT region, LGBTIQ+ residents, and those from linguistically diverse backgrounds. Of the 31 groups contacted, three confirmed they shared the post. It is possible some others did, however as all groups contacted have closed membership, it was not possible to confirm whether any group shared a post unless a moderator of the group confirmed it had been shared.

Online newsletter

The University of Canberra included an invitation to participate in the survey in its newsletter to university students.

Prize draw

A prize draw of $3,000 was offered, with eleven winners each having a choice of a Coles-Myer, WISH, Bunnings, iTunes or Amazon AU only gift cards. First place received a card to the value of $1,000, second place received a card to the value of $500, third place received a card to the value of $300, and fourth through eleventh places each received a card to the value of $150. No second drawing was required: all eleven original winners were contactable and received their prizes.

Sample

A total of 3675 survey responses were received. Invalid survey responses were then removed, with a final valid survey size (including respondents located in both the ACT and NSW parts of the study region) of 3,110. The 565 survey responses deemed invalid were removed based on the following

criteria (many responses met more than one criterion for removal; as a result, the total adds up to more than the 565 removed):

- Test survey responses (i.e., system tests on the live survey) – 9 responses
- Declined to answer survey questions – 65 responses
- Duplicate responses – 18 responses removed
- Answered less than 10 survey items – 476 responses
- Respondent located outside study region – 5 responses
- Likely fraudulent answer, as indicated by inconsistency of survey text field responses – 41 responses
- Respondents below the minimum age threshold (under 18 years of age) – 7 responses
- Responses below the minimum time threshold of 120 seconds (note, this criterion overlaps almost completely with the 'answered less than 10 survey items' exclusion criterion) – 354 responses
- Other indicators that caused suspicion as to the veracity of the response, with removal requiring at least one of the following as well as inspection of the survey return to determine whether it was considered valid or invalid: 'bot-like' email address, time of day indicting the response occurred between 1am and 6 am (not considered evidence of invalidity on its own, but considered evidence of higher likelihood of invalidity), or consistent evidence of straight lining (i.e., giving the same response within a block of questions) across multiple blocks of questions – 31 responses.

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2021 ABS Census of Population and Housing for the adult population of the ACT, and the ABS Estimated Resident Population data series. The model benchmark characteristics were gender, age group, ACT region, level of formal educational attainment, and whether English was the main language spoken at home.

In Wave 8, a significant number of respondents completing the survey via smartphone did not answer questions about their gender or age or geographic region (approx. 400 to 500 depending on the variable), with the questions appearing at the bottom of a scroll and often skipped. To ensure these respondents could be included in survey answers, when weighting, their responses were weighted based on those parts of the weighting criteria they did answer. In particular, to account for missing geographic data where a person had not identified which part of the ACT region they lived in, a weight was generated using gender, age, and language at home, and this weight value was imputed for cases where geographic data were not available.

The benchmark datasets used and criteria are specified in the table below.

Benchmark	Benchmark data source	Distribution in population (based on benchmark data)	Distribution of survey responses	Benchmark specification used for weighting purposes	Variable names and coding in dataset
Gender	ABS. 3101.0 National, state and territory population.	Female 51.2% Male 48.8%	Female 48.5% Male 30.5% Other/not specified 21.0%	Female 49.0% Male 46.6% Other/n.s. 4.4%	Variable: h_LWS_WT_GENDER Female = 1, Male = 2, other/prefer not

	Reference period March 2022, released 21/9/2022. Data table used: Table 58, Estimated Resident Population by Single Year of Age, Australian Capital Territory.				to answer and Not Specified = 3
Age		Aged 18-29 25.0% Aged 30-44 30.8% Aged 45-64 28.4% Aged 65+ 15.8%	Aged 18-29 5.9% Aged 30-44 16.8% Aged 45-64 30.4% Aged 65+ 31.0% Not specified 16.0%	Aged 18-29 24.0% Aged 30-44 29.8% Aged 45-64 27.4% Aged 65+ 15.3% Not specified 3.5%	Variable – h_LWS_WT_AGE Aged 18-29 = 1 etc until 4 = 65+ Not specified = 5
Residential location	ABS 2021 Census of Population and Housing. TableBuilder Pro.	Belconnen East 4.9% Gungahlin 18.0% Inner Belconnen 9.6% Inner North 8.1% Inner South 7.7% North 6.6% Outer Belconnen 8.9% Tuggeranong North 9.3% Tuggeranong South 10.1% Weston Creek & Molonglo 7.7% Woden Valley 8.8% Rural ACT 0.3%	Belconnen East 3.9% Gungahlin 14.4% Inner Belconnen 11.1% Inner North 5.9% Inner South 5.4% North 5.0% Outer Belconnen 8.3% Tuggeranong North 10.9% Tuggeranong South 10.6% Weston Creek & Molonglo 11.7% Woden Valley 8.0% Other and Rural ACT 0.2% NSW – not included in distribution (default weight of 1 for geographic component of weighting)	1 Belconnen East 4.9% 2 Gungahlin 18.0% 3 Inner Belconnen 9.6% 4 Inner North 8.1% 5 Inner South 7.7% 6 North 6.6% 7 Outer Belconnen 8.9% 8 Tuggeranong North 9.3% 9 Tuggeranong South 10.1% 10 Weston Creek & Molonglo 7.7% 11 Woden Valley 8.8% 12 Rural and unspecified 0.3% NSW participants given a default weight of 1 for geographic component of weighting.	h_LWS_REGION_WT
Language at home		Speaks English at home 70.6% Speaks another language at home 29.4%[1]	Speaks English at home 72.1% Speaks another language at home 8.8% Not specified 19.1%	English 69.3% LOTE 28.0% N.S. 2.7%	h_LWS_CALD_WT0 = no (English) 1 = yes (LOTE) 2 = not specified
Educational attainment		Completed year 12 or equivalent	Not used in weighting; weighted data checked to identify whether weighted data corrected for over-sampling of		

		80.7%. Did not complete year 12 or equivalent 19.3%[1].	those with higher levels of education and this was confirmed.
[1] In Census data, those who did not answer the question were excluded when calculating percentages. All data calculated for people aged 18 and over.			

Weighting specifications for SPSS

Gender - 1 .490 2 .466 3 .044

Age - 1 .240 2 .298 3 .274 4 .153 -999 .035

LOTE – 0 .693 1 .280 2 .027

Region - 1 0.049 2 0.180 3 0.096 4 0.081 5 .077 6 .066 7 .089 8 .093 9 .101 10 .077 11 .088 12 .003

6.9 Wave 9 (data collected November 2025 – February 2026)

Survey timing

Data were collected between 17 November 2025 and 13 February 2026. The majority of survey responses were collected prior to 31 December 2025. Surveys completed via mail were entered at the close of the survey, in mid-February. As the majority of surveys were collected in December 2025, this survey wave is described as 'Dec 2025'.

Survey platforms

The survey could be completed online or via a paper survey. A 1800 free call number and email were prominently displayed on all survey invitations and promotions together with an invitation to call the number or send an email to request a paper survey if this was preferred to completing an online survey. In total, 30 participants requested paper questionnaires to complete, with 18 completed surveys returned.

Survey length

Participants who completed the Wave 9 survey online could opt to complete one of two lengths of survey: short (~20-30 min) or long (~30-40 min).

Participant recruitment

Previous participants

Previous participants in the *Living well in the ACT region survey* (who had indicated that recontact for future survey was acceptable) were invited to take part in the survey. Of valid respondents, 1,678 indicated that they heard about the survey via a direct email from University of Canberra researchers (some of these also heard about the survey via other sources such as social media).

Addressed mailout (not personally addressed)

A mailed invitation to participate in the survey was used. This mailout targeted 15,000 addresses within the survey geographic footprint. Sampling was random within survey regions (i.e., the 14 geographic regions by which the Living Well Survey is reported – full details of these regions are provided in Appendix 1).

Unaddressed flyer

No unaddressed flyer was used.

Social and online media

The following promotions were used on social and online media:

- Social media advertising on Facebook and Instagram: 4 weeks using 2 'whole of Canberra' advertisements.
- University of Canberra online staff and student newsletters.

Social media advertising

The survey was promoted via social media ads promoted on Facebook to those in the geographic area targeted by the survey. Two different ads ran from 27 November 2025 to 23 December 2025. Collectively, these ads generated 495,538 impressions with a reach of 125,176. There were a resultant 3054 landing page views (i.e., click throughs to the link on the ad – to the survey introduction page). Not all of these click throughs resulted in survey completions. It is estimated approximately 5.2% of click throughs resulted in a survey completion, with 158 survey participants indicating they heard about the survey via social media. It is also difficult to identify the precise

result as some participants indicated both hearing about the survey via a direct email from UC *and* social media ads, indicating that the ads helped reinforce and remind about the invitation to participate in the survey, with some participants recruited through a blend of direct email and social media. The outcome of wave 9's social media advertising stands in contrast to the outcomes generated in wave 8 (where 587 participants indicating they heard about the survey from social media, and conversion was estimated at 7.5%), where a 'region-specific' set of advertising materials was used. Wave 10 may be best served by a return to a 'region-specific' approach.

Online newsletters

The University of Canberra included an invitation to participate in the survey in its newsletters to university staff (20 Jan 2026) and students (13 Feb 2026).

Prize draw

A prize draw of $4,000 was offered, with eight winners. First place received a card to the value of $1,500, second place received a card to the value of $1000, third place received a card to the value of $500, and fourth through eighth places each received a card to the value of $200. No second drawing was required: all eight original winners were contactable and received their prizes.

Sample

A total of 3853 survey responses were received. Invalid survey responses were then removed, with a final valid survey size (including respondents located in both the ACT and NSW parts of the study region) of 3,223. The 630 survey responses deemed invalid were removed based on the following criteria (many responses met more than one criterion for removal; as a result, the total sums to more than the 630 removed):

- Test survey responses (i.e., UC staff conducting system tests on the live survey) – 16 responses
- Declined to answer survey questions – 201 responses
- Duplicate responses – 152 responses removed
- Answered less than 10 survey items – 566 responses
- Respondent located outside study region – 5 responses
- Respondents below the minimum age threshold (under 18 years of age) – 1 response

Duplicate responses were identified by duplication of physical address, email, IP address and surname.

Responses were also *flagged and investigated* if they occurred at 'odd hours' (Start OR End Times between 0100 and 0600), if they had a positive 'Ballot Box Stuffing' variable (a Qualtrics generated marker of duplication), or if they had a low (below 0.5) 'ReCAPTCHA' score (a Qualtrics generated marker indicating possible 'bot' status). None of these markers were deemed sufficient, in the absence of other markers, to warrant removal. 73-74% of 'odd hours' responses had no other flags. Only 17 of the 86 (19.8%) 'low ReCAPTCHA' responses were flagged by other means as potentially invalid. 17 of 37 responses flagged by 'BallotBox Stuffing' were not flagged by other assessments of duplicate status – i.e., duplicate Surname, IP Address, email, or postal address. Each of these 17 responses was manually assessed but in no case could the rationale for their positive 'BallotBoxStuffing' status be determined and it was decided not to remove these responses.

Weighting

When generating data for the ACT adult population, weights were developed based on a superpopulation model that used data from the 2021 ABS Census of Population and Housing for the adult population of the ACT, and the ABS Estimated Resident Population data series. The model benchmark characteristics were gender, age group, ACT region, and whether English was the main language spoken at home.

The benchmark datasets used and criteria are specified in the table below.

Benchmark	Benchmark data source	Distribution in population (based on benchmark data)	Distribution of survey responses	Benchmark specification used for weighting purposes	Variable names and coding in dataset
Gender	ABS. 3101.0 National, state and territory population. Reference period June 2025, released 18/12/2025. Data table used: Table 58, Estimated Resident Population by Single Year of Age, Australian Capital Territory.	Female aged 18+ 51.5% Male aged 18+ 48.5%	Female 54.2% Male 34.8% Other/not specified 10.9%	Female 49.3% Male 46.3% Other/n.s. 4.4%	Variable: i_LWS_WT_GENDER Female = 1, Male = 2, 'other/prefer not to answer' and 'not specified'= 3
Age		Aged 18-29 24.3% Aged 30-44 30.8% Aged 45-64 27.2% Aged 65+ 17.7%	Aged 18-29 6.7% Aged 30-44 18.7% Aged 45-64 29.4% Aged 65+ 35.7% Not specified 9.5%	Aged 18-29 23.3% Aged 30-44 29.8% Aged 45-64 26.2% Aged 65+ 16.7% Not specified 4%	Variable – i_LWS_WT_AGE Aged 18-29 = 1 etc until 4 = 65+ Not specified = 5
Residential location	ABS Population estimated by SA2 and above, 2001 to 2024, Regional population 2023-24, released 11.30am 27 March 2025 Regional population, 2023-24 financial year | Australian Bureau of Statistics Accessed 24 Feb 2026	Belconnen East 4.6% East Gungahlin 6.7% West Gungahlin 12.7% Inner Belconnen 9.0% Inner North 7.5% Inner South 7.1% Molonglo 3.4% North 6.5% Outer Belconnen 9.2% Tuggeranong North 9.2% Tuggeranong South 9.7% Weston Creek 5.2% Woden Valley 8.5% Other and rural 0.6%	Belconnen East 4.3% West Gungahlin 9.0% Inner Belconnen 9.6% Inner North 7.0% Inner South 6.9% North 8.3% Outer Belconnen 8.1% Tuggeranong North 9.8% Tuggeranong South 8.7% Weston Creek 5.8% Molonglo 3.9% Woden Valley 9.0% Other and Rural ACT 0.3%	1 Belconnen East 4.6% 2 West Gungahlin 12.7% 3 Inner Belconnen 9.0% 4 Inner North 7.5% 5 Inner South 7.1% 6 North 6.5% 7 Outer Belconnen 9.2% 8 Tuggeranong North 9.2% 9 Tuggeranong South 9.7% 10 Weston Creek 5.2% 11 Molonglo 3.5% 12 Woden Valley 8.5%	i_LWS_REGION_WT

			East Gungahlin 4.3% NSW – (5.2%) not included in distribution (default weight of 1 for geographic component of weighting)	13 Rural and unspecified 0.6% 14 East Gungahlin 6.7% NSW participants given a default weight of 1 for geographic component of weighting.	
Language at home		Speaks English at home 70.6% Speaks another language at home 29.4%[1]	Speaks English at home 79.8% Speaks another language at home 10.3% Not specified 9.9%	English 69.3% LOTE 28.0% N.S. 2.7%	i_LWS_CALD_WT 0 = no (English) 1 = yes (LOTE) 2 = not specified
Educational attainment		Completed year 12 or equivalent 80.7%. Did not complete year 12 or equivalent 19.3%[1].	Not used in weighting; weighted data checked to identify whether weighted data corrected for over-sampling of those with higher levels of education and this was confirmed.		
[1] In Census data, those who did not answer the question were excluded when calculating percentages. All data calculated for people aged 18 and over.					

Weighting specifications for SPSS

Gender - 1 .493 2 .463 3 .044

Age - 1 .233 2 .298 3 .262 4 .167 5 .040

LOTE – 0 .693 1 .280 2 .027

Region - 1 0.046 2 0.127 3 0.090 4 0.075 5 .071 6 .065 7 .092 8 .092 9 .097 10 .052 11 .035 12 .085 13 0.006 14 0.067

1 Belconnen East 4.6%
2 West Gungahlin 12.7%
3 Inner Belconnen 9.0%
4 Inner North 7.5%
5 Inner South 7.1%
6 North 6.5%
7 Outer Belconnen 9.2%
8 Tuggeranong North 9.2%
9 Tuggeranong South 9.7%
10 Weston Creek 5.2%
11 Molonglo 3.5%
12 Woden Valley 8.5%
13 Rural and unspecified 0.6%
14 East Gungahlin 6.7%
NSW participants given a default weight of 1 for geographic component of weighting. (coded as 15 in syntax)

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Appendix 1: Definition of ACT regions

Suburbs located in each of the regions described in this report were:

- Belconnen East
  - Evatt, Giralang, Kaleen, Lawson, McKellar
- Gungahlin[1]
  - Amaroo, Bonner, Casey, Crace, Forde, Franklin, Gungahlin, Harrison, Jacka, Kenny, Moncrieff, Ngunnawal, Nicholls, Palmerston, Taylor, Throsby

    Starting in Wave 9 (Dec2025), Gungahlin was subdivided into East and West Gungahlin, for both reporting and weighting purposes

    - Gungahlin East
      - Bonner, Forde, Franklin, Harrison, Jacka, Throsby
    - Gungahlin West
      - Amaroo, Casey, Crace, Gungahlin, Kenny, Moncrieff, Ngunnawal, Nicholls, Palmerston, Taylor
- Inner Belconnen
  - Aranda, Belconnen, Bruce, Cook, Florey, Hawker, Macquarie, Page, Scullin, Weetangera, Jamison Centre
- Inner North
  - Acton, Ainslie, Braddon, Campbell, Canberra, Canberra City, City, Duntroon, Reid, Turner
- Inner South
  - Barton, Deakin, Forrest, Griffith, Kingston, Manuka, Narrabundah, Parkes, Red Hill, Yarralumla
- Molonglo[2]
  - Coombs, Denman Prospect, Molonglo, Stromlo, Whitlam, Wright
- North
  - Dickson, Downer, Hackett, Lyneham, O'Connor, Watson
- Outer Belconnen
  - Charnwood, Dunlop, Flynn, Fraser, Higgins, Holt, Latham, Macgregor, Macnamara, Melba, Spence, Strathnairn
- Tuggeranong North
  - Erindale Centre, Fadden, Gowrie, Greenway, Kambah, Macarthur, Monash, Oxley, Wanniassa
- Tuggeranong South
  - Banks, Bonython, Calwell, Chisholm, Conder, Gilmore, Gordon, Isabella Plains, Richardson, Theodore
- Weston Creek[2]
  - Chapman, Duffy, Fisher, Holder, Rivett, Stirling, Waramanga, Weston
- Woden Valley
  - Chifley, Curtin, Farrer, Garran, Hughes, Isaacs, Lyons, Mawson, O'Malley, Pearce, Phillip, Swinger Hill, Torrens

- Other and rural
    - Beard, Canberra Airport, Fyshwick, Hall, Hume, Majura, Mitchell, Oaks Estate, Pialligo, Symonston, Tharwa, Uriarra Village

[1]From Wave 9, Gungahlin is split for *weighting purposes* into East and West Gungahlin. For *reporting purposes*, East and West Gungahlin data will be reported separately where respondent numbers permit (i.e., where n > 49 respondents for any given response). 'Gungahlin' data will continue to be reported for several surveys to maintain backwards compatibility with prior survey reporting. After sufficient waves of the survey have passed to establish baseline data for East and West Gungahlin, this practice will be discontinued.

[2]Note that Weston Creek and Molonglo are combined in reporting in earlier waves due to the small population of Molonglo. As the population of Molonglo grows and with it survey participation, it will increasingly be possible to analyse Molonglo and Weston Creek as separate regions. To support this, Weston Creek is reported as a separate region in addition to the grouped 'Weston Creek and Molonglo' region. When sufficient sample is available to also report Molonglo as a separate region, this will occur.

Appendix 2: ACT Wellbeing Framework indicators – measurement specifications

The *Living well in the ACT region* survey provides data for some of the indicators reported in the ACT Wellbeing Framework. This Appendix describes measures used to examine indicators that form part of the ACT Wellbeing Framework. It includes both measures that have been included in the survey to explore their potential for use to report on an indicator in future, and measures currently included in part of ACT Wellbeing Framework reporting.

As not all indicators are measured in every wave of the survey, Section A2.1 first identifies in which wave different indicators have been measured. Section A2.2 then details how each indicator is measured, calculated, and reported for use in the ACT Wellbeing Framework. Section A2.3 details how different socio-demographic and geographic groups are defined for purposes of reporting, focusing in particular on definitions of the following groups, who are focused on specifically in the ACT Wellbeing Framework:

- Aboriginal and Torres Strait Islander peoples
- Carers
- Children and young people
- Culturally and linguistically diverse people
- Gender
- LGBTIQ+
- Older Canberrans
- People with disability.

The list of indicators described here is periodically updated as changes occur to the indicators reported in the ACT Wellbeing Framework that draw on data from the *Living well in the ACT region* survey.

A2.1 Collection of indicators by survey wave

✓ = collected in same format as that used for indicator as of wave 8 × = not collected in any form ~ = data were collected, but using different measures to that used as of Wave 8 (this includes test measures)			In which waves were data collected for this indicator?									
Domain	**Indicator**	**Subindicator (if applicable)**	**Wave 1 (Nov 2019)**	**Wave 2 (May 2020)**	**Wave 3 (Dec 2020)**	**Wave 4 (Sep-Oct 2021)**	**Wave 5 (Aug 2022)**	**Wave 6 (Dec 22-Jan 23)**	**Wave 7**	**Wave 8 (Nov/Dec 2024)**	**Wave 9 (Dec 25)**	**Wave 10 (proposed)**
Personal wellbeing	Personal Wellbeing Index		✓	✓	✓	✓	✓	✔	✔	✔	✔	
Access and connectivity	Liveable city	Liveability of Canberra region (discontinued)	×	✓	×	×	×	×	×	×	×	
Access and connectivity	Liveable city	Local area liveability	×	✓	×	✓	✓	✔	×	✔	✔	
Access and connectivity	Transport use and access	Ease of access to places	✓	×	✓	×	×	✔	×	✔	✔	
Environment and climate	Climate resilient environment and community	Heatwave resilience (1 = single item; 4 = all 4 items)	✓4	✓1	✓4	×	×	~	✓3	✓1	✓1	
Environment and climate	Climate resilient environment and community	Climate change resilience	×	×	×	~	×	~	✔	✔	✔	
Environment and climate	Connection to nature	Use of green spaces – self-reported (exp = expanded version)	✓	✓	✓exp	✓exp	✓exp	✓exp	×	✓exp	✓exp	
Governance and institutions	Feeling that voice and perspective matter	Having a say and being heard	✓	×	✓	×	×	✔	✓part (1 item of 3)	✔	✔	
Governance and institutions	Human rights	Community experience and perception of human rights	×	✓	✓	✓	×	✓	×	✔	✔	
Governance and institutions	Trust in government	Trust in government	✓	~	✓	✓~	×	✓	×	✔	✔	

✓ = collected in same format as that used for indicator as of wave 8 × = not collected in any form ~ = data were collected, but using different measures to that used as of Wave 8 (this includes test measures)			In which waves were data collected for this indicator?									
Domain	**Indicator**	**Subindicator (if applicable)**	**Wave 1 (Nov 2019)**	**Wave 2 (May 2020)**	**Wave 3 (Dec 2020)**	**Wave 4 (Sep-Oct 2021)**	**Wave 5 (Aug 2022)**	**Wave 6 (Dec 22-Jan 23)**	**Wave 7**	**Wave 8 (Nov/Dec 2024)**	**Wave 9 (Dec 25)**	**Wave 10 (proposed)**
Governance and institutions	Trust in other institutions	Trust in groups and institutions in the ACT (original measure; note expanded measure tested in Wave 3, 6)	✓	✓	✓exp	×	×	✓exp	✓	✓	✓	
Health	Overall health	Health status	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Health	Mental health status	Self-reported mental health	✓	✓	✓	✓	✓	✓	×	✓	✓	
Health	Mental health status	Psychological distress	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Health	Healthy lifestyle	Getting enough sleep (main)	✓	✓	✓	✓	×	✓	×	✓	✓	
Health	Healthy lifestyle	Getting enough sleep (alternative)	✓	✓	×	✓	✓	×	×	✓	×	
Health	Access to health services	Access to GP services; specialist services; mental health services; allied health services; dentists	✓	×	✓	×	×	✓	~	✓	✓	
Housing and home	Housing suitability index	Part = single item asked	✓	✓part	✓	✓part	×	✓	×	✓	✓part	
Housing and home	Overcrowding		✓	×	✓	✓	×	✓	×	✓	✓	
Identity and belonging	Connection to Canberra	Canberra is a good place to live	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Identity and belonging	Belonging		✓	×	✓	×	×	✓	✓	✓	✓	
Identity and belonging	Inclusion		✓	×	✓	×	×	✓	✓1 item of 3	×	✓	

✓ = collected in same format as that used for indicator as of wave 8 × = not collected in any form ~ = data were collected, but using different measures to that used as of Wave 8 (this includes test measures)			In which waves were data collected for this indicator?									
Domain	**Indicator**	**Subindicator (if applicable)**	**Wave 1 (Nov 2019)**	**Wave 2 (May 2020)**	**Wave 3 (Dec 2020)**	**Wave 4 (Sep-Oct 2021)**	**Wave 5 (Aug 2022)**	**Wave 6 (Dec 22-Jan 23)**	**Wave 7**	**Wave 8 (Nov/Dec 2024)**	**Wave 9 (Dec 25)**	**Wave 10 (proposed)**
Identity and belonging	Discrimination		✓	×	✓	×	×	✓	×	✓	✓	
Identity and belonging	Support for multiculturalism	Culturally inclusive city	✓	×	✓	×	×	✓	×	✓	✓	
Identity and belonging	Valuing Aboriginal and Torres Strait Islander cultures and recognising our Traditional Custodians	Valuing Aboriginal and Torres Strait Islander Culture	✓	×	✓	×	×	✓	×	×	✓	
Identity and belonging	Valuing Aboriginal and Torres Strait Islander cultures and recognising our Traditional Custodians	Engaging with Traditional Custodians and Aboriginal and Torres Strait Islander Cultures	✓	×	✓	×	×	✓	×	×	✓	
Identity and belonging	Valuing Aboriginal and Torres Strait Islander cultures and recognising our Traditional Custodians	Knowledge of Traditional Custodians	✓	×	×	×	×	✓	×	×	✓	
Living standards	Cost of living		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Living standards	Financial position		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Safety	Community resilience to emergencies		✓	✓	✓	×	×	✓	✓4 of 5 items	✓	✓	
Safety	Feeling safe	Perception of safety	✓~	✓~	✓~	×	×	✓~	×	✓	✓	

✓ = collected in same format as that used for indicator as of wave 8 × = not collected in any form ~ = data were collected, but using different measures to that used as of Wave 8 (this includes test measures)			In which waves were data collected for this indicator?									
Domain	**Indicator**	**Subindicator (if applicable)**	**Wave 1 (Nov 2019)**	**Wave 2 (May 2020)**	**Wave 3 (Dec 2020)**	**Wave 4 (Sep-Oct 2021)**	**Wave 5 (Aug 2022)**	**Wave 6 (Dec 22-Jan 23)**	**Wave 7**	**Wave 8 (Nov/Dec 2024)**	**Wave 9 (Dec 25)**	**Wave 10 (proposed)**
Social connection	Levels of loneliness	Loneliness scale	✓	✓	✓	✓	×	✓	✓	✓	✓	
Social connection	Levels of volunteering	Volunteers	✓	✓	✓	✓	×	✓	✓	✓	✓	
Social connection	Participation in community events and activities	Level of participation in events and activities	✓	✓	✓	✓	×	✓	✓	✓	✓	
Social connection	Sense of social connection	Social connection scale	✓	✓	✓	✓	×	✓	✓	✓	✓	
Time	Quality of time	Quality of time scale	✓	✓	✓	✓	✓	×	×	✓	✓	
Time	Time spent travelling within Canberra	Satisfaction with time spent commuting	✓	✓	✓	✓	✓	×	×	✓	×	
Time	Time spent travelling within Canberra	30 minute commute	✓	✓	✓	✓	×	✓	✓	✓	×	
Time	Unpaid work including caring	People performing unpaid work, including caring	✓	✓	✓	✓	✓	×	×	✓	✓	
Time	Work-life balance	Time spent on work	✓	✓	✓	✓	✓	×	×	✓	✓	

A2.2 Measuring ACT Wellbeing Framework indicators

This section describes the measures used to examined ACT Wellbeing Framework indicators. As noted, some measures are exploratory in nature, and have not been adopted for use in reporting as part of the ACT Wellbeing Framework. Others are currently reported as part of the ACT Wellbeing Framework. Ongoing work is occurring to test potential measures for different indicators that form part of the ACT Wellbeing Framework.

Some of the indicators reported in the ACT Wellbeing Framework use existing indicators published in the literature. Others use existing indicators, but in a form that has been modified to better suit the ACT context. Others use indicators specifically designed and collected for the first time in the *Living well in the ACT region* survey. For each indicator, a brief description is provided of measures explored and used, including the items included in the survey instrument, their original source if applicable, and relevant calculations and thresholds used to translate the survey items into a measure of the indicator.

In some cases, more than one option for measuring an indicator has been trialled, or measures have been adapted/altered after initial trial to improve their design. This history is documented for each indicator.

For each indicator, the following are identified:

- Source of measure
- Changes in measure since first collected
- Frequency of data collection
- Survey measure (current and, if relevant, previous versions)
- Indicator calculation and reporting

This section identifies, for each indicator, whether more than one measure has been trialled for the indicator, and whether measures have changed over time. Where a measure changes, advice is provided on reporting and interpreting the indicator as part of the 'changes in measure' section.

A2.2.1 Domain: Personal Wellbeing; Indicator: Personal Wellbeing Index

The Personal Wellbeing Index (PWI) is a relatively commonly used measure of overall subjective personal wellbeing, both in Australia and internationally. It is calculated using the procedure described by International Wellbeing Group (2013).

Source of measure

This indicator is measured using the Personal Wellbeing Index, a widely used measure of personal wellbeing that has been widely used both in Australia and internationally. See International Wellbeing Group (2013) for detailed information about the measure beyond that provided in this section.

Changes in measure

There have been no changes to this measure over time, or to the thresholds used to indicate low versus healthy levels of wellbeing.

In initial reporting of Personal Wellbeing, three groups were reported: the proportion of people with (i) low wellbeing (score below 60), (ii) 'typical' wellbeing (score of 60 to 79), and (iii) high wellbeing (80 or higher). This was based on thresholds emerging as meaningful in the literature (Schirmer et al. 2016).

The field of wellbeing research is rapidly evolving, and along with it understanding of the level of wellbeing needed to support long-term positive life outcomes. There is good evidence that those who experience low levels of wellbeing (based on the threshold above) are more likely to experience a range of negative life outcomes, such as experiencing mental health problems or life stresses. There is less evidence regarding the difference in life outcomes between those with the higher levels of wellbeing, compared to those with what is currently termed 'typical' levels of wellbeing. There may be justification to group those with 'typical' and 'high' levels of wellbeing into a single group described as having 'healthy' levels of personal wellbeing.

Frequency of data collection

This indicator is collected in every wave of the *Living well* survey.

Survey measure (current and, if relevant, previous versions)

The survey measure is documented below.

Thinking about your own life and personal circumstances, how satisfied are you with the following at the moment?	**Completely DISSATISFIED** ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**Completely SATISFIED** ⑩
Your standard of living	○	○	○	○	○	○	○	○	○	○	○
Your health	○	○	○	○	○	○	○	○	○	○	○
What you are currently achieving in life	○	○	○	○	○	○	○	○	○	○	○
Your personal relationships	○	○	○	○	○	○	○	○	○	○	○
How safe you feel	○	○	○	○	○	○	○	○	○	○	○
Feeling part of your community	○	○	○	○	○	○	○	○	○	○	○
Your future security	○	○	○	○	○	○	○	○	○	○	○

Indicator calculation & reporting

Responses to the seven items are transformed into a scale from 1 to 99, using the method described in International Wellbeing Group (2013). The PWI is reported in one of two ways:

- Identifying the average score for a group (using the mean of the score from 1 to 99), with up to two items missing (a mean from 5 or more answered items)
- Reporting the proportion of people with low wellbeing (score below 60), 'typical' wellbeing (score of 60 to 79), and high wellbeing (80 or higher). These thresholds are based on those emerging as meaningful in the literature (Schirmer et al. 2016).

A2.2.2 Domain: Access and connectivity; Indicator: Liveable city; Sub-indicator: Liveability of Canberra region (discontinued)

Source of measure

This indicator was first designed and used in Wave 2 of the *Living well* survey. It was designed for the *Living well* survey, and was modified from a similar item included in the *Regional Wellbeing Survey.*

Changes in measure since first collected

This indicator was measured in one wave only (Wave 2) and subsequently discontinued. This was due to high levels of similarity of responses to a question about liveability of the person's local area (see separate indicator). The question about liveability of a person's local area, however, was more effective in showing differences in self-rated liveability across different ACT regions, and for this reason only the 'Local area liveability' measure for this indicator was continued. This means data are only available for Wave 2 of the survey for this measure.

Frequency of data collection

N/A as indicator measured for a single wave only.

Survey measure (current and, if relevant, previous versions)

Respondents were asked to indicate the extent to which they agreed or disagreed with the following statement on a scale from 1 (strongly disagree) to 7 (strongly agree) and could also select 'don't know' if they were unsure.

How much do you agree or disagree with the following statements about living and working in the ACT region?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
The ACT in general is a very 'liveable' city (as a whole, it is good to live in)	○	○	○	○	○	○	○	○

Indicator calculation & reporting:

For purposes of reporting, those who responded '4' or 'don't know' are combined. Three groups are reported:

- Disagree that ACT region is liveable: Respondent selected 1, 2 or 3
- Neutral/don't know if ACT region is liveable: Respondent selected 4 or Don't know
- Agree that ACT region is liveable: Respondent selected 5, 6 or 7

A2.2.3 Domain: Access and connectivity; Indicator: Liveable city; Sub-indicator: Local area liveability

Source of measure

This indicator was designed specifically for the *Living well* survey, with first use in Wave 2 of the *Living well* survey. While designed for the *Living well* survey, it was modified from a similar item included in the *Regional Wellbeing Survey.*

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure was originally collected every second survey, being collected in Wave 2 and then Wave 4. However, substantive change in the indicator was observed between Wave 2 and Wave 4, suggesting that this measure may at times changes more rapidly than originally considered likely. Given this, the frequency of measurement was increased to annually from Wave 4.

Survey measure (current and, if relevant, previous versions)

Respondents are asked to indicate the extent to which they agreed or disagreed with the following statement on a scale from 1 (strongly disagree) to 7 (strongly agree) and can also select 'don't know' if they were unsure.

How much do you agree or disagree with the following statements about living and working in the ACT region?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
My local area (e.g. the suburb you live in) is very liveable	○	○	○	○	○	○	○	○

Indicator calculation & reporting

For purposes of reporting, those who responded '4' or 'don't know' are combined. Three groups are reported:

- Disagree that local area is liveable: Respondent selected 1, 2 or 3
- Neutral/don't know if local area is liveable: Respondent selected 4 or Don't know
- Agree that local area is liveable: Respondent selected 5, 6 or 7

A2.2.4 Domain: Access and connectivity; Indicator: Transport use and access; Sub-indicator: Ease of access to places

Source of measure

This measure is sourced from the Australian Bureau of Statistics' *General Social Survey*.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

Based on review of change in this measure when asked in the Australian Bureau of Statistics' *General Social Survey*, originally this measure was planned to be updated once every 2-3 years. It was collected in Wave 1, Wave 3 and Wave 6 to reflect this. However, in Wave 6 there was significant change with an increase in the proportion of people reporting difficulty with transport. This suggests a need to – at least temporarily – increase frequency of reporting to track change in the indicator over time on an annual basis until such time as there has been little change for 2 or 3 years.

Survey measure (current and, if relevant, previous versions)

Survey participants are asked the following question: "Consider all the places you need to go to, by car or other transport. Which statement best describes your overall transport situation?" Participants are then asked to select from the following responses: (i) Can easily get to the places I need to, (ii) Sometimes have difficulty getting to the places I need to, (iii) Often have difficulty getting to the places I need to, (iv) Can't get to the places I need to, (v) Never go out/housebound.

Consider all the places you need to go to, by car or other transport. Which statement best describes your overall transport situation?	◯ Can easily get to the places I need to ◯ Sometimes have difficulty getting to the places I need to ◯ Often have difficulty getting to the places I need to ◯ Can't get to the places I need to ◯ Never go out/ housebound

Indicator calculation & reporting

Responses to the measure are reported using three groups:

- Easy transport access (% who responded 'can easily get to the places I need to')
- Sometimes has difficulty with transport (% who responded 'sometimes have difficulty getting to the places I need to')
- Often/always has difficulty with transport (sum of % who responded to following three response options: 'often have difficulty getting to the places I need to', 'can't get to the places I need to', 'never go out/housebound'.

A2.2.5 Domain: Environment and climate; Indicator: Climate resilient environment and community; Subindicator: Heatwave resilience

Source of measure

The heatwave resilience measure is based on questions originally developed for the *Living well in the ACT with a changing climate* survey. These were first used and reported in 2018 (see Schirmer and Yabsley 2018). The four items initially included in the *Living well* survey represent only a subset of a much larger number of heatwave resilience measures identified by Schirmer and Yabsley (2018). These four items focus on (i) overall self-perceived heatwave resilience, in the form of answers to the item *I can easily cope with heatwaves when they happen*, and (ii) extent to which a person's home performs well to protect human health in heatwaves, measured via the remaining three items, *My home warms up very fast in hot weather (scores reversed); When the temperature outside drops after a hot day, my home cools down quickly; My home has sufficient cooling installed.*

From these items, two measures of heatwave resilience were produced. The first was an index of the three items related to housing performance, which reflects the aspect of heatwave resilience identified by Schirmer and Yabsley (2018) as being of highest concern. The other is reporting of the proportion of people who agree, disagree or are neutral/unsure whether they can cope easily with heatwaves. Caution is needed when using the latter, for two reasons. First, some people may incorrectly believe they can easily cope with heatwaves when in fact they are highly vulnerable to experiencing negative health impacts. Second, when few heatwaves have occurred for some time, self-rating of ability to cope may fall in accuracy due to lack of recent experiences with which to self-evaluate capacity to manage heatwaves.

Changes in measure since first collected

There have been no changes over time in wording of the two measures. Only one has been used in ACT Wellbeing Framework reporting to date, with the data dashboard noting the development of other indicators as an ongoing process.

In some waves of the survey only one of the two measures has been measured. In Wave 2 and 3 of the survey, only the item *I can easily cope with heatwaves when they happen* was asked, while the other three items were not, while in Waves 1 and 6 all items were measured. The repeated collection of data for the item *I can easily cope with heatwaves when they happen* in Waves 1, 2 and 3 suggested that the item may have poor statistical qualities, with some rapid change possibly associated with lack of recent experience of heatwaves in the latter two waves (in Wave 1, heatwaves had occurred relatively recently; in Wave 2, there had been three to four months since a significant heatwave; in Wave 3, there had been 15 to 16 months since a significant heatwave, and no significant heatwaves occurring subsequently during the period of measurement for Wave 4, 5 and 6, due to the repeated *La Nina* events in this time period)). For this reason, the item was not collected in Waves 4 to 6, while in Wave 6 the three item measure about housing resilience in heatwaves was repeated. This measure will continue to be assessed for validity, particularly through measurement after significant heatwaves have again occurred in the ACT, something which did not occur during Waves 4 to 6, reducing ability to continue testing the validity of the measure.

Frequency of data collection

This item is not expected to change rapidly, and is likely to be recommended for measurement once every two to five years. However, further testing of validity of the measure is required in terms of

change in perceptions of heatwave resilience and how these relate to the time since last experience of a significant heatwave.

Survey measure (current and, if relevant, previous versions)

Heatwave resilience is measured based on the average score of responses to the following items, all of which are asked as a 7-point scale from 'strongly disagree' (1) to 'strongly agree' (7) with a don't know option also provided:

a. I can easily cope with heatwaves when they happen

b. My home warms up very fast in hot weather (scoring reversed)

c. When the temperature outside drops after a hot day, my home cools down quickly

d. My home has sufficient cooling installed

How much do you agree or disagree with the following statements?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
I can easily cope with heatwaves when they happen	○	○	○	○	○	○	○	○
My home warms up very fast in hot weather	○	○	○	○	○	○	○	○
When the temperature outside drops after a hot day, my home cools down quickly (without use of air conditioning)	○	○	○	○	○	○	○	○
My home has sufficient cooling installed (e.g. air conditioning, evaporative cooling)	○	○	○	○	○	○	○	○

Indicator calculation & reporting

Two indicators have been produced from this measure: a heatwave resilience index; and a summary of the single item 'I can easily cope with heatwaves when they happen'. The latter was reported in the first ACT Wellbeing Framework data dashboard. Each is described below.

Heatwave resilience index

The answer 'don't know' is combined with those who responded '4' by recording it as '4'. Scores for the item 'My home warms up very fast in hot weather' are then reversed. The average score is then calculated for the four items, with up to one missing value, after re-coding 'don't know' as '4' and reverse scoring the second item.

The indicator is then reporting using the mean score of the index. An alternative reporting option is to report based on the following three groups:

- Low heatwave resilience: % with index score between 1 and 3.49
- Moderate heatwave resilience: % with index score between 3.50 to 5.49
- High heatwave resilience: % with index score between 5.50 and 7.

This indicator focuses on suitability of the home and self-rated ability to cope with heatwaves. If a person is unaware that they have a medical condition or health/age related vulnerability to heatwaves, their response to the item 'I can easily cope with heatwaves when they happen' may not reflect their actual vulnerability.

Wave 6: In wave 6, the item ‘I can easily cope with heatwaves when they happen’ was not asked. The heatwave resilience index was calculated using the remaining three items, using the process described above.

Confidence in ability to cope with heatwaves

This single item is reported using the following three groups:

- Disagree can cope easily with heatwaves (respondent selected 1, 2 or 3)
- Neutral or unsure can cope easily with heatwaves (respondent selected 4 or Don’t know)
- Agree can cope easily with heatwaves (respondent selected 5, 6 or 7).

This indicator focuses on self-rated ability to cope with heatwaves. It is based on the concept that simply having an illness or condition that may increase vulnerability to heatwaves does not indicate low resilience to heatwaves: if a person is successfully managing their higher risk, for example by ensuring their home is well managed to provide a suitable temperature during heatwaves, their higher vulnerability will not translate into negative heatwave impacts, and this would indicate resilience.

However, if a person is unaware that they have a medical condition or health/age related vulnerability to heatwaves, and have not taken steps to ensure safety during heatwaves given this vulnerability, their response to the item ‘I can easily cope with heatwaves when they happen’ may not reflect their actual level of resilience to heatwaves.

A2.2.6 Domain: Environment and climate; Indicator: Climate resilient environment and community; Subindicator: Climate change resilience

Source of measure

This indicator is in development. As noted in A2.2.6, there was a need to develop a short measure based on the much longer set of items found to be important to understanding resilience to climate change in the first wave of the *Living well with a changing climate* survey. An initial test measure was developed and tested in Wave 3, with findings used to develop an improved short measure. The revised items were tested in Wave 6 and subsequently in the second wave of the *Living well with a changing climate* survey, which will enable assessment of both test-retest statistical validity, and of the correlation of the shorter measure with more detailed measures of resilience to climate change.

Changes in measure since first collected

The initially tested measures in Wave 3 were revised and retested.

Frequency of data collection

To be determined based on outcomes of evaluating change across the Wave 3, Wave 6, and collection as part of the *Living well with a changing climate* survey.

Survey measure (current and, if relevant, previous versions)

This indicator is under development. A key challenge of measuring community resilience to climate change is that many of the measures that can be used are likely to already be a part of other indicators. For example, the 'safety' domain of the ACT Wellbeing Framework includes the indicator 'community resilience to emergencies', which could equally be considered a measure of preparedness for higher rates of events such as fires, storms, drought and bushfires resulting from climate change.

In 2017, measures were developed to examine the resilience of people living in the ACT to the expected effects of climate change, described in Schirmer and Yabsley (2018). Schirmer and Yabsley developed both an overall measure of resilience to climate change, and also separately reported the six sub-indices that made up this overall measure. Each sub-index measured a different aspect of resilience to climate change. Some of these sub-indices are measured by indicators located in other parts of the *ACT Wellbeing Framework,* for example the community resilience to emergencies indicator, and measures of overall access to financial and social resources.

Given this, and that Schirmer and Yabsley (2018) explicitly recommended that the sub-indices be the usual unit of measurement, rather than focusing on reporting only a single overall index, initially two sub-indices were reported: resilience to heatwaves, and emergency preparedness. These are each reported as separate indicators to this one (see A2.2.5, and A2.2.30). In addition, several of the indicators reported as part of the ACT Wellbeing Framework measure aspects of generalised resilience identified as important by Schirmer and Yabsley (2018).

However, in addition, there was ongoing interest in developing an overarching indicator of climate change resilience amongst residents of the ACT. In Wave 3, a set of questions was tested to seek to achieve an index that could be used to indicate human resilience to the expected effects of climate change in the ACT, using those identified in Schirmer and Yabsley (2018). The following items were included in the Wave 3 survey, and explored to identify whether a suitable index could be calculated from them.

How much do you agree or disagree with the following statements?	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
I feel confident I can cope with emergency situations such as fire, flood and storms	○	○	○	○	○	○	○	○
I have good access to practical support from family and friends if I need help coping with an extreme weather event	○	○	○	○	○	○	○	○
I have enough savings and/or insurance to cope with expenses resulting from an extreme weather event	○	○	○	○	○	○	○	○
During a heatwave, I can stay comfortable in my home without having to spend a lot of additional money on cooling	○	○	○	○	○	○	○	○
If smoke pollution from a fire happens, I am able to seal my home so only a little smoke gets in	○	○	○	○	○	○	○	○
My garden and home are well set up to be able to reduce water use in times of drought without losing many plants/amenity	○	○	○	○	○	○	○	○
I am in a group that has higher risk of experiencing health problems during heatwaves	○	○	○	○	○	○	○	○
I experienced a heatwave-related illness in the last year	○	○	○	○	○	○	○	○
I had difficulty managing an existing health condition during one or more heatwaves in the last year	○	○	○	○	○	○	○	○
In the last year, I've actively worked to increase how prepared my home and household are for extreme weather events	○	○	○	○	○	○	○	○
I feel there is not much I can do to reduce the impacts extreme weather events could have on my home	○	○	○	○	○	○	○	○
I have good access to information on how to prepare for extreme weather events	○	○	○	○	○	○	○	○
It's hard to know what are the most important things I need to do to prepare my home for extreme weather events	○	○	○	○	○	○	○	○

How much do you agree or disagree with the following statements?	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
ACT emergency services organisations are effective in responding to emergencies such as fire, storm and heatwave	○	○	○	○	○	○	○	○
The ACT Government is effective in supporting those impacted by emergencies such as fire, storm, drought and heatwave	○	○	○	○	○	○	○	○
People who live in my local areas are good at supporting those impacted by emergencies such as fire, storm, drought and heatwave	○	○	○	○	○	○	○	○
Community organisations in the ACT are good at supporting those impacted by emergencies such as fire, storm, drought and heatwave	○	○	○	○	○	○	○	○
Events such as drought, heatwave, fire or storms had a SHORT TERM negative impact on the liveability of my local area in the last year	○	○	○	○	○	○	○	○
Events such as drought, heatwave, fire or storms have caused long-term decline in the liveability of my local area	○	○	○	○	○	○	○	○
I support the ACT government's objective of achieving zero net emissions (carbon neutrality) by 2045	○	○	○	○	○	○	○	○

These items were analysed, and some found to have limitations with many people feeling unable to evaluate things such as effectiveness of government support, or impacts on liveability. In Wave 6, a revised version was tested, using the items below. This will enable both testing how responses change over time, for those items that remained the same, and revised versions of key items.

How much do you agree or disagree with the following?	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
I feel confident I can cope with emergency situations such as fire, flood and storms	○	○	○	○	○	○	○	○
I have good access to practical support from family and friends if I need help coping with an extreme weather event	○	○	○	○	○	○	○	○
I have enough savings and/or insurance to cope with expenses resulting from an extreme weather event	○	○	○	○	○	○	○	○
In the last year, I've actively worked to increase how prepared my home and household are for extreme weather events								
I feel there is not much I can do to reduce the impacts extreme weather events could have on my home	○	○	○	○	○	○	○	○
I have good access to information on how to prepare for extreme weather events	○	○	○	○	○	○	○	○
It's hard to figure out the most important things to do to prepare my home for extreme weather events	○	○	○	○	○	○	○	○
During a heatwave, I can stay comfortable in my home without having to spend a lot of additional money on cooling	○	○	○	○	○	○	○	○
If smoke pollution from a fire happens, I am able to seal my home so only a little smoke gets in	○	○	○	○	○	○	○	○
My garden and home are well set up to be able to reduce water use in times of drought without losing many plants/amenity	○	○	○	○	○	○	○	○
I have health or other challenges that mean I am at high risk of experiencing health problems during heatwaves	○	○	○	○	○	○	○	○
I have health or other challenges that mean I am at high risk of experiencing health problems on days with high pollen count	○	○	○	○	○	○	○	○
In the last 12 months, I have done less exercise than normal at times due to climate-related issues such as heatwaves, rain, smoke, or pollen count	○	○	○	○	○	○	○	○

How much do you agree or disagree with the following?	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
ACT emergency services organisations are effective in responding to emergencies such as fire, storm and heatwave	○	○	○	○	○	○	○	○
The ACT Government is effective in supporting those impacted by emergencies such as fire, storm, drought and heatwave	○	○	○	○	○	○	○	○
People who live in my local areas are good at supporting those impacted by emergencies such as fire, storm, drought and heatwave	○	○	○	○	○	○	○	○
Community organisations in the ACT are good at supporting those impacted by emergencies such as fire, storm, drought and heatwave								
Extreme weather events impacted local infrastructure (e.g. roads, parks, ovals playgrounds, walking paths, electricity) in the last year	○	○	○	○	○	○	○	○
Extreme weather events are reducing the liveability of my local area	○	○	○	○	○	○	○	○
The liveability of my local area is staying about the same over time, despite the effects of events like drought, storms/high rainfall, or fires	○	○	○	○	○	○	○	○

Indicator calculation & reporting

Indicator calculation and recommended thresholds for identifying higher and lower resilience are under development.

A2.2.7 Domain: Environment and climate; Indicator: Connection to nature; Subindicator: Use of green spaces – self-reported

Source of measure

This measure was initially adapted from the NEWS (Neighbourhood Environment Walkability Scale). Subsequently, an expanded was developed to be more specific to the way ACT residents spent time in outdoor areas.

Changes in measure since first collected

This measure has changed over time. See 'Survey measure' below for a detailed description of the change in measure. The amended measure is designed to still be used to report a binary measure of the proportion spending time in outdoor areas (enabling continuation of the time series that began in Wave 1), but was designed to be able to be further developed into a more sensitive measure of change in both (i) *frequency* of time spent in outdoor areas, rather than simply presence of absence of any time spent in outdoor areas, and (ii) time spent outdoors in *both* local neighbourhood and in less local locations in the ACT. This more detailed indicator can now be produced as needed to better understand changes in use of green spaces, and as a complement to the main indicator currently reported in the ACT Wellbeing Framework.

As of Wave 6, this indicator was measured by identifying whether a person did or did not typically spend time in local outdoor green spaces in a typical week. However, the change in measurement after Wave 2 means that there may be some reduced comparability of findings from Waves 1 and 2 compared to subsequent waves, if some people answered the original phrasing of the question differently to the revised phrasing. In pilot tests of the revised measure in which 42 people answered both sets of questions (in randomised order), the change in wording and structure of the question resulted in no significant change in the estimate of the proportion of people spending time outdoors in a typical week.

When analysing findings for this indicator, it is important to consider the timing of data collection, as there may be some seasonal variation: the Wave 5 survey was conducted during late winter/early spring whereas most Waves are collected in late spring/summer, and there was a reduction in the proportion reporting they spent time outdoors in a typical week in the Wave 5 data collection that may reflect a seasonal difference, rather than a long-term trend. The indicator should ideally be collected in waves of the survey occurring at a similar time each year to ensure comparability – meaning Waves 1, 3, 4 and 6 current provide data likely to be comparable seasonally and which can be used to assess longer term change.

Frequency of data collection

This item is currently collected in each wave of the survey. At a minimum, it will be collected annually going forward, ideally at the same time of year to reduce the effects of seasonal factors. However, if seasonal factors do affect this indicator, even data collection at the same time of year may not fully remove seasonal effects, for example if there is a 'cool summer' or a late spring or autumn, this may affect time spent outdoors compared to years in which seasonal change is not early or late compared to the average.

Survey measure (current and, if relevant, previous versions)

This indicator has been measured in two ways.

Initially, this measure examined whether in a usual week, a person typically walked in local places in their local area. It was measured by asking "Which places would you walk for recreation, health or fitness in your local area in a usual week? (i) Nature reserve or conservation reserve, (ii) Park or

oval". This measure reflects that physical proximity to nature (examined in the first two measures) is only one of several factors that may influence whether a person is able to spend time in natural or 'green' spaces. Many factors may act as barriers or enablers to using green spaces, such as a person's health, how busy they are, and their exercise/recreation preferences. This initial measure was developed for the *Living well* survey.

Which places would you walk for recreation, health or fitness in your local area in a usual week? (this includes walking a dog if applicable) *Select **ALL** that apply*	☐ Around the neighbourhood using the streets/footpaths (no specific destination) ☐ Nature reserve or conservation reserve ☐ Park or oval ☐ To or from shops ☐ To or from café or restaurant ☐ To or from friend's house ☐ Local gym or fitness centre ☐ Somewhere else (please describe place/ places) _____

Comparison of the findings from Wave 1 and 2 indicated that this indicator may not be sufficiently sensitive to changes in level of use: rather than simply changing whether they walked in an area in a week or not, the change may be in frequency of use in a typical week. Additionally, some people regularly walk in locations not directly located in their local area, for example a nature reserve near their place of employment, or driving to a location they enjoy walking.

Given this, the question was updated from Wave 3 onwards to ask the following.

In the last four weeks, how often have you spent time in the following types of outdoor places in the ACT?	**Didn't do this in the last four weeks**	**1-2 times**	**About 3-4 times**	**About 5-8 times (once or twice a week)**	**About 9-14 times (3-4 times a week)**	**About 15 times or more (every day or two)**
Local streets, walking paths, ovals, playgrounds near your home (e.g. going for a walk, riding a bike, jogging)	○	○	○	○	○	○
Local nature reserves within 10 minutes drive of your home (you may have walked, ridden or driven to these)	○	○	○	○	○	○
Parks/nature reserves WITHIN the city of Canberra but more than 10 minutes drive from home, e.g. parks near one of the large lakes, or the Botanic gardens	○	○	○	○	○	○
ACT parks/nature reserves OUTSIDE the city (e.g. Tidbinbilla Nature Reserve, Namadgi National Park or others)	○	○	○	○	○	○

This could still be used to estimate the proportion who were likely to walk in outdoor nature areas in a typical week, but also allowed a more nuanced indicator to be developed that examined types of outdoor area, and/or frequency of use. As of Wave 5, however, more detailed indicators to be used

had not been fully developed and implemented. This indicator will be updated in future if the reported indicator changes.

Indicator calculation & reporting

Original measure: % of people who reported they walked in one or both of a local 'nature reserve or conservation area' and/or 'park or oval' in typical week.

Updated measure: % of people who indicated walking in one or both of 'local streets, walking paths, ovals, playgrounds near your home' and/or 'local nature reserves within 10 minutes drive of your home (wave 5 wording)/ Local nature reserves near your home (you may have walked, ridden or driven to these) (wave 6 wording)', 3-4 times or more frequently in the last four weeks.

The indicator reported is the % who typically walked outdoors in their local area every week (whether once or more frequently).

In wave 9, a trial version of the updated measure has been calculated which uses data from the 'Parks and nature reserves within Canberra' and the 'ACT parks/nature reserves outside the city' responses (i.e., that reports use of greenspace using responses from all 4 questions, rather than only the two 'local' questions) has been calculated. This version reports % of people who indicated walking in any of 'local streets, walking paths, ovals, playgrounds near your home' and/or 'Local nature reserves near your home (you may have walked, ridden or driven to these)', and/or 'Parks/nature reserves WITHIN the city of Canberra but more than 10 minutes drive from home, e.g. parks near one of the large lakes, or the Botanic gardens', and /or 'ACT parks/nature reserves OUTSIDE the city (e.g. Tidbinbilla Nature Reserve, Namadgi National Park or others)', 3-4 times or more frequently in the last four weeks.

A2.2.8 Domain: Governance and institutions; Indicator: Feeling that voice and perspective matter; Subindicator: Having a say and being heard

Source of measure

Measure adapted from the measure used in the Regional Wellbeing Survey (the adaptation involved changing the measure to ask about the ACT rather than about a person's local community).

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure is currently collected once every 2-3 years as available evidence (from ongoing collection of the indicator as part of the Regional Wellbeing Survey) suggests that there is not typically significant change over shorter periods of time.

Survey measure (current and, if relevant, previous versions)

The 'feeling that voice and perspective matter' indicator seeks to 'measure the agency people feel they have in our city, including whether they can get involved in decision-making processes, and if they're confident their voices will have an impact' (ACT Government 2020, p. 15).

The measure used examines the confidence of ACT residents in being able to get involved in decision making processes in the ACT region if they wish to, and their confidence in being listened to, as well as engagement in contributing to discussion and decision making. It was based on similar measures used in the Regional Wellbeing Survey (Regional Wellbeing Survey 2014-2018 data tables), however as a slightly different set of overall measures is used in the Regional Wellbeing Survey, data are not directly comparable.

The measure used in the *Living well* survey is calculated as the average score of the following three statements, each of which was measured on a scale from 1 (strongly disagree) to 7 (strongly agree) with the option of selecting 'don't know' also provided:

- I can get involved in decision-making processes in the ACT if I want to
- If I want to have a say to decision makers in the ACT, I am confident they will listen to me
- I actively contribute to discussion and decision making in the ACT region, e.g. through local groups, consultation processes, school councils, business groups.

The measure overall is intended to reflect confidence and ability to contribute to civic life overall in the ACT, including to government and non-government processes and decision making.

How much do you agree or disagree with the following statements about decision making in the ACT region?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
I can get involved in decision-making processes in the ACT if I want to	○	○	○	○	○	○	○	○
If I want to have a say to decision makers in the ACT, I am confident they will listen to me	○	○	○	○	○	○	○	○
I actively contribute to discussion and decision making in the ACT region e.g. through local groups, consultation processes, school councils, business groups	○	○	○	○	○	○	○	○

Indicator calculation & reporting

For purposes of reporting, those who responded ‘4’ or ‘don’t know’ are combined. The average score of the three items is then calculated to form the ‘Feeling that voice and perspective matter’ indicator, with up to one missing (at least two items answered). Three groups are reported:

- Low confidence: Index score of 1 to 2.99
- Moderate confidence: Index score of 3.00 to 4.99
- High confidence: Index score of 5.00 to 7.

A2.2.9 Domain: Governance and institutions; Indicator: Human rights; Subindicator: Community experience and perception of human rights

Source of measure

Developed for the *Living well* survey.

Changes in measure since first collected

This measure has changed over time. An initial measure was tested in Wave 2 of the *Living well* survey, and an exploratory index produced from three measures (*The ACT Government respects and protects human rights; ACT Government decision makers consider human rights in their decision making processes; Aboriginal and Torres Strait Islander cultural rights are well protected in the ACT (e.g. through the Human Rights Act)*. However, exploratory calculation and use of this index identified that (i) the first two items had very similar responses suggesting they were redundant and only one should be used, and (ii) the third item was typically answered as 'don't know' due to its specificity, reducing useability of responses. This meant it was recommended that only *The ACT Government respects and protects human rights* be included. An alternative item also asked in the survey – *Vulnerable people are protected and supported in the ACT* – was also examined and found to provide useful insight into views about whether human rights protections are achieving desired outcomes. However, the two remaining items are best reported separately, rather than as an index, as they measure substantively different aspects of human rights, one focused on ACT Government systems and action, and the other on broader support and protection of vulnerable people that goes beyond government systems and processes. Given this, the two items have been recorded and reported separately for Wave 2, 3, 4 and 6.

Frequency of data collection

This indicator is collected annually, with ongoing assessment of rates of change which may result in future advice to change frequency of data collection.

Survey measure (current and, if relevant, previous versions)

This indicator examines the level of confidence Canberrans have that:

- The ACT Government respects and protects human rights
- Vulnerable people are protected and supported in the ACT

Originally other measures were also explored, including:

- ACT Government decision makers consider human rights in their decision making processes
- Aboriginal and Torres Strait Islander cultural rights are well protected in the ACT (e.g. through the Human Rights Act).

However, a large proportion of respondents answered 'don't know' to these two items; amongst those who had an opinion, views were very similar to responses to the item 'Vulnerable people are protected and supported in the ACT'. Additionally, exploratory factor analysis indicated that the different variables were not measuring a single latent variable. Given this, the two more specific items were not continued, and the first two measures were each reported as a separate indicator.

How do you feel about the ACT Government?	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
The ACT Government respects and protects human rights	○	○	○	○	○	○	○	○
Vulnerable people are protected and supported in the ACT	○	○	○	○	○	○	○	○
ACT Government decision makers consider human rights in their decision making processes	○	○	○	○	○	○	○	○
Aboriginal and Torres Strait Islander cultural rights are well protected in the ACT (e.g. through the Human Rights Act)	○	○	○	○	○	○	○	○

Indicator calculation & reporting.

The two items comprising the measures of human rights are each reported separately due to measuring different aspects of human rights: one measures perceptions of the ACT Government's approach, while the other examines protection of vulnerable people more broadly in the ACT, by all organisations. The two measures used report:

- % who agree that the ACT Government respects and protects human rights (defined as those giving a response of 5, 6, or 7, divided by the total number who responded to the question - excluding those who responded 'don't know').
- % who agree that vulnerable people are protected and supported in the ACT (defined as those giving a response of 5, 6, or 7, divided by the total number who responded to the question - excluding those who responded 'don't know').

A2.2.10 Domain: Governance and institutions; Indicator: Trust in government

Source of measure

Potential measures for this indicator have been explored using modified versions of two different existing institutional trust measures:

- The Edelman Trust Barometer. This international survey asks about multiple dimensions of trust, and measures drawn from this source are identified as they are described
- The World Values Survey. This international survey asks about the extent to which different organisations are trusted to do what is right. Measures drawn from this source are identified as they are described.

Measures explored for this indicator often include measures of both trust in government, and trust in other institutions (examined in A2.2.11). In this section, the measures used to examine both government and other institutions are listed to assist in identifying how measures are presented in the survey.

Changes in measure since first collected

More than one potential measure has been explored for this indicator, meaning that since Wave 1 of the survey the measures explored have changed. The different measures examined are detailed subsequently in this section. Some of the measures explored have been repeated in 2 or 3 waves of the survey to enable examination of change over time as part of indicator development.

A table is included in the 'survey measure' section identifying which measures were included in different waves.

From the different measures tested, ongoing tracking of the following statements was instituted from Wave 6 onwards:

- I trust the ACT Government to do what is right (response options from strongly disagree [1] to strongly agree [7], with a don't know option also provided). This item is based on the Edelman Trust Barometer.
- Extent to which a person is confident in the following to do what is right (adapted from the World Values Survey)
    a. The ACT Government (including elected members, public servants, and services they provide)
    b. The ACT public service.

While originally asking more specifically about different parts of the ACT Government was considered optimal, in reality this proved problematic. Other items asked about in the items tested, such as 'The ACT Courts', had a relatively high rate of 'don't know' responses, reducing interpretability of findings. Several survey participants also expressed frustration at being asked to complete a lengthy rating for many parts of government they had little or no interaction with – but were able to provide an overall rating. This suggests that these overall measures are preferable to asking about multiple individual parts of government and independent/ statutory authorities/ agencies.

These measures have a reasonable degree of similarity to the measure used in the Australian Government's *Measuring What Matters* framework, which uses data collected by the OECD that asks 'In this country, do you have confidence in national government?'. Future waves of the *Living well* survey may test the extent to which the measures included from Wave 6 in the survey – which

examine confidence the government does what is right - correlate with the OECD's less specific measure, which examines confidence in government without specifying that this be confidence the government will do what is right.

Frequency of data collection

The frequency of data collection for this indicator is likely to be annual once an ongoing measure is finalised. This is because available evidence from the Edelman Trust Barometer suggests that trust in government, while often remaining stable for periods of time, has potential to change rapidly.

Survey measure (current and, if relevant, previous versions)

Trust in government is an important indicator of wellbeing. However, it is also complex to measure, given the size and complexity of government: levels of trust may vary depending on whether a person is considering elected representatives, public servants, or different government agencies, with trust higher for some and lower for others.

Initially, the survey measure included to examine trust in government was based on the measures used in the Edelman Trust Barometer, a well known international measure of trust in a range of governments and institutions. This involved asking the following items, all on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree) with a 'don't know' option also provided:

- I trust the ACT Government to do what is right
- The ACT Government is honest
- The ACT Government keeps its promises
- The ACT Government is trying hard to have a positive impact on society.

In addition, two other items that measure more broadly whether the ACT Government is representative and effective were asked. These are not specifically measuring trust, but have potential to be included in a trust measure if testing suggests that, together with the items above, they measure a single underlying concept (latent factor):

- The ACT Government represents the whole ACT community, not just a part of it
- The ACT Government is able to help the ACT region face challenges.
- The ACT Government is good at what it does.

In addition, comparison data were collected in which the same questions were asked about the Australian government. These questions were included in Wave 1. In subsequent waves, only data regarding trust in ACT Government was asked.

The item on 'do what is right' is reported most frequently in Edelman Barometer data (see Edelman Trust Barometer 2022). Beyond this items, it can be difficult to obtain comparator data for Australia on a consistent basis from the Edelman Barometer, with sometimes varying data published each year for the barometer.

Additionally, when these items were pilot tested, several participants indicated having difficulty answering these questions, due to having differing levels of trust in different parts of the government – in particular, trust in public servants, in elected representatives, and the trustworthiness of different parts of government were highlighted as sometimes varying – for example, trust in specific services and agencies such as government health and law enforcement might be very different to each other. Additionally, trust in a wider range of institutions was highlighted as important. This suggested a need to investigate alternative measures for this indicator.

Given this, in Wave 3 alternative measures were designed, based on questions included in the World Values Survey. As many of the items in the World Values Survey are not specifically relevant to the ACT, the questions were adapted to reflect ACT institutions. The following table shows the items tested in Wave 3. Responses to these items were examined and compared to identify whether there were in fact large differences in views about different government-based institutions, as well as to compare to trust in a range of non-government institutions. The questions were then further modified to a shorter set that was tested in Wave 6, and intended to be used in combination with the original questions about the ACT Government in general.

How much confidence do you have in the following people and organisations to do what is right?

How much confidence do you have in the following people and organisations to do what is right?	**NO confidence they will do what is right** ①	②	③	④	⑤	⑥	⑦	⑧	**COMPLETE confidence they will do what is right** ⑨	**Don't know**
The Australian government	○	○	○	○	○	○	○	○	○	○
Federal police in the ACT	○	○	○	○	○	○	○	○	○	○
The ACT courts	○	○	○	○	○	○	○	○	○	○
The ACT Government (including elected members, public servants and services they provide)	○	○	○	○	○	○	○	○	○	○
The ACT public service	○	○	○	○	○	○	○	○	○	○
The ABC	○	○	○	○	○	○	○	○	○	○
The news media other than the ABC	○	○	○	○	○	○	○	○	○	○
Religious organisations	○	○	○	○	○	○	○	○	○	○
Banks and other commercial financial institutions	○	○	○	○	○	○	○	○	○	○
Community councils in the ACT	○	○	○	○	○	○	○	○	○	○
Major companies	○	○	○	○	○	○	○	○	○	○
Universities in the ACT	○	○	○	○	○	○	○	○	○	○
Unions	○	○	○	○	○	○	○	○	○	○
Facebook	○	○	○	○	○	○	○	○	○	○
Charity and humanitarian organisations operating in the ACT	○	○	○	○	○	○	○	○	○	○
Environmental organisations operating in the ACT	○	○	○	○	○	○	○	○	○	○

The shorter set of items primarily focuses on government-based institutions, with one exception (banks and other commercial financial institutions, which may be examined as part of indicator A2.2.11 to complement the current indicator).

How much confidence do you have in the following people and organisations to do what is right?	**NO confidence they will do what is right** ①	②	③	④	⑤	⑥	⑦	⑧	**COMPLETE confidence they will do what is right** ⑨	**Don't know**
The Australian government	○	○	○	○	○	○	○	○	○	○
Federal police in the ACT	○	○	○	○	○	○	○	○	○	○
The ACT courts	○	○	○	○	○	○	○	○	○	○
The ACT Government (including elected members, public servants and the services they provide)	○	○	○	○	○	○	○	○	○	○
The ACT public service	○	○	○	○	○	○	○	○	○	○
Banks and other commercial financial institutions	○	○	○	○	○	○	○	○	○	○
Community councils in the ACT	○	○	○	○	○	○	○	○	○	○

In Wave 8, the following questions from the OECD trust survey were measured, to further test variability in response when questions about trust are phrased in a different way. These questions also have comparisons for Australia and other countries available from OECD data. The responses will be assessed for reliability and validity to determine if these questions will be included in future waves:

- On a scale of 0 to 10, where 0 is not at all and 10 is completely, how much do you trust each of the following:
    a. People in general
    b. The Australian government
    c. The ACT Government

These measures of trust (in people, in ACT government, and in the Australian government) were repeated in wave 9, and a new trust measure was calculated (trust in government(s) relative to trust in people, or 'relative trust in government'). The value of this measure lies in its relative nature – government(s) are not advantaged by a high trust score in scenarios where trust in people is also high, and neither are they disadvantaged by a low trust score where trust in people is similarly low. The calculation and reporting of this score is both preliminary and experimental and is subject to change. Analysis will be undertaken as the opportunity arises to assess this trust in government measure against existing trust measures to determine its utility. Details of the calculation of this set of measures are found below.

On a scale from 0 to 10, where 0 means very unlikely and 10 means very likely, how likely do you think the following are:

- If people complained about a public service that is working badly, how likely do you think it is that it would be improved?
- If there was an innovative idea that could improve a public service, how likely do you think it is that it would be adopted by the responsible institution?
- If a decision affecting your local community is to be made by the ACT Government, how likely do you think it is that you would have an opportunity to voice your opinion?
- If you needed information about an administrative service from the ACT Government (for example obtaining a passport, applying for a driver's licence etc.) how likely do you think it is that clear information would be easily available?

Indicator calculation & reporting

Indicator calculation will be specified once a measure is confirmed for inclusion in ACT Wellbeing Framework reporting.

- I trust the ACT Government to do what is right (7 point agree/disagree with don't know): Report % disagree, % neither agree/disagree, % agree, % don't know
- **How much confidence do you have in the following people and organisations to do what is right?** (7 items) For each item, report no/low trust (score of 1-3), moderate trust (4-6), high trust (7-9), don't know. Note the item response refers to confidence, but we code this as a level of trust as level of confidence indicates a level of trust.
- **How much do you trust each of the following?** (3 items) For each item, report no/low trust (score of 0-3), moderate trust (score of 4-6), high trust (score of 7-10)
- **How likely do you find the following** (4 items) For each item, report no/low trust (score of 0-3), moderate trust (score of 4-6), high trust (score of 7-10). Note the heading refers to trust, while the item asks how likely people think it is something will happen; this is because the likelihood response indicates level of trust that a positive action will occur.
- **Trust in government(s) relative to trust in people** ('relative trust in government', 2 items) For each respondent with the appropriate pair of data points, a pair of new trust in government measurements were calculated. These measured were calculated by subtracting the trust in people measure ('How much do you trust each of the following? - People in general') from the trust in government measure ('How much do you trust each of the following? - The ACT Government' and 'How much do you trust each of the following? - The Australian Government'). This generates a value (for each government) ranging between +10 and -10, with a positive value indicating a respondent who trusts government more than people in general, and a negative value indicating a respondent who trusts people in general more than government. Each 'trust in government relative to trust in people' measure (Australian or ACT governments respectively), is reported as the percentage of respondents with values '-10 to -1' ('Trust governments less than people in general'), '0' ('Trust governments and people in general equally'), or '+1 to +10' ('Trust governments more than people in general').

Availability of data

Due to exploration of multiple measures across different waves, there are varying data available for different survey items over time. Availability of data for specific items is identified in the table below.

Item (does not include response options)	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
I trust the ACT Government to do what is right	✓	✓		✓		✓		✓	✓
The ACT Government is honest	✓	✓		✓		✓			
The ACT Government keeps its promises	✓	✓		✓		✓			
The ACT Government is trying hard to have a positive impact on society	✓	✓		✓		✓			
The ACT Government represents the whole ACT community, not just a part of it	✓	✓		✓		✓			
The ACT Government is able to help the ACT region face challenges	✓	✓		✓		✓			
The ACT Government is good at what it does	✓	✓		✓					
The Australian government			✓			✓		✓	✓
Federal police in the ACT			✓			✓		✓	✓
The ACT courts			✓			✓		✓	✓
The ACT Government (including elected members, public servants and services they provide)			✓			✓		✓	✓
The ACT public service			✓			✓		✓	✓
The ABC			✓						
The news media other than the ABC			✓						
Religious organisations			✓						
Banks and other commercial financial institutions			✓			✓		✓	✓
Community councils in the ACT			✓			✓		✓	✓
Major companies			✓						
Universities in the ACT			✓						
Unions			✓						
Facebook			✓						
Charity and humanitarian organisations operating in the ACT			✓						

Environmental organisations operating in the ACT			✓						

A2.2.11 Domain: Governance and institutions; Indicator: Trust in other institutions; Subindicator: Trust in groups and institutions in the ACT

Source of measure

This indicator has been examined using measured from two sources:

- The survey items 'Local groups and organisations in the ACT are good at getting things done' is adapted from a similar measure in the Regional Wellbeing Survey
- Items asking about confidence in a range of different organisations to do what is right are adapted from similar questions asked in the World Values Survey.

Changes in measure since first collected

There have been no changes to the original measure used for this indicator over time (*local groups and organisations in the ACT are good at getting things done*). This original measure was included in Wave 1, 2, 3 and 6 of the survey.

In Waves 3 and 6, an expanded measure was tested, described below.

Frequency of data collection

Originally, this indicator was intended to be collected once every two years. The COVID-19 pandemic was, however, associated with some change in the indicator. This suggests a potential need to measure the indicator annually. From Wave 6, the indicator will be measured annually.

Survey measure (current and, if relevant, previous versions)

A wide range of organisations are important to the functioning of the ACT community and economy. This indicator examines how much people trust the range of institutions that operate in the ACT community. From Wave 1, this has been examined using a single survey item that asks whether survey participants agree with the statement 'local groups and organisations in the ACT are good at getting things done'.

How much do you agree or disagree with the following statements about decision making in the ACT region?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
Local groups and organisations in the ACT are good at getting things done	○	○	○	○	○	○	○	○

This measure is limited, as it does not distinguish whether some groups or organisations are considered more effective and trustworthy than others, and there is often a relatively high proportion of respondents who answer 'don't know' or 'neither agree or disagree' (Schirmer 2020). The December 2020 *Living well* survey (Wave 3) included additional measures to examine whether a more detail measure could address this gap. These more detailed measures asked survey participants how much confidence they had in different organisations to 'do what is right', and was adapted from questions included in the global *World Values Survey* (with the adaptation being to use terms specific to ACT-based organisations). The table below shows the items asked (see also the previous indicator, which described testing of these questions, as they also ask about trust in government in some items).

How much confidence do you have in the following people and organisations to do what is right?	NO confidence they will do what is right ①	②	③	④	⑤	⑥	⑦	⑧	COMPLETE confidence they will do what is right ⑨	Don't know
The Australian government	○	○	○	○	○	○	○	○	○	○
Federal police in the ACT	○	○	○	○	○	○	○	○	○	○
The ACT courts	○	○	○	○	○	○	○	○	○	○
The ACT Government (including elected members, public servants and services they provide)	○	○	○	○	○	○	○	○	○	○
The ACT public service	○	○	○	○	○	○	○	○	○	○
Banks and other commercial financial institutions	○	○	○	○	○	○	○	○	○	○
Community councils in the ACT	○	○	○	○	○	○	○	○	○	○

In Wave 3, the question also asked about the following organisations (see the previous section for detail):

- The ABC
- The news media other than the ABC
- Religious organisations
- Major companies
- Universities in the ACT
- Unions
- Facebook
- Charity and humanitarian organisations operating in the ACT
- Environmental organisations operating in the ACT

However, initial responses indicated that many people either had no opinion on these, or felt that there was too much diversity in their views to be able give a rating – for example, some may trust some companies to do what is right but not others, or trust some news media outlets other than the ABC but not others. This meant that in Wave 6, the shorter list of organisations shown in the table above was reported.

Indicator calculation & reporting

The **primary measure** (*Local groups and organisations in the ACT are good at getting things done*) is reported in three groups:

- % who disagree that local groups and organisations in the ACT are good at getting things done (defined as those giving a response of 1, 2, or 3, divided by the total number who responded to the question including those who responded 'don't know').
- % who neither agree/disagree or are unsure that local groups and organisations in the ACT are good at getting things done (defined as those giving a response of 4 or don't know, divided by the total number who responded to the question including those who responded 'don't know').
- % who agree that local groups and organisations in the ACT are good at getting things done (defined as those giving a response of 5, 6, or 7, divided by the total number who responded to the question including those who responded 'don't know').

The potential **expanded measure** is under development, with the measure being repeated in Wave 6 to enable comparison of Wave 3 and 6, and development of appropriate reporting. Initially, data were reported using two groups: those who answered 6,7,8 or 9 on the scale from 1 (no confidence) to 9 (complete confidence), compared to those who answered less than this. However, this did not provide sufficient differentiation to identify changes in confidence. From Wave 8, categories were changed to report three groups: those with low confidence (1-3), moderate confidence (4-6), and high confidence (7-9), with 'don't know' responses removed.

A2.2.12 Domain: Health; Indicator: Overall health; Subindicator: Health status

Source of measure

The measure used is one previously used in a range of surveys internationally, and in Australia is measured in the ACT General Health Survey, the Australian Bureau of Statistics National Health Survey (ABS 2018), the Regional Wellbeing Survey and the Household Income and Labour Dynamics in Australia (HILDA) survey, amongst others, making it one of the most widely used general health measures in available Australian datasets.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey. However, the lead-in question has had slight variations in phrasing:

- Overall, how would you rate your health during the last four weeks? Select one
- How would you rate your general health? Select one (Wave 7 only)
- Overall, how would you rate your general health during the last four weeks? Select one

These variations have resulted in no noticeable change in response to the question in testing of the survey. However, the 4 week time period should be included, and it should be noted that in Wave 7 the 4 week period was not specified and this may have caused slight variation in responses.

Frequency of data collection

This measure is measured annually or more frequently, and to date has been included in every wave of the *Living well* survey.

Survey measure (current and, if relevant, previous versions)

This indicator examines a person's self-reported overall health using a single item measure that asks a person 'overall, how would you rate your health during the last four weeks' with response options of excellent, very good, good, fair or poor.

Overall, how would you rate your health during the last four weeks? *Select one*				
◯ Excellent	◯ Very good	◯ Good	◯ Fair	◯ Poor

Indicator calculation & reporting

The indicator is reported as the % with three categories of overall health:

- Very good or excellent health: Sum of % who answered 'excellent' or 'very good'
- Good health: % who answered 'good'
- Fair or poor health: % who answered 'fair' or 'poor'

A2.2.13 Domain: Health; Indicator: Mental health status; Subindicator: Self-reported mental health

Source of measure

This measure is sourced from the ACT General Health Survey.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure is measured annually or more frequently, and to date has been included in every wave of the *Living well* survey.

Survey measure (current and, if relevant, previous versions)

This indicator examines a person's self-reported overall mental health using a single item measure that asks a person 'overall, how would you rate your mental health during the last four weeks' with response options of excellent, very good, good, fair or poor.

Overall, how would you rate your mental health during the last four weeks? *Select one*				
◯ Excellent	◯ Very good	◯ Good	◯ Fair	◯ Poor

Indicator calculation & reporting

The indicator is reported as the % with three categories of overall health:

- Very good or excellent mental health: Sum of % who answered 'excellent' or 'very good'
- Good mental health: % who answered 'good'
- Fair or poor mental health: % who answered 'fair' or 'poor'

A2.2.14 Domain: Health; Indicator: Mental health status; Subindicator: Psychological distress

Source of measure

The measure used for this indicator is the Kessler 6 psychological distress scale, which is widely used both in Australia and internationally (Andrews and Slade 2001).

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure is measured annually or more frequently, and to date has been included in every wave of the *Living well* survey.

Survey measure (current and, if relevant, previous versions)

Psychological distress is defined as experiencing non-specific symptoms of stress, anxiety and depression. A person who is experiencing high levels of psychological distress will commonly also have poorer overall wellbeing, and vice versa. A person who has very high psychological distress is also more likely to have a diagnosable mental health disorder, although not all people with high psychological distress will have a diagnosable mental health disorder (Anderson et al. 2013).

Psychological distress is measured using the Kessler 6-item distress scale (K6). This widely used measure asks a person how often they have experienced six psychological distress symptoms in the last four weeks.

In the last four weeks, how often have you felt…	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Nervous?	◯	◯	◯	◯	◯
Hopeless?	◯	◯	◯	◯	◯
Restless or fidgety?	◯	◯	◯	◯	◯
So sad that nothing could cheer you up?	◯	◯	◯	◯	◯
That everything was an effort?	◯	◯	◯	◯	◯
Worthless?	◯	◯	◯	◯	◯

Indicator calculation & reporting

Each response is given a score, as follows:

- None of the time: 1
- A little of the time: 2
- Some of the time: 3
- Most of the time: 4
- All of the time: 5

Responses are summed to form a score from 6 (no or very low distress) to 30 (extremely high distress) (Andrews and Slade 2001), with up to two items missing (created by using the mean from 4 or more answered items and multiplying by 6). Findings are reported in three groups:

- % with low psychological distress: those with a score of 6-12
- % with moderate psychological distress: those with a score of 13-18
- % with high psychological distress: a score of 19 or higher.

A2.2.15 Domain: Health; Indicator: Healthy lifestyle; Subindicator: Getting enough sleep (main)

Source of measure

This indicator was designed based on questions included in multiple surveys that ask about hours of sleep achieved in a typical night.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure is measured annually.

Survey measure (current and, if relevant, previous versions)

This indicator examines whether a person achieved healthy levels of sleep during the 4 weeks prior to completing the survey, based on their self-reported typical hours of sleep.

During the last month, how many hours of actual sleep did you typically get at night (this may be different than the number of hours you spend in bed)?	_____ hours per night

Indicator calculation & reporting

Respondents are assigned to a category of 'healthy sleep hours' or 'less sleep than healthy' or 'more sleep than healthy' based on their age and reported average hours of sleep per night. Healthy levels of sleep are calculated based on the National Sleep Foundation's recommended sleep hours for different age groups, of 7-8 hours for those aged 65 and older, and 7-9 hours for those aged 18-64 (Hirshkowitz et al. 2015).

The indicator reported is the % of people who achieved, on average, healthy levels of sleep in the previous month.

A2.2.16 Domain: Health; Indicator: Healthy lifestyle; Subindicator: Getting enough sleep – self-rated satisfaction with sleep

Source of measure

This measure was designed as part of the time use measure developed for the *Living well* survey.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator was collected in Wave 1, 2, 4, 5 and 8. It is typically collected annually, however may not be collected with this frequency in future, with the main indicator of sleep hours considered more robust and having a higher priority for inclusion in the *Living well* survey.

Survey measure (current and, if relevant, previous versions)

In addition to identifying whether a person is typically achieving healthy hours of sleep, the *Living well* survey asks participants about their satisfaction with the amount of sleep they are achieving, as part of the *time use* measure. This can be examined as an indicator in its own right.

Survey measure

Survey participants are asked if during the last month they had achieved (i) less sleep than they wanted, (ii) about the right amount, or (iii) more sleep than desired.

	In the last four weeks the amount of this I did was…					
In the last month, did you have more, less or about the right amount of…	**Much less than I would have liked**	**A little less than I would have liked**	**About as much as I wanted to**	**A little more than I wanted to**	**Much more than I wanted to**	**N/A**
Time spent sleeping	◯	◯	◯	◯	◯	◯

Indicator calculation & reporting

The indicator is reported by identifying the proportion of people in three groups, after removing 'N/A' responses:

- Less sleep than wanted: Sum of % answering 'much less than I would have like' and 'A little less than I would have liked'
- About the right amount of sleep: % answering 'About as much as I wanted to'
- More sleep than wanted: Sum of % answering 'much more than I wanted to and 'A little more than I wanted to'.

A2.2.17 Domain: Health; Indicator: Access to health services; Subindicator: Access to GP services; specialist services; mental health services; allied health services; dentists

Source of measure

This measure was developed for the *Living well* survey to examine self-rated access to health services. Rather than focusing on whether a person had used health services, the measure examines the extent to which they had found it easy or difficult to access services they have accessed or sought to access in the last 12 months, either for themselves, or for a person they care for such as a child.

Changes in measure since first collected

This measure originally (in Wave 1) only asked those people who indicated they had accessed a service how hard or easy they found it to access that service. However, it was identified that this was not a full representation of service access, as it excluded those who had sought to access services but had been unable to. Given this, from Wave 6, the measure was examined for both those who had and those who had not accessed services. This enabled identification of whether there were meaningful differences between these groups. Significant differences were identified, and it is recommended that going forward, differences between the measures when it includes (i) both those who have and have not accessed services in the last 12 months, versus (ii) those who have not accessed services, be examined to better understand whether one is preferable to the other. It is possible in Wave 6 to report both the original measure and the new measure, providing ability to identify the magnitude of difference between the two.

Small changes were made after Wave 1 in the types of health practitioner asked about. In Wave 1, the following were asked about:

- Walk-in medical centre
- GP
- Dentist
- Psychologist, psychiatrist or mental health clinician
- Specialist doctor specialising in physical health problems
- Physiotherapist, occupational therapist or speech pathologist

It was identified that some of these categories grouped types of health professionals for which there was varying accessibility. Given this, from Wave 3, the following were asked about:

- Walk-in medical centre
- GP
- Dentist
- Psychologist/mental health clinician
- Psychiatrist
- Specialist doctor specialising in physical health problems
- Physiotherapist
- Occupational therapist or speech pathologist

This means there is a break in series for some groups of health professionals between Wave 1 and Wave 3, with more detailed information available from Wave 3 onwards.

Frequency of data collection

This measure was originally collected once every two years, being collected in Wave 1, 3, and 6. However, findings suggest sometimes rapid change in ability to access health services, and from Wave 6 onwards, the measure will be collected annually.

Survey measure (current and, if relevant, previous versions)

See 'Changes in measure' for detail on changes in the types of health professionals asked about. The information in this section shows the types of health professionals asked about from Wave 3 onwards.

In Waves 1 and 3, this measure was calculated based on asking those who reported accessing any of the following types of services in the last 12 months for themselves or a person they cared for were asked to rate whether they found it (i) hard, (ii) neither hard or easy, or (iii) easy to access each of type of health service asked about.

Have you accessed any of the following health services, for yourself or someone you care for, in the last 12 months?	In the last 12 months, did you use this type of service for you or someone you look after?			
	Yes - had one or more appointments for myself OR someone I care for	No - tried to get an appointment, but didn't end up getting one	No - thought about it, but didn't get around to making an appointment	No, didn't need to use this type of health service in the last year
Walk-in medical centre	◯	◯	◯	◯
GP	◯	◯	◯	◯
Dentist	◯	◯	◯	◯
Psychologist/mental health clinician	◯	◯	◯	◯
Psychiatrist	◯	◯	◯	◯
Specialist doctor, specialising in physical health problems	◯	◯	◯	◯
Physiotherapist	◯	◯	◯	◯
Occupational therapist or speech pathologist	◯	◯	◯	◯

	Overall, thinking about things like cost, availability and time, how easy do you find it to use this type of service?			
	Hard	Neither easy or hard	Easy	N/A
Walk-in medical centre	◯	◯	◯	◯
GP	◯	◯	◯	◯
Dentist	◯	◯	◯	◯
Psychologist/mental health clinician	◯	◯	◯	◯
Psychiatrist	◯	◯	◯	◯
Specialist doctor, specialising in physical health problems	◯	◯	◯	◯
Physiotherapist	◯	◯	◯	◯
Occupational therapist or speech pathologist	◯	◯	◯	◯

From Wave 6, the second part of the questions – asking participants to rate how hard or easy they find it to access different services – was asked of all survey participants, irrespective of whether they had accessed the service in the last 12 months for themselves or a person they care for.

Indicator calculation & reporting

For each service accessed, the indicator used is the % of those who accessed a service in the last 12 months, who identified that it was:

- Hard to access ('hard to access' responses divided by sum of 'hard to access', 'neither easy or hard' and 'easy')
- Neither easy or hard ('neither easy or hard to access' responses divided by sum of 'hard to access', 'neither easy or hard' and 'easy')
- Easy to access ('easy to access' responses divided by sum of 'hard to access', 'neither easy or hard' and 'easy')

Wave 6 onwards

In wave 6 two indicators were calculated: (i) data for only those who accessed the service, and (ii) the % of all people identifying ease of access – including those who did not indicate that they accessed the service (excluding NA responses only).

A2.2.18 Domain: Housing and home; Indicator: Housing suitability index

Source of measure

This measure uses survey items drawn from multiple sources, as follows:

- Overall my home meets my needs well: Designed for the *Living well* survey
- All other items: drawn from existing surveys conducted by the Community Services Directorate, which have not previously been used in an index.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

However, two versions of the measure have been produced, to enable some understanding of change in housing suitability even in waves of the surveys in which the full set of items is not asked.

Version 1: Full housing suitability index

Version 2: Level of agreement with statement 'Overall my home meets my needs well'

Frequency of data collection

This measure is collected every two years. However, the single item measure 'Overall my home meets my needs well' is collected annually, enabling identification of whether any more rapid change is occurring.

The full index has been collected in Wave 1, 3 and 6.

The single item measure 'Overall my home meets my needs well' has been collected in Wave 1, 2, 3, 4, 6, 8 and 9.

Survey measure (current and, if relevant, previous versions)

How suitable is your home for you?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
Overall my home meets my needs well	◯	◯	◯	◯	◯	◯	◯	◯
My home is well maintained	◯	◯	◯	◯	◯	◯	◯	◯

How satisfied are you with the overall condition of the outside of your home?	◯ Very dissatisfied ◯ Dissatisfied ◯ Neither satisfied or dissatisfied ◯ Satisfied ◯ Very satisfied
How satisfied are you with the overall condition of the inside of your home?	◯ Very dissatisfied ◯ Dissatisfied ◯ Neither satisfied or dissatisfied ◯ Satisfied ◯ Very satisfied

Indicator calculation & reporting

Measure 1: Full index

The full index is calculated as the average score of responses to the items (i) My home is well maintained, (ii) How satisfied are you with the overall condition of the outside of your home, (iii) How satisfied are you with the overall condition of the inside of your home? The first item is answered as 7-point agree-disagree scales, and the second two as 5-point satisfaction scales from 1 (very dissatisfied) to 5 (very satisfied). Initial exploration of statistical properties indicated the three items were suitable to use as a scale, however appropriate validation work should be conducted for this measure to confirm this.

The indicator is calculated by first converting the 7 point scale for 'My home is well maintained' to a 5 point scale by recording as follows:

Score	Original response
1	1,2
2	3
3	4
4	5
5	6,7

Following this, the average of the three items is calculated (with up to one missing value i.e. at least 2 items answered), giving an overall score from 1 (low housing suitability) to 5 (high housing suitability). Three groups are then reported:

- Low housing suitability: % with scores from 1 to 2.49
- Moderate housing suitability: % with scores from 2.50 to 3.99
- High housing suitability: % with scores from 4.00 to 5.

Measure 2: Self-rated suitability of housing

The second measure is based on the item 'Overall my home meets my needs well' and is reported in the following groups:

- Disagree (answered 1, 2 or 3)
- Neutral (answered 4 or Don't know)
- Agree (answered 5, 6 or 7)

A2.2.19 Domain: Housing and home; Indicator: Overcrowding

Source of measure

This indicator was designed for the *Living well* survey. It is a subjective measure of overcrowding based on self-reported experience of ability to live easily in a household. Overcrowding is often measured using data on the ratio of occupants to rooms in a house, often adjusted based on age of occupants and types of rooms (see for example Blake et al. 2007). These data are able to be measured from sources such as the ABS *Census of Population and Housing.* A subjective measure of overcrowding differs in that it asks a person their views about whether their house is over-crowded, rather than assuming crowding equates to an occupancy rate higher than a specific threshold.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator is collected annually, and was collected in Waves 1, 3, 4, 6, 8 and 9. New participants in Wave 2 were also asked this question.

Survey measure

In a measure designed for the *Living well* survey, participants are asked the extent to which they agreed or disagreed with the statement 'My home is too small for all the current residents to live in easily', on a scale from 1 (strongly disagree) to 7 (strongly agree), with a 'don't know' option also provided. Answers were grouped to identify the proportion who disagreed (score of 1-3), agreed (score of 5 to 7) or were neutral or unsure (score of 4 or 'don't know').

How suitable is your home for you?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
My home is too small for all the current residents to live in easily	○	○	○	○	○	○	○	○

Indicator calculation & reporting

First, 'don't know' responses are recoded to '4'. The indicator is then reported in three groups:

- % who disagree that 'My home is too small for all the current residents to live in easily' (defined as those giving a response of 1, 2, or 3, divided by the total number who responded to the question including those who responded 'don't know').
- % who neither agree/disagree or are unsure that 'My home is too small for all the current residents to live in easily' (defined as those giving a response of 4 or don't know, divided by the total number who responded to the question including those who responded 'don't know').
- % who agree that 'My home is too small for all the current residents to live in easily' (defined as those giving a response of 5, 6, or 7, divided by the total number who responded to the question including those who responded 'don't know').

A2.2.20 Domain: Identity and belonging; Indicator: Connection to Canberra; Subindicator: Canberra is a good place to live

Source of measure

This measure was adapted from a similar measure used in the Regional Wellbeing Survey.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator has been collected in all waves of the survey. It will be collected annually going forward, and more frequently if significant events are considered likely to be impacting how the liveability of the ACT is experienced.

Survey measure (current and, if relevant, previous versions)

Connection to Canberra is examined by asking participants the extent to which they agree or disagree that 'I would recommend the ACT region to others as a good place to live'. Respondents are asked to indicate the extent to which they agree or disagree with the statement on a scale from 1 (strongly disagree) to 7 (strongly agree), and can also select 'don't know' if they are unsure.

How much do you agree or disagree with the following statements about living and working in the ACT region?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
I would recommend the ACT region to others as a good place to live	○	○	○	○	○	○	○	○

Indicator calculation & reporting

Answers are grouped to identify the proportion who disagreed (score of 1-3), agreed (score of 5 to 7) or were neutral or unsure (score of 4 or 'don't know'). The indicator is then reported using the following groups:

- Disagree (respondent gave rating of 1-3)
- Neutral/don't know (respondent gave rating of 4 or don't know)
- Agree (respondent gave rating of 5 to 7)

A2.2.21 Domain: Identity and belonging; Indicator: Belonging

Source of measure

This measure is sourced from the Regional Wellbeing Survey.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey. However, the thresholds used to indicate low, moderate and high sense of belonging will be reviewed once sufficient data over time is available to enable analysis of whether a more specific set of thresholds can be identified that provides a more meaningful measure of inclusion levels.

Frequency of data collection

This indicator typically changes slowly over time, with evidence from the Regional Wellbeing Survey suggesting change is observable over periods of 2-5 years but that there is rarely significant annual change. Given this, it is recommended that this indicator be collected once every two to three years. The indicator was measured in Wave 1, 3 and 6 of the survey.

Survey measure (current and, if relevant, previous versions)

Sense of belonging is measured by asking the following items, each measured using a 7-point disagree-agree scale: (i) I feel welcome here, (ii) I feel part of the community in my local area, (iii) I feel like an outsider here [scoring reversed].

How do you find the other people in your local area?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
I feel welcome here	○	○	○	○	○	○	○	○
I feel part of the community in my local area	○	○	○	○	○	○	○	○
I feel like an outsider here	○	○	○	○	○	○	○	○

Indicator calculation & reporting

The Belonging score is calculated as the average score of the three items, after reversing the scoring of the item 'I feel like an outsider here' and excluding 'don't know' responses. This results in a Belonging measure scored from 1 (low sense of belonging) to 7 (high sense of belonging).

Answers are grouped to identify the proportion who have a:

- Low sense of belonging (score between 1 and 2.99)
- Moderate sense of belonging (score between 3.00 to 4.99)
- High sense of belonging (score of 5.00 to 7).

A2.2.22 Domain: Identity and belonging; Indicator: Inclusion

Source of measure

This measure is used in the Regional Wellbeing Survey.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey. However, the thresholds used to indicate low, moderate and high sense of inclusion will be reviewed once sufficient data over time is available to enable analysis of whether a more specific set of thresholds can be identified that provides a more meaningful measure of inclusion levels.

Frequency of data collection

This indicator typically changes slowly over time, with evidence from the Regional Wellbeing Survey suggesting change is observable over periods of 2-5 years but that there is rarely significant annual change. Given this, it is recommended that this indicator be collected once every two to three years. The indicator was measured in Wave 1, 3, 6 and 9 of the survey.

Survey measure (current and, if relevant, previous versions)

Sense of inclusiveness was measured by calculating the average score of responses to the following items, each measured using a 7-point disagree-agree scale: (i) Some groups in this local area keep to themselves, (ii) Some groups in this local area aren't made to feel welcome, (iii) There is a lot of disagreement between people in my local area.

How do you find the other people in your local area?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
Some groups in this local area keep to themselves	○	○	○	○	○	○	○	○
Some groups in this local area aren't made to feel welcome	○	○	○	○	○	○	○	○
There is a lot of disagreement between people in my local area	○	○	○	○	○	○	○	○

Indicator calculation & reporting

The Sense of inclusion score is calculated as the average score of the three items (with up to one missing), excluding 'don't know' responses. This results in a Sense of inclusion measure scored from 1 (high sense of inclusion) to 7 (low sense of inclusion).

Answers were grouped to identify the proportion who had a:

- Low sense of inclusion (score between 4.50 and 7)
- Moderate sense of inclusion (score between 3.00 to 4.49)
- High sense of inclusion (score of 1-2.99).

A2.2.23 Domain: Identity and belonging; Indicator: Discrimination

Source of measure

This measure has previously been used in the ACT *General Health Survey*, and the Australian Bureau of Statistics *General Social Survey*, amongst others.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

As the surveys in which this measure is collected only collect new data every two to five years, there is limited evidence regarding how often the indicator should be collected. Initially, the indicator was measured in Wave 1, 3, 6, 8 and 9 of the survey. The findings suggest the presence of sometimes significant change in experience of discrimination by some population groups. Given this, data for this indicator will be collected annually beyond Wave 6 to better evaluate the rate and type of change that occurs.

Survey measure (current and, if relevant, previous versions)

This indicator is measured by asking survey participants 'In the past 12 months, do you feel that you have experienced discrimination or have been treated unfairly by others?', with response options of (i) yes, (ii) no or (iii) don't know.

In the past 12 months, do you feel that you have experienced discrimination or have been treated unfairly by others?	◯ Yes ◯ No ◯ Don't know

Indicator calculation & reporting

The indicator is calculated as the % of people who report they have experienced discrimination in the last 12 months. This is calculated by identifying the proportion who answered 'yes' out of the total number of respondents to the survey item. The total defined as the sum of those who answered 'yes', 'no', and 'don't know'.

A2.2.24 Domain: Identity and belonging; Indicator: Support for multiculturalism; Subindicator: Culturally inclusive city

Source of measure

This measure examines four items drawn from different sources:

- The item 'Canberra as a community accepts people from different cultures' is used in the Canberra Omnibus Survey commissioned by the ACT Community Services Directorate (Winton 2018)
- The item 'There is room for a variety of languages/cultures in the ACT region' has been used in multiple surveys world-wide, sometimes as a stand-alone item and sometimes as one of multiple items intended to measure support for multiculturalism (e.g. Gui et al. 2016) and was adapted to focus specifically on the ACT region
- The item 'Australia is a racist country' is drawn from the Australian Reconciliation Barometer (Reconciliation Australia 2019).
- The item 'Australia is better off because we have many different races/cultures' was drawn from the Australian Reconciliation Barometer (Reconciliation Australia 2019).

The first item 'Canberra as a community accepts people from different cultures' has been used in the ACT Wellbeing Framework. Other items have been collected primarily to enable further assessment of their properties.

Changes in measure since first collected

Two items have not changes since this indicator was first examined: 'Canberra as a community accepts people from different cultures' and 'There is room for a variety of languages/cultures in the ACT region'.

Different wording has been tested for the other two items, both of which have differing patterns of response compared to the two unchanged items, and do not appear to measure the same underlying concept of multiculturalism.

The item 'Australia is a racist country' was found to be answered based on ACT resident's views of levels of racism in other parts of the country, rather than levels of racism believed to occur in the ACT. It is also answered very differently to the other items. In Wave 3, an alternative item was trialled 'Many people living in the ACT are racist'. This did not show significant difference to the original. Given the lack of consistent correlation between views about the prevalence of racism and levels of support for multiculturalism, this item was not measured (in either form) in Wave 6.

The item 'Australia is better off because we have many different races/cultures' was changed from Wave 3 to be specific to the ACT, using the working 'The ACT region is better off because we have many different races/cultures'. In Wave 6, the original 'Australia is better off…' was repeated to identify whether there was significant change compared for Wave 1.

Frequency of data collection

This indicator typically changes relatively slowly over time, with evidence from other surveys suggesting change is observable over periods of 2-3 years. Given this, it is recommended that this indicator be collected once every two years. The indicator was measured in Wave 1, 3 and 6 of the survey.

Survey measure (current and, if relevant, previous versions)

The 'support for multiculturalism' indicator examines the extent to which ACT residents feel Canberra, and Australia more generally, welcomes those from different cultures. This is measured by asking survey participants the extent to which they agree that:

- Canberra as a community accepts people from different cultures
- There is room for a variety of languages/cultures in the ACT region
- Australia (Wave 1,6)/The ACT region (Wave 3, 8, 9) is better off because we have many different races/cultures
- Australia is a racist country (removed from Wave 6 onwards).

How much do you agree or disagree that …	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
Canberra as a community accepts people from different cultures	○	○	○	○	○	○	○	○
Australia is better off because we have many different races/cultures (Wave 1,6) OR The ACT region is better off because we have many different races/cultures (Wave 3)	○	○	○	○	○	○	○	○
There is room for a variety of languages and cultures in the ACT region	○	○	○	○	○	○	○	○
Australia is a racist country (Wave 1,3) Many people living in the ACT are racist (Wave 3)	○	○	○	○	○	○	○	○

Indicator calculation & reporting

Each item is reported individually, rather than combining them into a single scale, as initial exploration suggested a need to further examine the suitability of the items for use as part of a single scale. For each item, the measure reported is the proportion of people who agreed with the statement (with 'don't know' responses included in the total (recoded as '4') when calculating the proportion who agreed).

A2.2.25 Domain: Identity and belonging; Indicator: Valuing Aboriginal and Torres Strait Islander cultures and recognising our Traditional Custodians; Subindicator: Valuing Aboriginal and Torres Strait Islander Culture

Source of measure

This measure is sourced from the Australian Reconciliation Barometer (Reconciliation Australia 2019).

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure is collected at least once every two years.

Survey measure (current and, if relevant, previous versions)

This indicator examines whether ACT residents value Aboriginal and Torres Strait Islander cultures, by asking the extent to which survey participants agree that (i) I feel proud of our Aboriginal and Torres Strait Islander cultures, and (ii) Aboriginal and Torres Strait Islander cultures are important to Australia's identity as a nation. Respondents could answer from 1 (strongly disagree) to 7 (strongly agree), with a 'don't know' option also provided.

How much do you agree or disagree that …	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
I feel proud of our Aboriginal and Torres Strait Islander cultures	○	○	○	○	○	○	○	○
Aboriginal and Torres Strait Islander cultures are important to Australia's identity as a nation	○	○	○	○	○	○	○	○

Indicator calculation & reporting

Each item is reported separately. For each of the items, the measure reported is the proportion of people who agreed with the statement (with 'don't know' responses included in the total when calculating the proportion who agreed, by including them with 4).

A2.2.26 Domain: Identity and belonging; Indicator: Valuing Aboriginal and Torres Strait Islander cultures and recognising our Traditional Custodians; Subindicator: Engaging with Traditional Custodians and Aboriginal and Torres Strait Islander Cultures

Source of measure

This measure was designed and used for the first time in the *Living well* survey. The design of this indicator was informed by the Australian Reconciliation Barometer, which asks people whether they feel having Acknowledgment of Country or Welcome to Country addresses at key events can help celebrate national unity and identity (Reconciliation Australia 2019).

Changes in measure since first collected

In Wave 1, this measure asked if a person had attended events that included (i) a Welcome to Country, (ii) an Acknowledgment of Country, and/or (iii) otherwise focused on or held by Aboriginal or Torres Strait Islander people. In the first wave, the type of attendance was not specific. This was changed in Wave 3 to specifically ask whether events were attended in person or online. This was done to ensure that online events were included in answers, with COVID-19 lockdowns making this important. In Wave 6, the original measure was reinstated which did not specifically ask about online versus in person events. This was done as pilot testing with focus groups indicated that when asked the original wording, participants included online events in their answers, meaning they did not need to be asked about separately to prompt their inclusion in the answer. When reporting this indicator, if Wave 3 data are used it is important to identify that the wording was slightly different, specifying online versus in person events.

Frequency of data collection

This measure is collected at least once every two years.

Survey measure (current and, if relevant, previous versions)

Rather than asking about importance, the *Living well* survey sought to identify engagement by asking survey participants whether in the last 12 months they had:

1. Attended an event in which Welcome to Country was performed by a Traditional Custodian representing Aboriginal people of the ACT region
2. Attended an event in which an Acknowledge of Country was given to acknowledge the Traditional Custodians of the ACT region
3. Attended any events, ceremonies or activities in the last year (other than acknowledgement of or welcome to country) that focused on or were held by Aboriginal or Torres Strait Islander people

This item was asked in Wave 1 using the following response options:

Have you attended events in the last year (e.g. meetings, conferences, festivals) at which a Welcome to Country was performed by a Traditional Custodian representing Aboriginal people of the ACT region?	◯ Yes ◯ No ◯ Don't know
Have you attended events in the last year (e.g. meetings, conferences, festivals) at which an Acknowledgement of Country was given to acknowledge the Traditional Custodians of the ACT region?	◯ Yes ◯ No ◯ Don't know
Have you attended any events, ceremonies or activities in the last year (other than acknowledgement of or welcome to country) that focused on or were held by Aboriginal or Torres Strait Islander people?	◯ Yes ◯ No ◯ Don't know

At the end of 2020, this question was repeated. However, with COVID-19 lockdowns having affected ability to hold face to face meetings, the question was modified to the following. This was done to ensure that both online and in person events were included in responses.

	Yes, in person	Yes, online	No	Don't know
Have you attended events in the last year (e.g. meetings, conferences, festivals) at which a Welcome to Country was performed by a Traditional Custodian representing Aboriginal people of the ACT region?	◯	◯	◯	◯
Have you attended events in the last year (e.g. meetings, conferences, festivals) at which an Acknowledgement of Country was given to acknowledge the Traditional Custodians of the ACT region?	◯	◯	◯	◯
Have you attended any events, ceremonies or activities in the last year (other than acknowledgement of or welcome to country) that focused on or were held by Aboriginal or Torres Strait Islander people?	◯	◯	◯	◯

In Wave 6, the original wording was reinstated, and was used subsequently in Wave 9.

Indicator calculation & reporting

For each item, the measure reported is the proportion of people who responded 'yes' (including both 'yes, in person' and 'yes, online' when asked in this way). The proportion is calculated by dividing the number answering 'yes' divided by the total (sum of 'yes', 'no' and 'don't know' – with don't know recoded to 'no').

A2.2.27 Domain: Identity and belonging; Indicator: Valuing Aboriginal and Torres Strait Islander cultures and recognising our Traditional Custodians; Subindicator: Knowledge of Traditional Custodians

Source of measure

This measure was developed and used for the first time in the *Living well* survey.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator is collected once every 3-5 years. This is because (i) it is not expected large change will occur over shorter period of time, and (ii) when asked repeatedly of the same survey participants over time, it is likely the question itself will support growth in knowledge, and thus reduce accuracy of estimates of knowledge. Asking the question less frequently ensures a large proportion of those answering the item have not previously been asked it.

Survey measure (current and, if relevant, previous versions)

Survey participants were asked to identify Traditional Custodians of the ACT region by writing the name/s of Traditional Custodians. Respondents are also able to select 'I am unsure who the Traditional Custodians of the ACT region are' if they are uncertain.

Who are the Traditional Custodians of the part of the ACT and surrounds you live in? *If you're not sure about spelling, don't worry, just write down the name as you know it.*	◯ The Traditional Custodians are _____ ◯ I am unsure who the Traditional Custodians of the ACT region are

Indicator calculation & reporting

Answers are coded to indicate if the person

(i) correctly named Traditional Custodians, with any of the following accepted, based on Traditional Custodians in the survey region: Ngunnawal, Ngambri, Ngarigo and/or Walgalu peoples, or variants of names of these peoples; or

(ii) Either responded 'I am unsure' or gave an incorrect name for the Traditional Custodians.

The indicator is the proportion of respondents who correctly named Traditional Custodians (i/(i+ ii))

A2.2.28 Domain: Living standards; Indicator: Cost of living

Source of measure

This measure is drawn from the Regional Wellbeing Survey, where it has been used since 2013.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator has been collected in all Waves of the survey. It will be collected annually going forward, and more frequently if cost of living is likely to be changing rapidly.

Survey measure (current and, if relevant, previous versions)

Affordability of cost of living is measured by asking survey respondents the extent to which they agree or disagree that 'living costs are affordable here', on a scale from 1 (strongly disagree) to 7 (strongly agree) with a 'don't know' option also provided.

How much do you agree or disagree with the following statements about living and working in the ACT region?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
I find living costs affordable in the ACT region e.g. food, petrol, housing	○	○	○	○	○	○	○	○

Indicator calculation & reporting

Answers are grouped to identify the proportion who:

- Disagree (score of 1 to 3)
- Agreed (score of 5 to 7)
- Neither agreed/disagreed (score of 4 or 'don't know').

A2.2.29 Domain: Living standards; Indicator: Financial position

Source of measure

The measure used is included in a number of Australian surveys, including the Household, Income and Labour Dynamics in Australia (HILDA) survey and the Regional Wellbeing Survey.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator has been collected in all Waves of the survey. It will be collected annually going forward, and more frequently if household financial wellbeing is likely to be changing rapidly.

Survey measure (current and, if relevant, previous versions)

Participants are asked 'Given your current needs and financial responsibilities, would you say that you and your family are...' and able to respond (i) Very poor, (ii) Poor, (iii) Just getting along, (iv) Reasonably comfortable, (v) Comfortable or (vi) Prosperous.

Given your current needs and financial responsibilities, would you say that you and your family are... *Select one*	◯ Very poor ◯ Poor ◯ Just getting along	◯ Reasonably comfortable ◯ Very comfortable ◯ Prosperous

Indicator calculation & reporting

The indicator is reported in three groups:

- % who are poor/just getting along (those who responded 'very poor', 'poor', 'just getting along')
- % who are reasonably comfortable (those who responded 'reasonably comfortable')
- % who are very comfortable/prosperous (those who responded 'very comfortable', 'prosperous').

A2.2.30 Domain: Safety; Indicator: Community resilience to emergencies

Source of measure

This measure was originally designed and used by Schirmer and Yabsley (2018) as part of examining resilience to climate change in the ACT.

Changes in measure since first collected

There have been no changes in wording of items between waves. However, a change in response options was trialled in Wave 6, shifting from response options of 'No, Sort of, Yes, N/A, Don't know' to an agree-disagree scale. Responses are comparable across waves, however when presenting data it should be noted that response options changed at this point.

A further potential change has been proposed: to change wording of the item 'Copies of my important documents are stored in a safe place in case of emergency' to a new wording that clearly identifies that this includes storage in digital form online.

Frequency of data collection

This indicator was originally intended to be collected every second year, based on the expectation that it was unlikely emergency preparation would change rapidly except in circumstances where a major event triggered a rapid shift in levels of preparedness. Two such events occurred between Waves 1 and 2, meaning the measure was included in Wave 2, and then Wave 3, to measure how preparedness changed. The measure was then measured again two years subsequently, as per original intentions for frequency of measurement. In future waves, this measure will be included either once every two year, or in the first wave after any major emergency events that may have affected levels of preparedness for emergencies.

Survey measure (current and, if relevant, previous versions)

Emergency preparedness is examined by asking survey participants whether:

- If a bushfire, severe storm or flooding causes damage to my home, I know what to do
- I've discussed our emergency plan with others in my household in the last 12 months
- Copies of my important documents are stored in a safe place in case of emergency
- There is an emergency kit in my household with things such as a radio, flashlights and batteries
- My household has a written plan for emergencies such as storm, flood or fire

How much do you disagree or agree with the following statements about planning and preparing for extreme weather events at your home?	**No**	**Sort of *(a little, but with some limitations)***	**Yes**	**N/A**	**Don't know**
If a bushfire, severe storm or flooding causes damage to my home, I know what to do	◯	◯	◯	◯	◯
My household has a written plan for emergencies such as storm, flood or fire	◯	◯	◯	◯	◯
I've discussed our emergency plan with others in my household in the last 12 months	◯	◯	◯	◯	◯
There is an emergency kit in my household with things such as a radio, flashlights and batteries	◯	◯	◯	◯	◯
Copies of my important documents are stored in a safe place in case of emergency	◯	◯	◯	◯	◯

For each item, respondents can answer 'no', 'sort of' or 'yes'. The 'sort of' option was provided as testing of these measures by Schirmer and Yabsley (2018) found that many people reported they

had done a little preparation but described themselves as being 'sort of' prepared rather than being fully confident that they were prepared. Respondents can also answer 'don't know', as Schirmer and Yabsley found that some were unaware of whether others in their household had prepared a written plan, or an emergency kit. An N/A option is also provided, with 'N/A'; this is intended for those, such as people living in single person households, who would not be able to discuss their emergency plan with others in the same household.

In wave 6 onwards the items were asked with a response scale from 1 (strongly disagree) to 7 (strongly agree) with a 'don't know' option also provided. This was done to better align the question with others to increase ease of answering multiple questions easily using the same scale type.

Indicator calculation & reporting

Rather than produce a single indicator from the five measures, large differences in the proportion of people who had done each suggested a need to report each separately. For each measure, the following is reported:

- % answering 'yes' (calculated as the percentage of those responding no, sort of, yes and don't know)
- % answering 'sort of' (calculated as the percentage of those responding no, sort of, yes and don't know).

Wave 6 onwards indicators:

- % answering 'yes' (calculated as the percentage of those responding 6 or 7 on the scale)
- % answering 'sort of' (calculated as the percentage of those responding 3,4,5 on the scale)
- % answering 'no' (calculated as the percentage of those responding 1 and 2 on the scale).

A2.2.31 Domain: Safety; Indicator: Feeling safe

Source of measure

See description of survey measure.

Changes in measure since first collected

This measure changed, with one measure used in Waves 1-2, and a new measure in Wave 3 and 6. This results in a break in series, with data not able to be directly compared before and after the change.

Frequency of data collection

This indicator is collected at least once every two years.

Survey measure (current and, if relevant, previous versions)

Sense of safety in the local area a person lived in was initially measured (in Wave 1 and 2) by asking survey participants the extent to which they agreed or disagreed that:

- My local area is a safe place to live (used previously in studies including Pawson and Herath 2015) (also asked in Wave 6)
- It is unsafe to walk outside in my local area at night (used in the ACT General Health Survey, with very similarly phrased measures used in multiple surveys)
- It is unsafe to walk outside in my local area during the day (used in the ACT General Health Survey, with very similarly phrased measures used in multiple surveys).

How safe is your local area?	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
My local area is a safe place to live	○	○	○	○	○	○	○	○
It is unsafe to walk outside in my local area at night	○	○	○	○	○	○	○	○
It is unsafe to walk outside in my local area during the day	○	○	○	○	○	○	○	○

In Waves 3 and 6, a different measure of safety was examined, which asked about safety in a wider range of situations – at home alone at night, walking alone in a person's neighbourhood, using public transport, and safety at work. These questions were adapted from similar items used as part of the National Survey of Community Satisfaction with Police. However, their phrasing is slightly different, and the question about walking alone asks specifically about the neighbourhood the person lived in.

	Very unsafe	Unsafe	Neither safe or unsafe	Safe	Very safe	N/A
How safe do you feel if you are home alone at night?	◯	◯	◯	◯	◯	◯
How safe do you feel walking alone in your neighbourhood (e.g. on streets near where you live)?	◯	◯	◯	◯	◯	◯
How safe do you feel using public transport?	◯	◯	◯	◯	◯	◯
How safe do you feel when you are at work	◯	◯	◯	◯	◯	◯

In Wave 8 and 9, the safety 'walking alone in your neighbourhood' question was subdivided into two items, addressing perception of safety walking alone 'during the day', and 'at night', to allow for time of day effects to be distinguished.

How safe do you feel?	Very unsafe	Unsafe	Neither safe or unsafe	Safe	Very safe	N/A
How safe do you feel walking alone in your neighbourhood during the day?	◯	◯	◯	◯	◯	◯
How safe do you feel walking alone in your neighbourhood at night?	◯	◯	◯	◯	◯	◯
How safe do you feel if you are home alone at night?	◯	◯	◯	◯	◯	◯
How safe do you feel using public transport?	◯	◯	◯	◯	◯	◯
How safe do you feel when you are at work	◯	◯	◯	◯	◯	◯

Indicator calculation & reporting

Wave 1 indicators: the indicator is the proportion of those who responded who agreed with each statement (answered 5, 6, or 7), with the total respondents including those who answered 'don't know.

Wave 2 onwards indicators: the indicator is the proportion who reported feeling safe and very safe, as a proportion of total respondents. Not applicable responses were excluded when calculating percentages.

A2.2.32 Domain: Social connection; Indicator: Levels of loneliness; Subindicator: Loneliness scale

Source of measure

The measure used is a validated three-item loneliness scale, which is used in a number of studies, some of which use slightly different variants of the response scale, but which have all shown good characteristics for the scale (see Hughes et al. 2004, Matthews-Ewald and Zullig 2013, Snape and Martin 2018).

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure is collected annually, or more frequently if events occur that may affect ability to interact socially.

Survey measure (current and, if relevant, previous versions)

Levels of loneliness are measured by asking survey respondents (i) How often do you feel you lack companionship, (ii) How often do you feel left out, and (iii) How often do you feel isolated from others. Response options were (i) Never, (ii) Hardly ever, (iii) Occasionally/sometimes, (iv) Often, or (v) All of the time.

Thinking about your experiences in the last four weeks…	**Never**	**Hardly ever**	**Occasionally/ sometimes**	**Often**	**All of the time**
How often do you feel that you lack companionship?	◯	◯	◯	◯	◯
How often do you feel left out?	◯	◯	◯	◯	◯
How often do you feel isolated from others?	◯	◯	◯	◯	◯

Indicator calculation

The mean scores of the three items are combined to form the index of loneliness, scored from 1 (low levels of loneliness to 5 (high levels of loneliness), with up to 1 missing item.

Reporting

Three groups are identified from the measure of loneliness, using the following scoring thresholds:

- Hardly ever lonely: Score between 1 and 2.49
- Sometimes lonely: Score between 2.50 and 3.49
- Often lonely: Score of 3.50 or higher.

A2.2.33 Domain: Social connection; Indicator: Levels of volunteering; Subindicator: Volunteers

Source of measure

This measure is adapted from one used in the Regional Wellbeing Survey. It is slightly more detailed than the measure used in the ABS Census of Population and Housing, which asks if a person in the last 12 months spent 'any time doing voluntary work through an organisation or group' and directs people to 'include voluntary work for sporting teams, youth groups, schools or religious organisations' (ABS 2016).

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This measure is collected annually, or more frequently if events occur that may affect ability to spend time engaged in volunteering.

Survey measure (current and, if relevant, previous versions)

Participation in volunteering is measured by asking survey participants to select from one of three categories, shown below.

Are you a volunteer? *Select one*	
In the last 12 months, I have volunteered my time unpaid. This can include anything from being in a volunteer fire brigade to helping out at a sports club or school canteen.	◯
I used to volunteer, but have not done so in the last 12 months	◯
I have never volunteered my time for a group or organisation	◯

In some waves, participants are also asked to identify the types of volunteering they engage in, and how frequently they engage in each. The specific types of volunteering asked about may vary depending on the wave; refer to the specific questionnaire for that wave to identify which types of volunteering were asked about.

What types of groups or events have you volunteered for in the last 12 months?	**I haven't volunteered for this type of group**	**In the last year, I have volunteered for this type of group:**					
		Once or twice	**3 to 5 times**	**6 to 10 times**	**11 to 25 times**	**Most weeks**	**More than once a week**
Emergency services group e.g. fire brigade, SES	◯	◯	◯	◯	◯	◯	◯
Sporting or outdoor recreation club/group	◯	◯	◯	◯	◯	◯	◯
School-related activities e.g. canteen, P&C	◯	◯	◯	◯	◯	◯	◯
Service club/group e.g., Rotary, Lions, CWA	◯	◯	◯	◯	◯	◯	◯
Community event e.g. field day, festival, market	◯	◯	◯	◯	◯	◯	◯

Online group, e.g. community Facebook page, site admin for an online group	◯	◯	◯	◯	◯	◯	◯
Natural resource management/ conservation group (e.g. Landcare, Frogwatch, Greening Australia)	◯	◯	◯	◯	◯	◯	◯
Health care/social welfare organisation	◯	◯	◯	◯	◯	◯	◯
Church or other religious organisation	◯	◯	◯	◯	◯	◯	◯
Animal services e.g. animal rescue, RSPCA	◯	◯	◯	◯	◯	◯	◯
Music, arts or culture group or organisation	◯	◯	◯	◯	◯	◯	◯
Political group	◯	◯	◯	◯	◯	◯	◯
Other (please describe) _____ _____	◯	◯	◯	◯	◯	◯	◯

Indicator calculation & reporting

The indicator is reported as:

- % who have volunteered in the last 12 months
- % who used to volunteer but have not done so in the last 12 months, and
- % who have never volunteered.

A2.2.34 Domain: Social connection; Indicator: Participation in community events and activities; Subindicator: Level of participation in events and activities

Source of measure

This measure is adapted from similar measures included in the Regional Wellbeing Survey.

Changes in measure since first collected

Two changes have occurred to this measure

1) Removal of one item in the measure due to impacts of COVID-19.

The collection of this measure was significantly disrupted by the effects of COVID-19 lockdowns, which restricted some of the activities usually asked about. This meant that while Wave 1 asked about participation in community festivals, arts or cultural events, this type of community activity was not asked about in subsequent waves that were impacted by cancellation of large numbers of these events. Removal of this item was considered important as asking it when events were mostly cancelled could reinforce negative impacts of those cancellations. The item was included again after the end of COVID-19 related restrictions on travel and in-person events. When data are presented for Waves 3-6, it should be noted that the measure did not include this item due to community-wide cancellation of many community events affecting ability to participate within the 12 months prior to these surveys being conducted.

2) Addition of item measuring attendance at sporting events as a spectator. From Wave 2, a new item was added to this measure, asking about frequency of attending sporting events as a spectator. This was added due to evidence of sport event spectating being a significant point of social connection for many.

The overall scale measured is relatively comparable over time despite these changes: the scale is calculated as an average of the score across all items, rather than as an additive scale, which means addition or removal of any single item rarely results in significant change in the overall score. What will cause significant change is a large drop in ability to participate in one of the items, which means that if a type of community participation is not possible for a period of time for any residents, that item should not be included in score calculations. Items should only be included in calculations if it was possible for residents to easily take part in the activity in the previous 12 months if they wished to.

Frequency of data collection

This indicator is collected annually.

Survey measure (current and, if relevant, previous versions)

Participation in community events and activities was measured by developing an index of community participation. This index was calculated based on the extent to which a person reported participating in any of the different types of activity asked about in a given wave: community events; sports groups; local community clubs or hobby groups; local online community groups e.g. local area Facebook group. As noted above, the specific items asked about changed from Wave 2 with the addition of an extra item, and from Wave 3-6 one item was not asked due to widespread cancellation of large-scale community events due to COVID-19.

Wave 1 items:

How OFTEN do you do the following things (no matter where the activities occur)?	NEVER or almost never ①	②	③	④	⑤	⑥	ALL the time ⑦
I attend community festivals, arts or cultural events e.g. music concert, play/theatre, Floriade, Balloon Festival, multicultural festival exhibitions or events in the ACT region	○	○	○	○	○	○	○
I take part in sports groups or teams	○	○	○	○	○	○	○
I attend meetings/events held by local clubs/social groups/church e.g. local school parent night, Rotary club, religious meeting	○	○	○	○	○	○	○
I follow or participate in online discussions with others in my local area, e.g. via a local community Facebook page	○	○	○	○	○	○	○

Wave 2 items:

How OFTEN do you do the following things (no matter where the activities occur)?	NEVER or almost never ①	②	③	④	⑤	⑥	ALL the time ⑦
Attend community festivals, arts or cultural events (e.g. music concert, play/theatre, Floriade, Balloon Festival, multicultural festival exhibitions or events in the ACT region)	○	○	○	○	○	○	○
Attend sporting events	○	○	○	○	○	○	○
Take part in sports groups or teams	○	○	○	○	○	○	○
Attend meetings/events held by local clubs/social groups/church (e.g. local school parent night, Rotary club, religious meeting)	○	○	○	○	○	○	○
Follow or participate in online discussions with others in my local area (e.g. via a local community Facebook page)	○	○	○	○	○	○	○

Wave 3, 4, 6, 7, 8 and 9 items:

How OFTEN do you do the following things (no matter where the activities occur)?	NEVER or almost never ①	②	③	④	⑤	⑥	ALL the time ⑦
Attended a sporting event as a spectator	○	○	○	○	○	○	○
Taken part in a sports group/team e.g. face to face or online training, playing games, or social activities with the team	○	○	○	○	○	○	○
Attended meetings/events held by a group such as a church, hobby club, social group, or community group (in person or online)	○	○	○	○	○	○	○
Followed or participated in ONLINE discussions with others in my local area e.g. via a local community Facebook page	○	○	○	○	○	○	○

Indicator calculation & reporting

A new experimental method for developing an index was developed as part of the *Living well* survey. Existing indexes, such as that used in the Regional Wellbeing Survey have typically summed total participation across multiple types of group, based on an assumption that greater participation is

necessarily ‘better’. This may not be the case and, especially when multiple types of participation are asked about, can give a misleading picture of participation. It is possible that different types of participation are relatively substitutable in terms of providing benefit for wellbeing – meaning that rather than assume a person needs to engage in multiple types of participation, wellbeing may in reality be supported through engaging in preferred types of activities or, when one activity is not available for a period of time, through engaging on available activities.

To reflect the idea of a person being able to achieve sufficient participation in the types of events/activities they prefer, the average score of participation was added across the items asked to give a score from 1 (no participation in any of these 4) to 7 (frequent participation in all 4). A score of 1-1.50 was considered low participation, 1.51-3.49 moderate participation, and 3.50 or above high participation, as a person was considered to only need to participate frequently in one activity or more, or moderately in two or more, to have a high level of community participation.

This is an experimental index and may require further exploration and development to better understand what thresholds are appropriate for defining low, moderate and high levels of community participation.

A2.2.35 Domain: Social connection; Indicator: Sense of social connection; Subindicator: Social connection scale

Source of measure

This measure is sourced from one use in the Regional Wellbeing Survey since 2013, which was in turned adapted from previous studies using similar measures (see for example Berry et al. 2007, Dekker 2007). The main measure (social connection – traditional) was used based on the measure in the RWS. A second measure (social connection – phone and online) was developed for the *Living well* survey.

Changes in measure since first collected

This measure has not changed since first being collected. However, the 'phone and online' version of the measure continues to be monitored for statistical validity, and further work examining interpretation of the scale and its meaning for wellbeing is ongoing. In particular, it is anticipated the recommended thresholds for specifying what is considered to be a 'healthy' level of social connection will change in future after greater evidence is available over time enabling analysis of the connection between having differing levels of social connection at a given point in time, and a person's wellbeing outcomes over the subsequent 1-3 year period.

Frequency of data collection

This measure is collected annually. It was collected in Waves 1, 3, 4, 6, 7, 8 and 9.

Survey measure (current and, if relevant, previous versions)

Social connection is measured using both 'traditional' measures of connecting socially (those drawn from the RWS measure) and new measures focusing on online connection (designed for the *Living well* survey):

- Social connection – traditional: This is measured by asking people how frequently they typically (i) spend time doing things with family members who don't live with me, (ii) Spend time with friends who don't live with me (face to face); or (iii) Chat with my neighbours. They could answer from 1 (never) to 7 (all the time). These questions do not seek to identify the quality of interactions, but rather whether a person feels their social connection is frequent or infrequent relative to their desired levels of social connection. These measures are used in the Regional Wellbeing Survey, with three items used to create a single scale since 2013.
- Social connection – phone and online: This is measured by asking people how frequently they typically (i) Talk to family members or friends by phone (not including messages), (ii) Catch up with what my friends are doing online; or (iii) Take part in online groups with people I never or rarely see face to face e.g. discussion groups about a particular topic, gaming. They could answer from 1 (never) to 7 (all the time). These questions were used for the first time in the *Living well* survey in Wave 1.

How OFTEN do you do the following things (no matter where the activities occur)?	**NEVER or almost never**						**ALL the time**
	①	②	③	④	⑤	⑥	⑦
I spend time doing things with family members who don't live with me	○	○	○	○	○	○	○
I spend time with friends who don't live with me (face to face)	○	○	○	○	○	○	○
I talk to family members or friends by phone (not including messages)	○	○	○	○	○	○	○
I catch up with what my friends are doing online e.g. via Facebook, Instagram, online chat, text/online messages	○	○	○	○	○	○	○

I take part in online groups with people I never or rarely see face to face, e.g. discussion groups about a particular topic, gaming	○	○	○	○	○	○	○
I chat with my neighbours	○	○	○	○	○	○	○

Indicator calculation & reporting

For both measures, an overall social connection score was calculated by calculating the average score of the items included in the scale, with up to one missing value. Using this scale, participants were then categorised as having low social connection (defined as an average score of 3.49 or less), moderate social connection (a score of 3.50 to 4.49) or high social connection (a score of 4.50 to 7). However, further ongoing work is testing the longitudinal association between social connection and wellbeing in order to refine recommended thresholds for this indicator. This means that in future the thresholds recommended may change. If this occurs, backcasted data will be produced that enable the indicator to be interpreted using the new thresholds for all survey waves in which this indicator has been measured.

A2.2.36 Domain: Time; Indicator: Quality of time; Subindicator: Quality of time scale

Source of measure

This measure was designed for the *Living well* survey. A new measure was designed and implemented as review of existing measures identified that none were fit for purpose for inclusion. This was due to one of two primary reasons: while some existing measures have well demonstrated validity, they were too long to include. Other measures focused on measuring how much time a person spent on different activities, rather than whether a person had undertaken the amount they personally felt was sufficient. As there is a body of evidence showing that the amount of different activities required for health will vary from person to person depending on their circumstances and preferences, a new measure was designed.

Changes in measure since first collected

There have been no changes in the indicator used for ACT Wellbeing Framework reporting since it was first included in the survey. However, as this is a newly designed measure, some additional items have been tested that asked about other aspects of time use, which are noted as part of the documentation of the survey measure. Review of these measures and of overall statistical properties of the measure will be used to identify whether any future changes are recommended for this indicator.

Frequency of data collection

This indicator was collected in Wave 1, 2, 4 and 5. Longer-term, it is recommended the indicator be measured every 1 to 2 years, with more frequent measurement when large community-wide changes are occurring, and less frequent measurement when no significant events affecting time use across the population are occurring (such as a pandemic, recession or similar large-scale event).

Survey measure (current and, if relevant, previous versions)

The 'quality of time use' measure is calculated by recording a person's ratings of whether in the last four weeks they felt they spent (i) less time than desired, (ii) about the right amount of time, or (iii) more time than desired, doing the following activities: paid work, commuting to work, caring for family members or friends the person is a carer for, volunteering or informally helping out local groups, housework/chores other than gardening, time spent outdoors (including gardening), time spent with family/friends, sleep time and time spent exercising

As this measure was developed for the first time as part of the *Living well survey*, and further validation work is ongoing to evaluate the utility of the measure, and identify appropriate thresholds for defining low, moderate and high quality of time use.

The table below shows the item as asked in Wave 1 of the survey.

	In the last four weeks the amount of this I did was…					
In the last month, did you do more, less or about the right amount of…	**Much less than I would have liked**	**A little less than I would have liked**	**About as much as I wanted to**	**A little more than I wanted to**	**Much more than I wanted to**	**Don't know**
Paid work (if applicable)	◯	◯	◯	◯	◯	◯
Time spent commuting to work (if applicable)	◯	◯	◯	◯	◯	◯
Caring for family members or friends you are a carer for	◯	◯	◯	◯	◯	◯

Volunteering, or informally helping out local groups	◯	◯	◯	◯	◯	◯
Housework/chores other than gardening	◯	◯	◯	◯	◯	◯
Time spent outdoors	◯	◯	◯	◯	◯	◯
Time spent with family/friends	◯	◯	◯	◯	◯	◯
Amount of sleep time	◯	◯	◯	◯	◯	◯
Amount of time spent exercising	◯	◯	◯	◯	◯	◯

Two phrasings have been tested of some items, with the updated phrasing (which increased completion of the item but had no material impact on the patterning of responses) used from Wave 4 onwards. This involved changing the 'Don't know' to 'N/A', which resulted in clearer identification by those for whom some activities were not relevant, such as paid work (previously some of this group had simply not answered these items rather than answering 'Don't know' as the Don't know option was not clearly appropriate for them). It also involved adding 'Time spent' to the start of several items after some respondents identified they felt a need for a reminder of what the main purpose of the question was. From Wave 4, the 'Caring for family members or friends you are a carer for' was split into two items – one focused on caring for children and the other on other caring responsibilities, as per the table below.

In addition to the core items that form this measure, the following additional items were tested in Waves 4 and 5, shown in the extended measure below used from Wave 4 onwards.

- 'Free time' where you could do things of your own choosing
- Time spent gardening
- Time spent outdoors OTHER than gardening (e.g. visiting parks, nature reserves, outdoor exercise)
- Time spent attending arts, culture or music events (e.g. theatre, concert, exhibition – include attending events online)
- Time spent doing creative activities of your own, such as craft, blogging, writing, painting, game development, performing music or theatre

These additional items are used to provide insight into additional specific aspects of time use. Further testing of their utility may result in a recommendation to update the overall time use measure to incorporate one or more of these, however this will be determined after repeat measurement for an additional 1-2 waves of data to enable understanding of whether the additional items provide further utility in understanding how time use quality changes over time.

	In the last four weeks the amount of this I did was…					
In the last month, did you have more, less, or about the right amount of…	**Much less than I would have liked**	**A little less than I would have liked**	**About as much as I wanted to**	**A little more than I wanted to**	**Much more than I wanted to**	**N/A**
Paid work (if applicable)	◯	◯	◯	◯	◯	◯
Time spent commuting to work (if applicable)	◯	◯	◯	◯	◯	◯
'Free time' where you could do things of your own choosing	◯	◯	◯	◯	◯	◯
Time spent with family/friends	◯	◯	◯	◯	◯	◯

Time spent caring for your children (if applicable)	○	○	○	○	○	○
Time spent on other caring duties for people you are a carer for (e.g. a partner, parent, person who is disabled, frail, ill or elderly) (if applicable)	○	○	○	○	○	○
Time spent doing unpaid housework/chores other than gardening	○	○	○	○	○	○
Time spent gardening	○	○	○	○	○	○
Time spent volunteering, or informally helping out local groups	○	○	○	○	○	○
Time spent sleeping	○	○	○	○	○	○
Time spent outdoors OTHER than gardening (e.g. visiting parks, nature reserves, outdoor exercise)	○	○	○	○	○	○
Amount of time spent exercising (all, whether indoor or outdoor)	○	○	○	○	○	○
Time spent attending arts, culture or music events (e.g. theatre, concert, exhibition – include attending events online)	○	○	○	○	○	○
Time spent doing creative activities of your own, such as craft, blogging, writing, painting, game development, performing music or theatre	○	○	○	○	○	○

In Wave 9, 'Time spent sleeping', 'Time spent commuting to work (if applicable)' (see A2.2.37) and ''Free time' where you could do things of your own choosing' were not asked.

Indicator calculation & reporting

For each of the activities a person answered, they are given a score of 1 for every activity they report doing about the right amount of, and 0 for each they report doing too much or too little of. The average score is then calculated across all items (with up to 3 missing values), giving a score from 0 to 1, where 1 represents the best possible quality of time use. Proportions of the population with low quality of time use (score 0-0.34), moderate quality of time use (0.35-0.66) and high quality of time use (0.67 or higher) are then reported.

A2.2.37 Domain: Time; Indicator: Time spent travelling within Canberra; Subindicator: Satisfaction with time spent commuting

Source of measure

This measure was designed for the *Living well* survey, as part of the longer set of items used to measure the 'quality of time' measure.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator is collected annually, and was collected in Wave 1, 3, 4, 5, and 8. However, if using data from Wave 4, a note should be included explaining data were collected while COVID-19 movement restrictions were in place, which meant many people were not permitted to commute. This resulted in significant change in the proportion of people reporting being satisfied and unsatisfied with their commuting time.

Survey measure (current and, if relevant, previous versions)

The 'satisfaction with time spent commuting' measure is calculated by recording a person's ratings of whether in the last four weeks they felt they spent (i) less time than desired, (ii) about the right amount of time, or (iii) more time than desired, commuting to work. Those who do not work are not asked to answer the question.

	In the last four weeks the amount of this I did was…					
In the last month, did you do more, less or about the right amount of…	**Much less than I would have liked**	**A little less than I would have liked**	**About as much as I wanted to**	**A little more than I wanted to**	**Much more than I wanted to**	**Don't know**
Time spent commuting to work (if applicable)	◯	◯	◯	◯	◯	◯

Indicator calculation & reporting

The indicator is reported in three groups, after removing any respondents who did not have paid employment in the previous four weeks who provided an answer to the question, and removing don't know responses:

- Less time commuting than desired (% of valid respondents who answered 'much less than I would have liked' and 'a little less than I would have liked')
- About the right amount of commuting time (% of valid respondents who answered 'about as much as I wanted to')
- More time commuting than desired (% of valid respondents who answered 'a little more than I wanted to' and 'much more than I wanted to').

A2.2.38 Domain: Time; Indicator: Time spent travelling within Canberra; Subindicator: 30 minute commute

Source of measure

This measure was designed for the *Living well* survey. It is intended to support understanding of whether the ACT is achieving being a '30 minute city', a goal adopted by many cities worldwide in recent years (see for example Wu 2021).

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

It is recommended that this measure be collected annually. Due to the COVID-19 pandemic, collection was not annual in the initial years of the *Living well* survey, with this question not asked if the survey was being conducted in a period in which travel restrictions were in place in the ACT. The measure was included in Wave 1 (2019), Wave 3 (2020) and Wave 6 (2022), with Wave 4 occurring during a lockdown period and hence the measure not included in the questionnaire in that wave.

Survey measure (current and, if relevant, previous versions)

Survey respondents who were in paid employment or studying were asked to identify the average number of minutes it took them to commute to their place of work or study. They were asked about their commute to work/study and their commute home, as for some people the commute time may vary depending on time of day they are commuting.

On average, in the last 4 weeks, how long did it take you to commute to and from work or study?	Commute to work/study: _____ minutes Commute home: _____ minutes

Indicator calculation & reporting

The average time spent commuting is calculated as the average of the two responses (sum of commute to work/study and commute home, divided by two). The resulting measure is then used to identify two groups:

- % who had an average commuting time of 30 minutes or less
- % who had an average commuting time greater than 30 minutes.

A2.2.39 Domain: Time; Indicator: Unpaid work including caring; Subindicator: People performing unpaid work, including caring

Source of measure

This measure was designed for the *Living well* survey, through adaptation of the longer 'Quality of time' measure.

Changes in measure since first collected

This measure was not included in reporting for the ACT Wellbeing Framework when an initial test measure was collected in Wave 1. This initial measure asked about all types of unpaid caring (including both caring for children and caring for one or more people with a disability, long-term illness or age-related frailty) in a single survey item. It was identified that to better understand unpaid work including caring, it was necessary to separate these. This was done from Wave 4, and reporting for this indicator should either (i) use data from Wave 4 onwards only, or (ii) if using data from Wave 1, identify that two types of unpaid caring were measured in a single survey item in this wave but not subsequent waves, and that findings regarding unpaid care cannot be compared for Wave 1 and Wave 4 due to this.

Frequency of data collection

This indicator was collected in Wave 1, 4, 5 and 9; however, in Wave 1, the measure used combined both child care and caring for people with an illness, disability or age-related frailty in a single measure. It was identified that these two aspects of caring should be separated, and in Waves 4 and 5 this single item was separated into two items. It is recommended this indicator be collected annually going forward.

Survey measure (current and, if relevant, previous versions)

As part of the 'quality of time use' measure, unpaid work is asked about using the measures shown below. As noted above, these changed between Wave 1 (shown first) and Wave 4 onwards (shown second).

As this measure was developed for the first time as part of the *Living well survey*, and further validation work is ongoing to evaluate the utility of the measure, and identify appropriate thresholds for defining low, moderate and high quality of time use.

The table below shows the items as asked in Wave 1 of the survey.

	In the last four weeks the amount of this I did was…					
In the last month, did you do more, less or about the right amount of…	**Much less than I would have liked**	**A little less than I would have liked**	**About as much as I wanted to**	**A little more than I wanted to**	**Much more than I wanted to**	**Don't know**
Caring for family members or friends you are a carer for	◯	◯	◯	◯	◯	◯
Volunteering, or informally helping out local groups	◯	◯	◯	◯	◯	◯
Housework/chores other than gardening	◯	◯	◯	◯	◯	◯

The table below shows the items as asked in Wave 4 of the survey onwards.

In the last month, did you have more, less, or about the right amount of…	In the last four weeks the amount of this I did was… Much less than I would have liked	A little less than I would have liked	About as much as I wanted to	A little more than I wanted to	Much more than I wanted to	N/A
Time spent caring for your children (if applicable)	○	○	○	○	○	○
Time spent on other caring duties for people you are a carer for (e.g. a partner, parent, person who is disabled, frail, ill or elderly) (if applicable)	○	○	○	○	○	○
Time spent doing unpaid housework/chores other than gardening	○	○	○	○	○	○
Time spent volunteering, or informally helping out local groups	○	○	○	○	○	○

Indicator calculation & reporting

The indicator is reported by reporting each of the four types of unpaid care separately. Each is reported in three groups, after removing don't know responses:

- Less time doing unpaid work/care (caring for children/other caring duties/doing unpaid housework/volunteering) than desired (% of valid respondents who answered 'much less than I would have liked' and 'a little less than I would have liked')
- About the right amount of time (% of valid respondents who answered 'about as much as I wanted to')
- More time in unpaid work/care than desired (% of valid respondents who answered 'a little more than I wanted to' and 'much more than I wanted to')

A2.2.40 Domain: Time; Indicator: Work-life balance; Subindicator: Time spent on work

Source of measure

This measure was designed for the *Living well* survey. A new measure was designed and implemented as review of existing measures identified that none were fit for purpose for inclusion. This was due to one of two primary reasons: while some existing measures have well demonstrated validity, they were too long to include. Other measures focused on measuring how much time a person spent on different activities, rather than whether a person had undertaken the amount they personally felt was sufficient. As there is a body of evidence showing that the amount of different activities required for health will vary from person to person depending on their circumstances and preferences, a new measure was designed.

Changes in measure since first collected

There have been no changes in measure design, analysis or reporting since it was first included in the survey.

Frequency of data collection

This indicator was collected in Wave 1, 2, 4, 5 and 9. Longer-term, it is recommended the indicator be measured every 1 to 2 years, with more frequent measurement when large community-wide changes are occurring, and less frequent measurement when no significant events affecting time use across the population are occurring (such as a pandemic, recession or similar large-scale event).

Survey measure (current and, if relevant, previous versions)

The 'quality of time use' measure is calculated by recording a person's ratings of whether in the last four weeks they felt they spent (i) less time than desired, (ii) about the right amount of time, or (iii) more time than desired, doing the following activities: paid work, commuting to work, caring for family members or friends the person is a carer for, volunteering or informally helping out local groups, housework/chores other than gardening, time spent outdoors (including gardening), time spent with family/friends, sleep time and time spent exercising

As this measure was developed for the first time as part of the *Living well survey*, and further validation work is ongoing to evaluate the utility of the measure, and identify appropriate thresholds for defining low, moderate and high quality of time use.

	In the last four weeks the amount of this I did was…					
In the last month, did you do more, less or about the right amount of…	**Much less than I would have liked**	**A little less than I would have liked**	**About as much as I wanted to**	**A little more than I wanted to**	**Much more than I wanted to**	**Don't know**
Paid work (if applicable)	○	○	○	○	○	○
Time spent commuting to work (if applicable)	○	○	○	○	○	○
Caring for family members or friends you are a carer for	○	○	○	○	○	○
Volunteering, or informally helping out local groups	○	○	○	○	○	○
Housework/chores other than gardening	○	○	○	○	○	○
Time spent outdoors	○	○	○	○	○	○
Time spent with family/friends	○	○	○	○	○	○

Amount of sleep time	◯	◯	◯	◯	◯	◯
Amount of time spent exercising	◯	◯	◯	◯	◯	◯

Indicator calculation & reporting

The indicator is reported in three groups, after removing any respondents who did not have paid employment in the previous four weeks who provided an answer to the question, and removing don't know responses:

- Less time in paid work than desired (% of valid respondents who answered 'much less than I would have liked' and 'a little less than I would have liked')
- About the right amount of time in paid work time (% of valid respondents who answered 'about as much as I wanted to')
- More time in paid work than desired (% of valid respondents who answered 'a little more than I wanted to' and 'much more than I wanted to')

Appendix 2.3 Socio-demographic and cultural groups

This details how defines different socio-demographic groups are defined for purposes of reporting, specifically the following groups, which have been identified as of specific importance and focus as part of the ACT Wellbeing Framework:

- Aboriginal and Torres Strait Islander peoples
- Carers
- Children and young people
- Culturally and linguistically diverse people
- Gender
- LGBTIQ+
- Older Canberrans
- People with disability.

Aboriginal and Torres Strait Islander peoples

At the time this User Guide was current, it was not yet possible to report findings for Aboriginal and Torres Strait Islander peoples using data from the *Living well* survey, due to small sample sizes. In each Wave, between 25 and 40 participants typically identify as Aboriginal and/or Torres Strait Islander. A deliberately stratified sample that over-samples Aboriginal and Torres Strait Islander residents of the ACT is needed to be able to achieve a sufficiently large sample to be able to report for this group. This in turn should occur via collaboration with Aboriginal and Torres Strait Islander residents, including having a process to enable to implementation of appropriate Indigenous Data Sovereignty principles when designing survey content, collecting and reporting data related to Aboriginal and Torres Strait Islander peoples. A priority for the *Living well* survey is to seek additional funding to enable this work to occur.

Carers

A carer is defined as a person who provides unpaid care to a person who has a disability, mental illness, drug or alcohol dependency, chronic condition, terminal or serious illness, or age-related frailty. The Australian government Carers payment and Carers allowance are not considered to represent payment for care, with recipients of these government benefits included in the definition of unpaid carers. Everyday care for children is not included in the definition of carer, however if a person is caring for a child with a specific disability, illness, condition or frailty, they are considered a carer.

In most waves of the survey, carers are asked how many hours they spend fulfilling their caring responsibilities in a typical week. This enables analysis of carers as a whole, as well as of two groups of carers: those who typically spend less than 15 hours a week on their carer responsibilities, and those whose caring responsibilities take up 15 or more hours per week. This distinction is made to better understand differences in wellbeing and experiences of these groups, with carers who have higher hours of caring obligations shown in other work to typically have lower wellbeing compared to carers whose caring responsibilities take up fewer hours per week (Schirmer et al. 2021, 2022).

Children and young people

The *Living well* survey collects data from people aged 18 and over. It therefore does not collect data from children in the ACT. It does, however, including a sample of younger adults. This young adult cohort often have specific wellbeing challenges that differ to those of older adults. Broadly, this cohort is considered to be those aged 18 to 29. In all waves of the survey, experiences of those aged 18-29 are examined separately to those of other age groups (those aged 30-49, 50-64, and 65 and older). In some waves where sample size is sufficiently large, it is also possible to examine the experiences of those aged 18-24 compared to those aged 25-29, however this is not possible in all waves of the survey, as it depends on achieving a sufficiently large sample of each of these age groups to report data for each separately.

Culturally and linguistically diverse people

Canberra is home to many people from culturally and linguistically diverse (CALD) backgrounds. The *Living well* survey identifies cultural and linguistic backgrounds in varying levels of detail in each wave, with the ability to link this information across waves for those participants who give permission for this to occur. The *minimum* level of information available in every wave is the following measures of CALD:

- Language spoken at home. This identifies whether the main language the person speaks at home is English or another language. If another language is the main language spoken at home, the survey participant is asked to identify the language spoken at home.
- Country of birth. This identifies whether the person was born in (i) Australia, (ii) another English speaking country, or (iii) a non-English speaking country. Those born in other countries are in most waves asked to identify their country of birth.

At the time this edition of the User Guide was current, the *Living well* survey was available only in English, and was not translated into other languages. This will reduce participation in the survey by those who have low confidence in reading and writing in English.

Gender

The *Living well* survey asks participants the gender they identify as, and does not ask about gender assigned at birth. Participants are able to identify as female, male, other, or to select 'prefer not to say'. As of Wave 9, too few people identify as 'other (e.g. non-binary)' or 'prefer not to say' to enable reporting of findings for these groups of respondents. Thus, reporting only provides data for those identifying as male and female. To be able to report for those identifying as a gender other than male and female would require specifically sampling those with non-binary gender identities.

LGBTIQ+

Living well survey participants are asked if they identify as LGBTIQ+, straight, or if they are unsure or prefer not to say. Sufficient sample is achieved of those who identify as LGBTIQ+ to enable reporting for this group, as well as for those who identify as straight.

Older Canberrans

The *Living well* survey collects data from people aged 18 and over. This includes an often relatively large sample older Canberrans, defined broadly as those aged 65 and older. As older residents are more likely to respond to invitations to take part in the survey compared to younger adults, there is an unintentional bias in survey responses towards older Canberrans (see earlier sections of this report for discussion of the weighting used to address this bias in sampling). For each wave of the survey, it is possible to examine the experiences of those aged 65 and older separately to other age

groups (those aged 18-29, 30-49, and 50-64). In some waves where sample size is sufficiently large, it is also possible to separately examine the experiences of those aged 65-74 separately to those aged 75 and older. This can provide useful insight into often significant differences in the experiences of the younger cohort of older Canberrans (65-74 year olds) who often have significantly better health and mobility compared to the older cohort of older Canberrans (those aged 75 and older).

People with disability

There is no consistent approach to defining and measuring whether a person is living with a disability across Australia. Given this, the *Living well* survey has trialled several measures of disability, and (with support from the ACT Government) reviewed different approaches to defining and measuring disability, in order to improve the measures included in the survey.

This means that the potential ways disability can be defined differ depending on the wave of the survey. The table on the next page summarises the different measures, while the subsequent pages show the specific survey items used for these measures.

From Wave 5, items that better reflect international best practice in defining disability were included in the survey (Measures 2 and 5 on subsequent pages). These should be considered best practice measures, and used where possible to define disability if using data from the *Living well* survey. Other measures of disability provide some useful insight, however have important limitations that should be noted if reporting data from earlier Waves that uses a definition of disability known to have limitations.

From Wave 6 onwards, the questions included in the survey enable multiple approaches to identifying and classifying:

- Whether a person lives with disability
- The extent of restriction to day to day functioning experienced
- The type of disability a person lives with.

Users of survey data can choose to create their own measure/s of specific aspects/types of disability. The data collected is used to generate the following classifications of disability, which dataset users can choose to use:

- Person with no disability/person with disability. This is defined in either of two ways:
    - Self-defined: Person self-defines using Measure 2, described further below, 'Do you have any long-term health conditions, impairment or disability that restricts you in your everyday activities and has lasted (or is likely to last) for 6 months or more?'. Respondents could only answer 'No' or 'Yes' to this question. Note that the question inherently defines disability to a condition or state that 'restricts you in your everyday activities' – i.e., disability here is definitionally restrictive.
    - Based on specific types of functioning reports: Person is defined as not having a disability if they report no restrictions to functioning in answer to any item in Measure 5, described further below.
- Disability status - level of restriction to daily functioning: A person is identified as having no disability, no restriction to functioning, low restriction, moderate restriction or severe restriction to functioning due to a condition/impairment/disability lasting 6 months or more, based on their responses to Measure 5. Often the categories are combined into fewer

groups, such as a three group of (i) no disability/has condition causing no restriction, (ii) low restriction, (iii) moderate/severe restriction.

- Disability status - type of restriction. There are four subdivisions of this reporting category: (i) sight, hearing and speech, (ii) physical/mobility, (iii) cognitive or mental health, and (iv) other. See Measure 5 for detailed description of how these are defined.

Disability measure	Advantages	Disadvantages	In which Waves were data collected enabling this definition of disability to be used?	Specific survey items used
Self-identified presence or absence of diagnosed long-term illness, health condition or disability	Simple measure	Substantially over-estimates rates of disability as the measure does not identify whether the long-term conditions restricts a person in their everyday activities	1,2,3,4,5 (discontinued after Wave 5)	Measure 1 (see next pages)
Self-identified presence or absence of diagnosed long-term illness, health condition or disability that restricts a person in their everyday activities	Simple measure; assesses disability based on ability to function in everyday activities rather than presence or absence of a condition (consistent with international guidelines)	Does not differentiate between different conditions. May under-represent mental health-related disabilities as these may not be self-identified as restricting a person in their everyday activities. Does not enable identification of extent of restriction in function.	5,6,8,9 (note: not included in Wave 7)	Measure 2 (see next pages)
Physical movement ability	Simple measure of one specific type of disability (physical movement restriction).	Not all who experience significant restrictions to physical movement would identify themselves as having restrictions in everyday activities (however, >90% do based on our comparison of level of correlation to answers to different disability related questions in Waves 5 and 6). Does not measure all types of physical movement restriction, or other types of disability. Physical movement ability is useful as a measure	1,2,3,4,5,6,7,8,9	Measure 3 (see next pages)
Classification of conditions into disability using open-ended responses	Can be based on data showing prevalence of	Unclear specification of conditions by respondents; wide variability in level	1,2,3,4 (discontinued after Wave 4)	Measure 4 (see next pages)

Disability measure	Advantages	Disadvantages	In which Waves were data collected enabling this definition of disability to be used?	Specific survey items used
	restriction associated with different conditions.	of restriction associated with many conditions.		
Classification of conditions into different functional types of disability using classification asked about	Classification based on specific questions that focus on different restrictions to functions, and can be categorised into several types of functional disability to enable comparison of groups.	Not all people reporting some of the function difficulties will experience restrictions in day to day life, however the question structure actively reduces this likelihood – thus this is a minor disadvantage.	5,6,7,8,9	Measure 5 (see next pages)
Psychological distress as an indicator of disability	This involves translating psychological distress scores into probability of having a diagnosable serious mental illness that in turn is likely to present significant function restriction.	Not all people with diagnosable serious mental illness will experience significant function restriction (however, a majority will if actively experiencing the types of distress symptoms measured). Not a specific measure of disability, however available data suggests strong crossover with ability to identify those with mental health problems that result in experiencing barriers to day to day functioning. Only measures the previous 4 week period which is not always indicative of long-term functioning.	All waves	Measure 6 (see next pages)

Measures included in the *Living well* survey that can be used to identify people likely to be living with a disability

Note that not all the measures described in this section are recommended for future use, and some are likely to be discontinued in future waves of the survey due to identified limitations as a measure of disability (namely Measure 1 and Measure 4).

Measure 1 (Waves 1,2,3,4,5)

Discontinued after Wave 5 when responses were cross-checked against Measure 2, and measure 2 was found to provide a more meaningful response.

Do you have any diagnosed long-term physical or mental illness, health condition or disability you need to manage on an ongoing basis?	◯ Yes ◯ No

Measure 2 (Wave 5,6,8,9)

Do you have any long-term health condition, impairment or disability that restricts you in your everyday activities and has lasted (or is likely to last) for 6 months or more?	◯ Yes ◯ No

Measure 3 (Wave 1, 2,3,4,5,6,7,8,9)

Are you currently limited in the following activities (for example due to disability, long term health condition or old age)?	**Yes, completely unable to do this**	**Yes, limited a lot**	**Yes, limited a little**	**No, not limited at all**
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	◯	◯	◯	◯
Lifting or carrying groceries	◯	◯	◯	◯
Walking more than one kilometre	◯	◯	◯	◯
Walking half a kilometre	◯	◯	◯	◯
Walking 200 metres	◯	◯	◯	◯

Measure 4 (Wave 1,2,3,4; discontinued after Wave 5)

Measure 4 involves classifying the conditions or disabilities specifically listed by survey participants, based on their likely impact on day to day functioning. It was discontinued after Wave 5 as identifying the type of condition on its own is not a good guide to level of functioning, with people who have the same condition often varying significantly in their level of functioning.

Do you have any diagnosed long-term physical or mental illness, health condition or disability you need to manage on an ongoing basis?	◯ Yes ◯ No	**If yes,** how many health conditions and/or disabilities are you managing? **Number:** ☐ Please name these health conditions and/or disabilities: _____

	_____ _____

Measure 5 (Wave 5,6,7,8,9)

Measure 5 involves grouping different types of conditions listed in the second set of survey items to report on disability by type of function restriction – sight/hearing, communication/cognition, physical movement, psychosocial, or other.

In Wave 5, this question was asked by first asking if a person had a long-term condition/impairment/ disability that restricted them, and then asking them to select which types of conditions, using the following list.

Do you have any long-term health condition, impairment or disability that restricts you in your everyday activities and has lasted (or is likely to last) for 6 months or more?	◯ Yes ◯ No

You said you have one or more long-term health conditions, impairments, or disabilities that restricts you in your everyday activities. Does this involve any of the following (select all that apply)	Sight problems NOT corrected by glasses or lenses Hearing problems Speech problems Blackouts, fits or loss of consciousness Difficulty learning or understanding things Limited use of arms or fingers Difficulty gripping things Limited use of feet or legs A nervous or emotional condition which requires treatment Any condition that restricts physical activity or physical work (e.g. back problems, migraines) Any mental illness which requires help or supervision Shortness of breath or difficulty breathing Chronic or recurring pain Long-term effects as a result of a head injury, stroke or other brain damage A long-term condition or aliment which is still restrictive, even though it is being treated or medication is being taken for it Any other long-term condition such as arthritis, asthma, heart disease, Alzheimer's disease, dementia, etc. Other (please specify) _____ Don't know

From Wave 6, this measure was updated to better examine the extent to which the person experiences restrictions to functioning, and enable classification of disability by extent of restriction experienced to daily functioning, as well as by type of restriction. From Wave 6 onwards, the following questions have been used. All respondents are asked to answer them, rather than only

asking those who have earlier indicated having a condition/impairment/disability that restricts functioning.

Do you have any long-term health conditions, impairments or disabilities related to the following, and if you do, do they restrict you in your everyday activities?	**NO, I don't have this**	**YES, but condition does NOT AT ALL restrict everyday activities**	**YES, condition restricts everyday activities a LITTLE**	**YES, condition restricts everyday activities MODERATELY**	**YES, condition restricts everyday activities SEVERELY**
Sight problems NOT corrected by glasses or lenses	◯	◯	◯	◯	◯
Hearing problems	◯	◯	◯	◯	◯
Speech problems	◯	◯	◯	◯	◯
Blackouts, fits or loss of consciousness	◯	◯	◯	◯	◯
Difficulty learning or understanding things	◯	◯	◯	◯	◯
Limited use of arms or fingers	◯	◯	◯	◯	◯
Difficulty gripping things	◯	◯	◯	◯	◯
Limited use of feet or legs	◯	◯	◯	◯	◯
A nervous or emotional condition which requires treatment	◯	◯	◯	◯	◯
Any condition that restricts physical activity or physical work e.g. back problems, migraines	◯	◯	◯	◯	◯
Any mental illness which requires help or supervision	◯	◯	◯	◯	◯
Shortness of breath or difficulty breathing	◯	◯	◯	◯	◯
Chronic or recurring pain	◯	◯	◯	◯	◯
Long-term effects as a result of a head injury, stroke or other brain damage	◯	◯	◯	◯	◯
A long-term condition or aliment which is still restrictive, even though it is being treated or medication is being taken for it	◯	◯	◯	◯	◯
Any other long-term condition such as arthritis, asthma, heart disease, Alzheimer's disease, dementia, etc.	◯	◯	◯	◯	◯
Other (please specify) _____	◯	◯	◯	◯	◯

This measure is then used to define the following categories of people with disability:

Presence/absence of disability

This way of identifying whether a person has a disability can be measured in two ways using the table above.

- The first considers anyone who has a long-term condition as having a disability, irrespective of whether it restricts day to day functioning. All respondents who answered 'No, I don't have this' to all items in the table above are considered to have no disability; those who answered to any of the 17 items with any type of 'yes' answer is reported as having a disability.
- The second considers a person to have a disability only if they have a condition that results in some level of restriction to day to day functioning. Only those who answered "Yes, condition restricts everyday activities a little/ moderately/ severely" to one or more of the items are considered to have a disability; all others are considered to not have a disability. This approach defines disability as necessarily involves some restriction to functioning, rather than as only requiring the presence of a condition/ impairment.

Level of restriction to functioning

A person is identified as having no disability, no restriction to functioning, low restriction, moderate restriction or severe restriction to functioning due to a condition/impairment/disability lasting 6 months or more, based on their responses to Measure 5. Often the categories are combined into fewer groups, such as a three group of (i) no disability/has condition causing no restriction, (ii) low restriction, (iii) moderate/severe restriction.

Type of restriction to functioning.

The type of restriction to functioning is categorised in broad categories related to sight/hearing/speech, physical/mobility, cognitive/mental health and other. Note that other groupings can be generated from answers to the table above.

- Sight, hearing and speech encompasses the following categories: 'Sight problems NOT corrected by glasses or lenses', 'Hearing problems' and 'Speech problems.
- Physical or mobility encompasses the following categories: 'Limited use of arms or fingers', 'Difficulty gripping things', 'Limited use of feet or legs' and 'Any condition that restricts physical activity or physical work e.g. back problems, migraines.
- Cognitive or mental health encompasses the following categories: 'Difficulty learning or understanding things', 'A nervous or emotional condition which requires treatment', 'Any mental illness which requires help or supervision', and 'Long-term effects as a result of a head injury, stroke or other brain damage'.
- 'Other' encompasses the following categories: 'Blackouts, fits or loss of consciousness', 'Shortness of breath or difficulty breathing', 'Chronic or recurring pain', 'A long-term condition or aliment which is still restrictive, even though it is being treated or medication is being taken for it', and 'Any other long-term condition such as arthritis, asthma, heart disease, Alzheimer's disease, dementia, etc'.

Each of these subdivisions reports 'no disability' as the combination of the first two categories (No, I don't have this' and 'Yes, but the condition does not at all restrict me in everyday activities'). Those who indicate one or more of the other three responses (i.e., Yes, condition restricts everyday activities a little', 'Yes, condition restricts everyday activities a moderately', and 'Yes, condition restricts everyday activities a severely') is considered to be living with disability. As such, each of these subdivisions reports the presence or absence of RESTRICTIVE disability, rather than any form of disability.

It is also possible to report fewer groups. In some reporting, a variable labelled 'Disability status - type of restriction – grouped' is used which reports Physical disability (a combination of 'Sight, hearing and speech' and 'Physical or mobility'), Mental health disability (directly equivalent to 'Cognitive or mental health'), and 'No disability'. Note that 'No disability' in this reporting includes both individual who did not report a 'Sight, hearing and speech', 'Physical or mobility', 'Cognitive or mental health' disability AND includes respondents who reported an 'Other' disability, per the 'Disability status – types of restriction' reporting above. As such, 'No disability' in this reporting should be interpreted to mean no 'Physical or mental health disability', rather than the absence of any disability. As with the 'Disability status - type of restriction' reporting, the threshold for positive reporting of a disability in the 'grouped' responses is any RESTRICTIVE disability, rather than any disability at all.

Measure 6 (Waves 1,2,3,4,5,6,7,8,9)

In the last four weeks, how often have you felt…	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Nervous?	◯	◯	◯	◯	◯
Hopeless?	◯	◯	◯	◯	◯
Restless or fidgety?	◯	◯	◯	◯	◯
So sad that nothing could cheer you up?	◯	◯	◯	◯	◯
That everything was an effort?	◯	◯	◯	◯	◯
Worthless?	◯	◯	◯	◯	◯

Appendix 3: Sampling Wave 1, detailed – addressed mailout and unaddressed flyers

Table A3.1 summarises the number of participants invited to participate from the mailing database in Wave 1, removals from the database made, and responses received. In total, 2,185 addresses were removed from the mailing list after the initial sample was sent. Of these, 142 requested to be removed and the remaining 2,043 were 'return to sender' mail indicating the address was invalid.

As sampling within the ACT was done using information on both suburb and postcode (with suburbs typically being a subset of a postcode, and most postcodes covering multiple suburbs), selection of sample is shown in the table by suburb and postcode, which reflects the criteria used for selection. Both postcode and suburb are shown in the table when reporting sampling for the ACT.

Sampling in NSW was done by postcode, using the following postcodes:

- 2581
- 2582
- 2583
- 2584
- 2585
- 2586
- 2620
- 2621
- 2622
- 2623

This was done to cover the LGAs of Queanbeyan-Palerang and Yass Valley, as well as those parts of Hilltops, Upper Lachlan and Snowy-Monaro that have populations who commonly commute to work in the ACT (defined as those parts located in the postcodes listed above, as these are geographically closest to the ACT and 2016 Census data suggested most commuting to Canberra occurs from these parts of the ACT). It is important to note that some postcodes cross the ACT and NSW border: 2611, 2618 and 2619.

Table A3.1 Direct invitation letter delivery and responses

Suburb/Town	LGA	Postcode	Total number in AML database	Number selected at random and sent letter inviting participation in survey	Removals	Number of respondents who either reported code or reported hearing about survey via letter mailed to them	Number of respondents providing a survey code	Number who did not provide a survey code but indicate hearing about survey via a letter invitation Completed
ACTON	ACT	2601	23	3	1	0	0	0
AINSLIE	ACT	2602	731	253	29	34	27	7
AMAROO	ACT	2914	713	244	5	30	24	6
ARANDA	ACT	2614	344	123	9	23	20	3
BANKS	ACT	2906	717	267	18	26	22	4
BARTON	ACT	2600	282	89	25	4	4	0
BEARD	ACT	2620	1	1		0	0	0
BELCONNEN	ACT	2617 (2616 for 2 respondents)	873	275	65	28	26	2
BONNER	ACT	2914	268	94	7	3	3	0
BONYTHON	ACT	2905	869	284	40	29	25	4
BOOROOMBA	ACT	2620	6	1	1	0	0	0
BRADDON	ACT	2612	528	173	67	7	4	3
BRUCE	ACT	2617	853	317	35	31	26	5
CALWELL	ACT	2905	921	307	26	20	17	3
CAMPBELL	ACT	2612	517	180	12	23	21	2
CANBERRA	ACT	2601 (3 addresses had postcode 2600)	271	90	31	0	0	0
CANBERRA AIRPORT	ACT	2609	22	3	1	0	0	0
CANBERRA CITY	ACT	2601	5	2	1	0	0	0
CAPITAL HILL	ACT	2600	3	2		0	0	0
CASEY	ACT	2913	489	176	3	6	4	2
CHAPMAN	ACT	2611	413	150	5	26	20	6
CHARNWOOD	ACT	2615	413	140	9	9	9	0
CHIFLEY	ACT	2606	314	102	11	14	11	3
CHISHOLM	ACT	2905	867	292	4	39	33	6
CITY	ACT	2601	36	12	12	12	11	1
CONDER	ACT	2906	723	243	10	23	21	2
COOK	ACT	2614	515	188	16	35	31	4
COOMBS	ACT	2611	130	39	1	3	3	0
CRACE	ACT	2911	185	60	1	7	5	2
CURTIN	ACT	2605	714	221	6	30	24	6
DEAKIN	ACT	2600	581	191	10	21	19	2
DENMAN PROSPECT	ACT	2611	9	2		1	1	0
DICKSON	ACT	2602	245	88	10	5	5	0
DOWNER	ACT	2602	419	138	11	13	12	1
DUFFY	ACT	2611	430	158	7	20	16	4
DUNLOP	ACT	2615	1208	439	15	24	23	1
ERINDALE CENTRE	ACT	2903	3	1		0	0	0
EVATT	ACT	2617	798	279	9	27	26	1
FADDEN	ACT	2904	572	219	8	37	30	7

Suburb/Town	LGA	Postcode	Total number in AML database	Number selected at random and sent letter inviting participation in survey	Removals	Number of respondents who either reported code or reported hearing about survey via letter mailed to them	Number of respondents providing a survey code	Number who did not provide a survey code but indicate hearing about survey via a letter invitation Completed
FARRER	ACT	2607	466	164	7	14	11	3
FISHER	ACT	2611	455	156	9	14	13	1
FLOREY	ACT	2615	678	233	16	33	31	2
FLYNN	ACT	2615	485	171	4	31	26	5
FORDE	ACT	2914	189	72	1	1	1	0
FORREST	ACT	2603	262	95	21	10	7	3
FRANKLIN	ACT	2913	377	128	11	2	2	0
FRASER	ACT	2615	284	96	3	22	20	2
FYSHWICK	ACT	2609	67	20	10	0	0	0
GARRAN	ACT	2605	460	157	20	22	21	1
GILMORE	ACT	2905	430	147	2	16	13	3
GIRALANG	ACT	2617	390	124		15	14	1
GORDON	ACT	2906	1162	421	40	36	29	7
GOWRIE	ACT	2904	582	210	7	21	17	4
GREENWAY	ACT	2900	341	118	28	8	8	0
GRIFFITH	ACT	2603	773	271	72	25	22	3
GUNGAHLIN	ACT	2912	696	228	29	11	10	1
HACKETT	ACT	2602	329	114	6	19	16	3
HALL	ACT	2618	135	47	3	3	2	1
HARRISON	ACT	2914	622	218	5	14	12	2
HAWKER	ACT	2614	449	167	27	27	23	4
HIGGINS	ACT	2615	385	153	3	17	14	3
HOLDER	ACT	2611	419	152	5	19	17	2
HOLT	ACT	2615	797	275	33	36	31	5
HUGHES	ACT	2605	419	142	11	16	15	1
HUME	ACT	2620	16	7		0	0	0
ISAACS	ACT	2607	415	137	11	23	19	4
ISABELLA PLAINS	ACT	2905	674	220	3	19	16	3
JACKA	ACT	2914	22	5	2	0	0	0
KALEEN	ACT	2617	932	339	13	45	41	4
KAMBAH	ACT	2902	2063	700	45	73	60	13
KINGSTON	ACT	2604	611	216	82	17	14	3
KOWEN	ACT	2620	2	2		0	0	0
LATHAM	ACT	2615	474	166	4	21	19	2
LAWSON	ACT	2617	107	39		7	7	0
LYNEHAM	ACT	2602	691	224	32	30	25	5
LYONS	ACT	2606	437	145	18	8	8	0
MACARTHUR	ACT	2904	771	92	3	13	11	2
MACGREGOR	ACT	2615	265	263	5	24	23	1
MACQUARIE	ACT	2614	431	148	14	23	20	3
MAJURA	ACT	2609	10	4	1	0	0	0
MANUKA	ACT	2603	9	4	2	0	0	0
MAWSON	ACT	2607	475	165	36	25	22	3
MCKELLAR	ACT	2617	395	148	6	23	19	4
MELBA	ACT	2615	493	173	6	24	22	2
MITCHELL	ACT	2911	39	11	6	0	0	0
MONASH	ACT	2904	1010	356	39	32	26	0
MONCRIEFF	ACT	2914	137	53		2	2	0
NARRABUNDAH	ACT	2604	898	295	120	24	19	5
NGUNNAWAL	ACT	2913	1309	442	18	43	39	4

Suburb/Town	LGA	Postcode	Total number in AML database	Number selected at random and sent letter inviting participation in survey	Removals	Number of respondents who either reported code or reported hearing about survey via letter mailed to them	Number of respondents providing a survey code	Number who did not provide a survey code but indicate hearing about survey via a letter invitation Completed
NICHOLLS	ACT	2913	1190	429	13	43	32	11
OAKS ESTATE	ACT	2620	31	10		0	0	0
O'CONNOR	ACT	2602	606	214	18	28	27	1
O'MALLEY	ACT	2606	158	65	6	4	4	0
OXLEY	ACT	2903	232	85	6	14	11	3
PADDYS RIVER	ACT	2620		4	3	0	0	0
PAGE	ACT	2614	483	142	14	16	15	1
PALMERSTON	ACT	2913	743	272	20	29	24	5
PARKES	ACT	2600	9	3	2	0	0	0
PEARCE	ACT	2607	368	132	16	21	20	1
PHILLIP	ACT	2606	511	166	75	11	11	0
PIALLIGO	ACT	2609	19	5		2	2	0
RED HILL	ACT	2603	377	129	11	9	6	3
REID	ACT	2612	208	80	17	6	6	0
RICHARDSON	ACT	2905	505	178	4	13	13	0
RIVETT	ACT	2611	492	175	14	16	14	2
SCULLIN	ACT	2614	393	137	8	11	9	2
SPENCE	ACT	2615	372	135		17	13	4
STIRLING	ACT	2611	354	104	16	8	6	2
STROMLO	ACT	2611	9	1		0	0	0
SYMONSTON	ACT	2609		28	10	1	0	0
THARWA	ACT	2620		10		1	1	0
THEODORE	ACT	2905	589	217	16	12	12	0
THROSBY	ACT	2914	4	2		0	0	0
TIDBINBILLA	ACT	2620	1	1	1	0	0	0
TORRENS	ACT	2607	312	104	7	13	10	3
TUGGERANONG	ACT	2900	10	4	2	0	0	0
TURNER	ACT	2612	415	138	42	14	12	2
URIARRA VILLAGE	ACT	2611	22	17		2	2	0
WANNIASSA	ACT	2903	994	359	21	43	36	7
WARAMANGA	ACT	2611	359	130	7	21	17	4
WATSON	ACT	2602	587	217	24	25	24	1
WEETANGERA	ACT	2614	407	143	5	27	25	2
WESTON	ACT	2611	556	204	16	33	30	3
WODEN	ACT	2606	2	1		0	0	0
WRIGHT	ACT	2611	158	57	2	7	4	3
YARRALUMLA	ACT	2600	501	182	19	20	15	5
		2581	449	160	26	9	9	0
NSW sample by		2582	2,409	838	33	75	65	10
postcode.		2583	1,292	441	31	23	21	2
		2584	132	48	9	5	4	1
Postcode recruitment		2585	64	20	4	0	0	0
was used when selecting		2586	764	254	20	27	25	2
participants: these data		2620	6,250	2166	173	162	142	20
provide probability of		2621	1,083	378	13	33	30	3
selection.		2622	1,018	338	61	16	13	3
		2623	133	52	4	4	3	1

Suburb/Town	LGA	Postcode	Total number in AML database	Number selected at random and sent letter inviting participation in survey	Removals	Number of respondents who either reported code or reported hearing about survey via letter mailed to them	Number of respondents providing a survey code	Number who did not provide a survey code but indicate hearing about survey via a letter invitation Completed
The rows below identify the broad sample selected by LGA to give an indication of the relative population of NSW LGAs that were sampled, and the population.								
	Hilltops	2582, 2583, 2585, 2586, 2622	Not estimated as AML database not classified by LGA	292	29	27	25	2
	Queanbeyan					224	194	
	Palerang	2619, 2620, 2621, 2622, 2623, 2581		3279	264			30
	Snowy Monaro	2629, 2621, 2622		54	5	5	4	1
	Upper Lachlan	2581, 2583, 2582		578	57	35	32	3
NSW local government areas	Yass Valley	2581, 2582, 2583, 2584, 2611, 2618		1152	49	114	98	16
	Other[1]	2582, 2622		9	7	4	2	2

[1]Unintentionally sampled due to postcodes and some localities crossing local government area boundaries

Wave 1 – Flyer delivery

The locations to receive flyers were determined by identifying the postcodes of the study region. Postcodes were used as Australia Post books unaddressed mail such as flyer deliveries by postcode, rather than other geographies.

In Wave 1, the objective was to deliver flyers to all private address mailing points in the study region. A private address mailing point means any mail delivery point that is a private residence, and includes PO Boxes and those who collect mail directly from a post office, as well as letterboxes at individual residences. When sending flyers that are unaddressed, there is no ability to specify the member of the household who is being targeted: hence the flyers were sent to households, rather than individuals, and the probability of different individuals within a household viewing the flyer is not able to be estimated. What is known is that the large majority of ACT households have either two or one adult residents, with few having three or more adult residents.

A request was made to have flyers delivered to all mailing points, including mailboxes displaying 'no advertising material' signs (educational institutions are sometimes permitted to deliver unaddressed mail to these mailboxes, but this varies depending on interpretations of the legislation guiding the delivery of unaddressed mail. This request was not granted.

This means that the flyers were delivered to all private mailing addresses, with the exception of those displaying a 'no advertising material' sign. In total, this was 160,872 delivery points across the study region. The number of flyers delivered, and the number of respondents who reported they heard about the survey from a flyer, is provided in the table on the next page.

Delivery of unaddressed mail is not always completed to 100% of delivery points. Australia Post estimated that up to 5% of flyers would not be delivered as expected, due to issues such as poor access on the day to some letterboxes, or a deliverer running out of flyers on a postal run before reaching the end of that run. To further test whether flyers were received, an opportunistic sample of 35 the region's residents – based on those who worked at the University of Canberra and lived in different parts of the study region – were asked if they received a flyer in their letterbox. Of the 35, 10 had 'no advertising material signs' on their mailbox and were not eligible to receive a flyer. Of the remaining 35, 28 reported receiving a flyer (two reported receiving two flyers), while 7 did not. This represents 20% of potential recipients, rather than the 5% estimated by Australia Post. Australia Post were asked to investigate whether flyers were delivered on all postal runs, to ensure that if the number of delivery points was lower than expected this did not have specific forms of bias in the form of specific delivery 'runs' not delivering any flyers. Australia Post reported that flyers were delivered on all delivery runs, and believed the average under-delivery would be 5%.

Table A3.2 shows (i) the number of flyer delivery points Australia Post reports are available within each postcode using their online database, and (ii) the number of flyers reported delivered to those flyer delivery points in the delivery report provided by Australia Post. In some cases, the number of flyers delivered to a flyer delivery point reported was greater than the number of delivery points recorded in Australia Post's database. This can result when there are changes in the number of people who display 'no advertising material' signs.

Table A3.2 Flyer delivery points and responses

			Wave 1a		
Postcode	Number of flyer delivery points	Number of flyers delivered	Number of respondents heard about through flyer	Number of respondents heard about through flyer only	Number of respondents heard about through flyer and other means
0200	28	28	0	0	0
2581	938	955	2	1	1
2582	4912	4912	31	27	4
2583	1850	1826	4	2	2
2584	564	564	1	1	0
2585	11	11	0	0	0
2586	1199	1155	6	5	1
2600	2372	2372	12	11	1
2601	1978	1978	10	8	2
2602	8306	8306	113	104	9
2603	3141	3141	20	16	4
2604	4265	4265	22	18	4
2605	3428	3428	21	16	5
2606	3426	3426	23	23	0
2607	4056	4056	50	45	5
2608	210	210	0	0	0
2609	839	839	2	1	1
2610	17	17	0	0	0
2611	9130	9130	90	78	12
2612	4724	4724	26	24	2
2614	5471	5471	49	38	11
2615	13653	13653	95	81	14
2616	189	189	0	0	0
2617	9743	9743	91	81	10
2618	523	523	3	2	1
2619	2709	2709	9	8	1
2620	15163	15163	61	53	8
2621	2131	2131	6	5	1
2622	1676	1669	1	1	0
2623	260	260	1	1	0
2630	3564	3195	16	15	1
2900	1296	1296	8	7	1
2901	312	312	0	0	0
2902	4296	4296	42	40	2
2903	2784	2784	17	12	5
2904	3869	3869	49	44	5
2905	8404	8404	74	66	8
2906	5443	5443	34	31	3
2911	1502	1502	10	9	1
2912	2806	2806	20	19	1
2913	11475	11475	71	62	9
2914	8209	8209	71	69	2
2918	N/A	0	1	1	0

Appendix 4 – Statistical weighting method

Weighting is a strategy employed in various types of research to adjust data that is for one reason or another not representative of the population of interest. Very often this data is derived from surveys which typically cannot achieve perfectly distributed and representative responses. To correct for discrepancies between the sample and the population, and to generate estimates of population characteristics, statistical weights can be generated. Weights are a "multiplying factor applied to some or all of the respondents in a survey" (Sharot, 1986, p. 1) when data are analysed, which address bias in the sample and enable production of of estimates that are – as far as feasible – representative of the population being surveyed. Weights can be any positive number. Weights above one will increase the relative contribution of an individual response, whereas weights between 0 and 1 will reduce the contribution. For example, if 50% of a given adult population are aged 18-45, but only 30% of respondents to a survey of that population are aged 18-45, weighting will assign a value larger than one to each respondent aged 18 to 45, and less than one for older respondents, so that the findings represent a population in which 50% of the population is aged 18-45.

Weighting of survey responses is used in many surveys, including large household surveys conducted by national statistical agencies such as the Australian Bureau of Statistics (see for example ABS 2017), as well as in large sampling surveys conducted by both market research and non-market research organisations (Keeter et al. 2017).

While the goal of all weighting approaches is to increase the representativeness of the sample, the underlying reasons for the non-representativeness will affect the choice of method. Non-representativeness can be classified into three broad categories:

1. "When unequal probabilities of selection are an integral part of the sample design (the sample is deliberately designed to have variable sampling fractions, or disproportionate sampling, for example by using stratified random sampling).
2. When the design has equal probabilities, but the achieved sample is visibly 'unrepresentative' when compared with (say) the population age structure (post-stratification).
3. When non-probability sampling methods are used, and weighting is used to achieve a 'balanced' sample" (Sharot, 1986, p. 1).

All three types of non-representativeness are possible in the *Living well* survey sample, due to both intentional over-sampling of some groups (unequal probabilities of selection in sample design), responses being unrepresentative despite equal probability of selection in the design (for example, older and female residents being more likely to respond to mailed invitations send to randomly selected addresses), and use of non-probability sampling methods (such as social media advertising).

Typically, weights developed to correct for the first type of non-representativeness are termed 'design weights' (also called 'sample weighting adjustments') as they have been planned for as part of the sampling process. Weights developed to address the second and third types of non-representativeness are often termed post-hoc or non-response adjustment weights, and are designed to correct for biases identified after data collection is complete.

Many people generate survey weights using an iterative process in which design weights are first generated, followed by non-response weights. Others develop statistical weights in a single step process in which all types of bias – both planned and unplanned - after survey data are collected (Kalton and Flores-Cervantes 2003). In non-probability samples, weighting is typically undertaken as

a single step process as it is not possible to separate sampling bias from non-response bias (Vehovar et al. 2016). Where those properties are known, two-stage weighting similar to probability-based surveys is possible and has been demonstrated to be effective in addressing selection/non-response bias (Arcos et al. 2020). However, Arcos et al. (2020) also found that using two separate steps was not necessary and that it was possible to weight by calibration to a superpopulation model in a single step, rather than using a two-step process.

Single step weighting processes typically use model-based weighting, in which a model is developed that specifies the true characteristics of the population (usually using data from sources such as a Census of the population). This model is referred to as a 'superpopulation' as it specifies the characteristics of the population considered important for the survey sample to be consistent with in order to achieve meaningful estimates for the population. Weights are developed by comparing the distribution of specified characteristics in the sample compared to the superpopulation model, and using one of a range of statistical techniques to generate weights.

Common methods include cell weighting, raking/rim weighting, and GREG weighting. Weights for the *Living well* survey are generated using raking/rim weighting. Rim weighting (also called raking) is a weighting method that is used when 'interlaced' (cross-tabulated) benchmark data is not available to enable cell weighting, or when researchers want to weight by a larger number of variables than would be feasible with cell weighting (Sharot, 1986, p. 9) due to the very small numbers of respondents in some categories. This involves weighting the sample in an iterative way where the sample is adjusted to match each of the demographic benchmarks specified in the superpopulation model sequentially.

This method has a number of advantages and is preferred as it allows the weights to be calculated in a relatively simple and easily reproducible way, without being limited by the availability of cross-tabulated data for each weighting variables. Furthermore, raking minimises the "design effect" of the weights compared to other approaches ("Data Weighting – Raking vs. Post-Stratification Weights," 2018). It "operates only on the marginal distribution of the auxiliary variables" (Kalton & Flores-Cervantes, 2003, p. 86) (e.g. the variables we are using in our weighting method) and generates weights in an iterative way. For example, suppose we want to weight by two variables, age and gender. The sample is firstly weighted by one variable (e.g. age). It is then weighted by the second variable (e.g. gender) and a second set of weights are created. The first set of weights are multiplied by the second to create a final weight. This is slightly less prone to very high weights than adjustment cell weighting, although only to a small extent when an external benchmark data set is used according to Kaltan and Maligalig (1991), who also question whether raking/rim weighting has any meaningful differences to adjustment cell weighting in cases of having availability of an interlaced (cross-tabulated) external population benchmark dataset.

However, a number of specific raking algorithms have been developed that aim to iteratively optimise weighting using this method such that:

> "*The weighted sample will not be exactly balanced against any of the preceding variables, but the balance is (hopefully) better than prior to weighting. The whole process is then repeated, starting with the first variable, and continuing until either: (a) a satisfactory balance is achieved on all axes, (b) no further convergence can be obtained, (c) the number of iterations reaches a pre-set limit*" (Sharot, 1986, p. 9).

Essentially, raking is an iterative version of cell weighting in which the sample is iteratively weighted by one variable at a time, with the sum totals checked at each step and adjusted until 'convergence'

is reached, interpreted as meaning the sum of the sample is the same as the sum of people in the population or the sum of the people who completed the survey.

See Kalton and Flores-Cervantes (2003) and Baxter (2016) for a review of different approaches to raking/rim weighting: beyond the simple approach described here, weight capping (similar to winsorisation) can be used at each step of weighting in raking/rim weighting to reduce the increase in sample error resulting from weighting; Baxter (2016) argues instead of using weight capping a process of asymmetric rim weighting should be used. Raking and rim weighting are sometimes considered better for situations with small sample sizes in individual cells, and some advocate use of a mixed-method approach in which cell weighting is used where sample sizes are sufficiently large, and raking for small sample size cells (Kalton and Flores-Cervantes 2003).

In general, raking/rim weighting can reduce risk of large outlier weights that can result from cell weighting, still has the same assumption that data are missing at random, and increases sampling error, with the overall argument being that the reduction in bias should be greater than the increase in sampling error (Baxter 2016). It is arguably able to be used with smaller cell sizes, with some recommending a minimum sample size of as little as 10 people for each category within variables used to iteratively weight the sample (Kulas et al. 2018).

The ability of weights to make a sample representative is, irrespective of the specific method used, always dependent on the variables used to construct the weights. For weights to be effective the variables must be correlated with (non-)response. Demographic variables such as age and gender typically address some of the bias, but there may be other important variables that will need to be included in the weighting procedure for estimates to be reliable. There must also be a robust benchmark data set available that can be used to assess response biases: this is often challenging, as even national census have some bias in responses and under- and over-represent some groups. Thus even with use of weights, a lack of accuracy in benchmark datasets, or lack of availability of benchmarks, can reduce effectiveness (Keeter et al. 2017).

Mercer et al. (2018a,b) compared different weighting methods and concluded that choice of weighting methodology was less important than ensuring optimal choice of variables used to weight the dataset – for example, should weighting be based on adjusting the survey sample so it is representative of gender and age of respondents, or of gender, age and educational attainment, or of gender and geographic location of residence? These decisions create large variance in the weights assigned. If too many variables are used in weighting, sampling error can increase substantially due to small cell sizes for some aspects of weighting; too few may miss important sources of bias in the dataset. Overall, Benford et al. (2009) recommend focusing on selecting the fewest possible variables that represent the greatest amount of bias in order to maximise efficiency of the weighting while reducing risk of substantial increase in sampling error by unnecessarily weighting using variables that are not as relevant.

In reality, the choice of variables also depends on availability of suitable benchmark data. Thus the decision becomes what available benchmark variables are suitable to use for weighting a dataset.

It is important to recognise that no approach to weighting should be expected to fully remove sample bias. To achieve this would require perfect external benchmark data that corresponds to 100% of the factors associated with sample bias – which is not realistic. Thus all survey data that use weights will have some remaining bias, although the extent of remaining bias is debated, with some arguing that it is difficult to remove more than 30-40% of bias (e.g. Mercer et al. 2018b) and others finding that up to two-thirds to three-quarters of bias can be removed (see Benford et al. 2009).

Appendix 5 – Evolving survey methods

As noted in the main body of the text, the methods used to conduct surveys are changing rapidly worldwide, as are some of the opportunities and challenges occurring when seeking to achieve a robust sample via a survey. This appendix provides background information on some of these changes, which supports the decisions made to use the following approaches in the *Living well* survey:

- Use of multiple survey recruitment techniques, rather than relying on a single recruitment method
- Inclusion of non-probabilistic survey recruitment methods to assist in reaching groups known to be under-represented if relying solely on available options for probabilistic recruitment techniques
- Use of a survey prize draw incentive
- Use of single step superpopulation-based weighting of a blended sample recruited using more than one survey recruitment method
- Making survey available to complete both online and via a paper form.

Declining survey response rates and concern about survey nonresponse bias

The first potential challenge to be considered when designing the *Living well* survey was that of declining survey response rates. Willingness to participate in surveys has declined rapidly worldwide in recent decades, for all types of survey including phone and mail (Connelly et al. 2003, Keeter et al. 2017, Pickett et al. 2018). For example, Gallup – one of the most prominent polling firms worldwide – have reported rapidly declining response rates to key surveys such as the Gallup Poll Social Series: response rates to this phone survey fell from an average 28% response rate in 1997 to 7% in 2017 (Marken 2018). Keeter et al. (2017) identified that Pew Research Center phone survey response rates declined from 36% in 1997 to 9% in 2016. There are many reasons for this decline, including growing concerns about privacy and confidentiality, and survey fatigue associated with 'the growing number of unsolicited requests from the survey and the marketing industry' (Arcos et al. 2020).

The decline in response rates appears to have been particularly marked for phone surveys, high for mail surveys, and less strong for face-to-face surveys, according to a review by Czajka and Beyler (2016). However, even though some survey modes may have experienced a less steep decline in survey response rates, declining response rates are a significant challenge for all types of surveys:

> Household sample surveys depend upon their ability to reach and engage the individuals they select as potential respondents. The viability of such surveys is being challenged by declining response rates and related developments that affect not only the quantity but the quality of the information collected. (Czajka and Beyler 2016, p. vii)

Does this decline in survey response rates present a threat to quality of survey data, and ability to rely on findings? Traditionally, advice on conducting best practice surveys has recommended that survey researchers should seek to achieve as high a response rate as possible, with many textbooks making claims about the levels of response needed to have a 'quality' survey and often setting benchmarks such as 60% or 70% that are rarely, if ever, achieved in surveys in the 2020s (Picket et al. 2018). This advice is based on the common assumption that higher response rates reduce overall bias in survey response. Based on this assumption, many have expressed concern that declining response rates may increase non-response bias in surveys (Hendra and Hill 2018, Picket et al. 2018), meaning bias that occurs 'when the kinds of people who are contacted and who agree to participate

in a survey are systematically different from those who can't be contacted or who refuse to participate' (Keeter et al. 2017 p. 5).

However, despite high response rates commonly being recommended as a way of ensuring survey quality, multiple studies have found that in reality, there is often little to no association between response rates and non-response bias (Czajka and Beyler 2016, Keeter et al. 2017, Hendra and Hill 2018, Marken 2018). In a review of multiple studies examining response bias, Czajka and Beyler (2016) concluded that the evidence suggested that large non-response bias can occur in almost any survey irrespective of response rate. The growing number of studies showing limited association between response rates and bias has led to:

> … a consensus that survey nonresponse rates do not immediately cause bias in the sample but that specific features of the population, the sample, or the survey design will lead to bias being more evident. (Nield and Nordstrom 2016)

In other words, low response rates on their own are not the cause of non-response bias, however they may exacerbate the many other factors that do cause non-response bias. If these factors are present, then lower response rates may increase total size of bias in response, while not being the ultimate 'cause' of this bias. If factors likely to cause bias are not present, then responses will be representative, even if the response rate is low. Connelly et al. (2003) noted that the risk of bias depends on factors such as the homogeneity of the target population being surveyed and their willingness to respond to the survey, and particularly whether these things vary together with the things a survey is measuring. More formally:

> …bias in a variable's mean comes from the probability that an individual will respond and how that probability is correlated with the variable of interest. … a higher response rate could actually lead to higher mean biases in cases where the variable is highly correlated with the individual's probability of responding to the survey.' (Nield and Norstom 2016 p. 3, citing Groves 2006)

Studies into response rates and quality of survey data have found that in some cases, high response rates are associated with *poorer* quality data rather than the higher quality some would expect (e.g. Hendra and Hill 2018):

> Efforts to add respondents in order to increase response rates may not reduce bias and could actually increase it, depending on whether the additional respondents are more representative or less representative of sample members who are underrepresented among the existing respondents. There is also evidence that reluctant respondents may provide data of lower quality than respondents who participated more willingly. (Czajka and Beyler 2016, p. ix)

The growing agreement that response rates are not in and of themselves a particularly useful indicator of survey quality or of non-response bias has led to discussion of what criteria should be used to indicate quality. Instead of relying on response rates as a measure of quality, the sources of bias that a low response rate may amplify should be examined. These may include things such as the likelihood of bias being introduced as a result of the sampling frames or survey recruitment methods used, and design features of the survey such as the types of incentives provided and survey design.

A key risk for non-response bias relates to survey 'salience'. Put simply, people are more likely to participate in a survey if they are interested in the topic of the survey. For example, the Pew Research Center found that telephone polls examining social engagement and political views are biased to those who are more socially involved and engaged in political activity, and can readily under-represent the views of those who are less engaged in community and political activities (Keeter et al. 2017).

A method sometimes used to reduce salience bias and increase response rates is providing survey incentives such as a small payment to complete a survey or a prize draw (Schirmer 2009). Provision of incentives has been shown in some studies to improve sample quality, and in many to increase numbers of responses. While findings regarding effects on sample quality are mixed, most have found either no effect on response bias, or a positive effect, and there is little evidence that prize incentives reduce the quality of survey responses (see Singer and Ye 2013 for a review of studies). A prize draw is offered in the *Living well* survey based on the evidence that this may reduce some forms of salience bias and is unlikely to have a negative effect on response quality.

The *Living well* survey is by design an omnibus survey that is promoted as asking about liveability, wellbeing and how people find living in the ACT region. This type of broad focus is not associated with known salience bias, however in initial waves of the survey, higher response from older and female residents, as well as those with higher educational attainment, suggests this topic may hold more salience for these groups compared to others.

Other methods used to improve quality of survey samples include use of responsive survey design (in which participants are only asked questions relevant to them), providing multiple survey mode options (such as the option of completing by mail, online or by phone), and two-phase sampling (a short survey followed by another subsequent phase) (Czajka and Beyler 2016). In the *Living well* survey, both responsive survey design, and multiple survey mode options are used. A modified version of two phase sampling was trialled in Wave 3 and 4 in which participants were given the option to complete a shorter or longer survey after having completed the first part of the survey.

Overall, while declining response rates are a challenge, the 'crisis' sometimes claimed in relation to declining survey response rates is 'both real and imagined' (Pickett et al. 2018, p.7). Rather than assuming higher survey response rates will automatically increase quality of responses, it is more important to critically examine sources of non-response and sample bias *irrespective of response rate*. It is useful to increase response rates, particularly to ensure cost-effectiveness of efforts to conduct surveys – but when doing so, it is important to work to grow responses in ways that either (i) do not increase bias or (ii) that can track bias to enable this bias to be subsequently addressed using methods such as statistical weighting. Resources should only be directed to increasing response rates if this is the best way to achieve quality survey responses and minimise bias. In some cases, expanding the size of the sample sent an invitation to participate in a survey may be more appropriate than attempting to raise response rates amongst a smaller sample.

While declining response rates may not be as significant an issue for surveys as they initially appear to be, they do have two important implications beyond highlighting the importance of evaluating likely sources of response bias in surveys. First, lower response rates often result in significantly increased cost of data collection. Second, the finding that response rate is not a highly effective indicator of representativeness of a sample highlights the need to identify appropriate indicators – and the opportunity to develop indicators that are as applicable to non-probability as probability-based surveys (discussed further subsequently in this chapter).

While low survey response rates will not necessarily increase bias or have implications for quality, they do have the significant disadvantage that they result in higher costs per survey response. The cost of achieving a given sample size has increased substantially for many surveys due to declining response rates, as it requires contacting many more people than used to be required to achieve a given number of responses. The resulting increase in cost is often significant (Jager et al. 2017, Buelens et al. 2018, Andridge et al. 2019, Arcos et al. 2020). This increased cost can reduce ability to

conduct regular surveys, or to achieve large samples in any given survey, and suggests a need to examine alternative, cost effective approaches to recruiting survey participants.

Many of the most cost-effective methods of achieving a survey sample use non-probability sampling approaches. Non-probability sampling is often dismissed based on the assumption that samples achieved using non-probabilistic approaches will achieve more biased samples than probability-based sampling. However, the finding that declining response rates can exacerbate sources of non-response bias in probability surveys has led some to call for reconsideration of non-probabilistic survey methods as potentially important ways of achieving robust survey samples. For example, Czajka and Beyler (2016) argued that declining response rates effectively reduce the likelihood of a difference in inherent quality of samples achieved using probability versus non-probability sampling:

> Declining response rates encourage consideration of alternatives to reliance on probability surveys … Strategies that have been suggested include making greater use of administrative records, learning how to extract useful information from "big data," and developing better ways to use the data obtained from nonprobability samples. (p. x).

The growing focus on understanding bias in survey responses irrespective of response rates has led to a shift in how response bias is examined for both probability and non-probability based samples – increasing opportunity to better use both types of sampling to achieve a robust survey sample. Whereas probability-based surveys traditionally assessed quality of responses by examining survey response rate (the proportion of people from a sample frame who responded to an invitation to complete a survey), as noted earlier this is a poor indicator of response quality. Better insight can be achieved by comparing responses to known benchmark characteristics of the target population to identify the nature and extent of biases in a given survey sample (these benchmark characteristics are developed into what is called a 'superpopulation' model). This type of benchmark analysis is now routinely done as part of many surveys, both probability and non-probability based (Keeter et al. 2017). It is particularly useful as, by acknowledging and identifying bias, it is possible to use statistical weighting (discussed subsequently in this chapter) to correct for identified response biases. While statistical weighting is not a 'cure-all' for survey response bias, in many circumstances it can be used to significantly reduce the effect of known biases in survey samples.

Changing availability of sampling frames

When designing a survey methodology, the first steps are often identifying the target population being studied, and then identifying how best to sample from this population – whether via a sample frame, or another method. The use of sample frames is most commonly associated with probability-based sampling approaches. Probability-based surveys involve sampling from a frame in such a way that it is possible to identify the probability that a person was selected to participate in the survey. Usually, this involves randomised sampling. Probability based sampling relies on having access to a sample frame that has good coverage of a survey's target population. It is therefore important to consider how the coverage and availability of sampling frames is changing. A sample frame is a set of information containing contact information about a particular target population – for example, the postal addresses of households, or phone numbers, or emails. By identifying the number of people to be surveyed from that sample frame, and randomly selecting those who will be surveyed from the sample frame (with or without stratification into specific groups), it is possible to identify the probability that any individual person (or household or business, etc) had of being selected to participate in the survey (hence the term 'probability-based' sampling).

Sample frames are typically an imperfect representation of the 'target population'. The White Pages – once a reasonably comprehensive compilation of Australian private household addresses – by

2013 included under half of Australian households. In recent decades, the coverage of many sample frames has declined, meaning that they typically include a smaller proportion of the target population than used to be the case. For example, two decades ago, sampling frames such as the White Pages included phone numbers and postal addresses for 80% to 90% of Australia's households, and commercial survey sampling frames could achieve good coverage of the population using databases of landline phone numbers. In the past two decades, the emergence of mobile phones means that phones are now typically linked to individuals rather than households, while use of landlines has declined substantially: as of 2019, while 95.9% of Australians used a mobile phone, and 83.5% had access to internet at home, only 48.6% lived in households that had a landline – down from over 96% having a landline as recently as 2001 (Roy Morgan 2019). This means that traditional phone survey databases, focused on landlines, have reasonably limited coverage of households, and quite biased coverage of households, as households with older residents are more likely to have landlines, while younger people are very unlikely to have a landline (Keeter et al. 2017). At the same time, listings in the White Pages have declined to a small percentage of households.

Even databases such as the Australian Electoral Roll are in reality an imperfect sample frame, as the electoral roll excludes those who are ineligible to vote (including the many adults living in Australia who are not Australian citizens), as well as those who have not enrolled to vote despite being eligible to, or who have changed address without updating their details on the electoral roll. As noted in the main body of the User Guide, the Electoral Roll at best has coverage of approximately 80% to 85% of ACT adults after accounting for those who are excluded as they are not Australian citizens (12.2% of adult ACT residents as of 2016[2]), and lower representation of younger people and those who have shifted to the ACT in recent years (as of 2016, 16.6% of ACT adults reported they lived outside the Australian Capital Territory 12 months prior to the Census[1]; while some of these will have updated electoral roll details, many will not have). Several commercial postal databases are available that include a large number of ACT residential addresses, but these at best have less than 50% coverage of households in the ACT.

Commercial databases of phone numbers (mobile and/or landline) and postal addresses can be purchased, and as of 2019 had largely replaced use of the White Pages as sampling frames in Australia. However, these rarely have very high coverage of Australian households and, as households can opt out of these databases, there will typically be bias in their coverage. In many cases, sampling from listed phone numbers (mobile plus landline) cannot achieve suitable coverage of the population. To address this, many surveys recruit participants using random-digit dialling (RDD) – meaning dialling randomly generated mobile phone numbers that fall with the range of known issued phone numbers across Australia.

While the use of RDD means it is theoretically possible to reach all phone users (landline and mobile), and data collected for research purposes is typically exempt from 'do not call' registers, there is growing use of apps that block unwanted phone calls (Marken 2018). This means that, similar to other modes of research, RDD does not provide an unbiased sample frame from which to select a sample, as the use of blocking apps takes some users out of the sample frame.

[2] Data source: ABS 2026 *Census of Population and Housing* data, sourced from TableBuilderPro, examining ACT residents by Australian citizenship and place of residence one year prior to the Census.

While random digit dialling and phone databases can have higher population coverage, the high cost of these methods to achieve sufficient data from a large enough sample meant they were not feasible for the *Living well* survey.

When a sample frame is an imperfect representation of the target population, there is potential for bias when selecting a random sample from the sample frame. However, it is important to note that the presence of bias does not mean a frame cannot be used: if a sample frame has overall good coverage of the target population then, even if not perfect, it is likely to be suitable for use. However, consideration is needed of whether use of a single sampling frame will be sufficient to achieve the sample desired for a survey, or whether a blended sampling approach is needed. Blended sampling involves sampling from either multiple sampling frames, or combining sampling from frames with non-probabilistic sampling methods.

Sample frames remain key to recruiting participants in many surveys, despite the arguably growing potential for any given sample frame to be systematically different to the target population as its coverage of the population declines (Mercer et al. 2017). It is important to note that a decline in coverage does not automatically result in growing bias – instead, it results in increased *risk* of bias.

The risk of bias in sampling frames does not mean they should not be used. Instead, it means that researchers need to identify how to address that bias – either at the sampling stage, and/or through use of statistical weighting after obtaining a sample.

Perhaps the most common method used to reduce risk of bias in a sample obtained using a biased sample frame is stratified random sampling – specifying the size of sample to be invited from a number of groups which have differing representation in a sample frame. For example, a researcher may identify that a population is made up of equal proportions of people aged under 40 and aged 40 and older, but that the people included in a given sample frame are biased such that 30% of the sample frame is aged under 40, and 70% are aged 40 and older. The potential for bias when sampling from this frame can be addressed through stratifying the sample by age. The survey sampling may specify that 50% of a sample of 2,000 people to be invited to complete the survey will be randomly selected from those aged under 40, and the other 50% from those aged 40 and over, in the sample frame. This stratification results in a final sample that properly represents the different ages in the actual population.

However, in many cases stratified random sampling is unlikely to fully address bias in responses. In reality, most surveys will have some bias in responses, even if the group of people invited to participate in the survey was perfectly representative of the population being studied. This is because some of those invited to participate will be more likely to participate than others. Given this, it is common to use statistical weighting to correct for biases in samples achieved from any survey. When sampling has been undertaken using stratified probability sampling, this can be done by using weights to adjust for the different probabilities of sampling relative to distribution of sampling characteristics in the population being sampled. In addition, however, it is common to find that additional post-hoc weighting is needed, which corrects for biases identified in the resulting sample that have resulted from non-response bias. These differences are often identified by comparing the characteristics of the sample to the known characteristics of the population using available data sources. The known characteristics of the population are used to construct a 'superpopulation' model that specifies what characteristics an ideal sample would have; the characteristics of the actual sample can then be compared to this. This model-based approach does

not rely on the use of probability sampling, and can be used with samples achieved using non-probabilistic sampling methods.

Non-probability sampling – can it produce robust findings?

Increasingly, many surveys recruit participants using non-probabilistic methods. 'Non-probability' surveys recruit survey participants in ways that do not enable calculation of the probability that a member of a given population or sample frame was selected to participate in the survey.

Many assume that use of non-probability sampling equates to 'convenience sampling' – recruiting survey participants using any convenient method with little structure or design involved in the sampling methodology. In reality non-probability sampling can use many different recruitment methods, and some are much more likely to result in a robust survey sample than others. For example, sampling from a database of contacts until different quotas are met is an example of non-probability sampling which can, if designed well, achieve a robust sample.

Examples of non-probability sampling approaches include 'river sampling' in which an ad is placed on a website that 'hooks' some people who see the ad as they are travelling through the 'river' of the internet, purposive sampling (researchers specify type of sample required based on specific criteria), expert selection (experts picked who should be sampled based on their knowledge), case studies (many or all people in a given part of the target population are sampled as a case study), location sampling (recruiting at locations where the target population is likely to be present e.g. in a shopping centre, via ads on a website this population frequents), and volunteer sampling (general invitations to participate are provided in non-individualised form e.g. flyers, posters, media), amongst others (Tyrer and Heyman 2016, Vehovar et al. 2016). These will result in samples of varying quality depending on the population being sampled, their interest in the topic of the survey, and how the sampling methods (particularly the approach to recruiting survey participants) are designed.

The view that probability-based surveys are the only meaningful way of sampling robustly became widespread from the 1930s, as part of a long history of debate about how best to build knowledge about a population using sampling. Until the 1800s, collecting data from an entire population was widely viewed as the only way to understand a population. The development of sampling theory, arguably building from Anders Kiaer's 1880s proposal of a representative method for sampling from a population using purposive sampling, represented what Bethlehem (2009) describes as one of Kuhn's 'intellectually violent revolutions', in that it reshaped ideas about how it was possible to understand a population. The idea of sampling is that it is possible to make inferences about a population using data drawn only from a part of that population, if the sample is appropriately designed.

Early approaches to using 'designed based inference' (meaning the use of specifically designed sampling) rather than census approaches to understanding a population used non-probabilistic approaches, most alike to purposive and quota sampling. The idea of probabilistic selection as a way of achieving a representative sample developed in the early 1900s and until the 1930s existed alongside non-probabilistic methods (Bethlehem 2009; Brewer 2013). In 1947, the United Nations Statistical Commission issued guidelines for statistical sampling that advocated for the use of probability sampling and highlighted that purposive and quota sampling were not equivalent to random selection. By 1950 what is now considered the classical theory of random sampling was 'more or less completed' (Bethlehem 2009, p. 16). However, while probability sampling was dominant in statistical sampling through the 1950s to 1980s in social and economic research as the

'gold standard', in market research there was continued development of use of non-probabilistic methods, particularly the use of quota sampling and model-based weighting (Bethlehem 2009).

As early as the 1950s, concerns were raised that relying solely on probability-based sampling using randomised selection – or on design-based inference more generally, in which the design of sampling was considered the main or in some cases only step to achieving a representative sample of the population - was not the panacea some were promoting it to be. Godambe challenged this 'model free' orthodoxy, publishing a proof he argued showed that a uniformly best randomization-based estimator of a population mean did not exist. He argued that design-based inference methods were not sufficient to create bias-free inference to a given population, and that it was necessary to minimize sampling variance from the population by using a superpopulation model (Bethlehem 2009; Brewer 2013). Model-based inference is based on the idea that inference about a population can be made through adjusting a survey sample so that its characteristics match a model that specifies the distribution of important characteristics of the population.

From the 1980s onwards, three broad approaches to inferring from a survey to a population have been used in survey research, with ongoing debate about which is most appropriate and when. First, many continue to argue for reliance on design-based inference using probability sampling alone. In this approach, statistical inference to the population is based entirely on the sampling design, and the probability of selection into the sample determines the weighting given to make population inference. However, it is widely recognised that this approach has problems when non-sampling error occurs such as response bias (Chambers 2011). Given this, many use a second approach: model-assisted inference, in which inference to a population is made by combining both design-based inference and subsequent model-based adjustment that seeks to address issues such as non-response bias. Finally, there is growing use of model-based inference using superpopulations. In this approach, model-based inference is used without examining the probability of selection into a survey sample. This third approach still enables use of probabilistic sampling, but can also be used to make inference from blended sampled collected using multiple sampling techniques, including probability and non-probabilistic approaches (Chambers 2011).

Model-based inference can be used both to select a sample - by designing sampling to match a pre-determined hypothetical population that has the desired characteristics - and to guide subsequent correction of bias in achieved samples using statistical weighting. Model-based inference focuses on identifying how the sample relates to the 'superpopulation' – simply put, the hypothetical target population (Smith and Dawber 2019). This can be as simple as sample matching, where data from a benchmark population – such as data from a national Census – are compared to data from the sample, with respondents sampled until they match the composition of the target population identified using Census data.

The use of model-based weighting enables design of specific methods to address known risks of bias in recruitment of survey samples. For example, propensity score matching is used in treatment/control studies and increasingly applied to weighting nonprobability samples, and involves identifying the conditional probability of a person being selected based on a set of benchmark data and known rates of incidence of key confounding characteristics or behaviours (for example, a person with a particular health condition may be known to visit the supermarket only 1/3 as often as a person who is healthy, and the sampling can be corrected to address this known difference in behaviour). Quota sampling can be used to achieve a representative sample in sample matching or propensity matching, or more broadly to set quotas for sampling until the sample

reaches benchmarks for participation based on the superpopulation, or the modelled characteristics of the target population to be surveyed (Smith and Dawber 2019).

Those who use model-based inference often face criticism of their approach from others. Some of these criticisms result from the application of standards developed to assess design-based inference, particularly probability based statistical inference theory, to model-based inference approaches (Baker et al. 2013, Buelens et al. 2018). By definition, model-based weighting does not meet the criteria set by theories focused on design-based inference, which are based on the idea of achieving quality of survey data through design of sampling. Model-based inference can, of course, be done well and poorly – when done poorly, it may involve collecting data from an extreme sample that is biased in ways that cannot be addressed using the population characteristics incorporated in the model that is used to produce statistical weights. When done well – with a sample that is of suitable quality to support model-based weighting – it can produce relevant and robust data (Chambers 2011).

This again returns to the central importance of assessing the quality of data collected using any sampling method. However, quality needs to be assessed in ways appropriate to the type of sampling and inference approach being used. Those using probability-based statistical inference need to ensure the data were collected in ways enabling estimation of probability of selection. Those who use broader designed based inference need to assess the quality of the sample, likely biases, and whether there is sufficient sample of all groups to support model-based inference.

Both probability- and non-probability surveys face the challenge that there is no perfect way to sample randomly from most large populations. Both also vary dramatically in quality depending on either the quality of the sample frame used (probability surveys) or the quality of the sampling method used to achieve sufficient sample of the target population (non-probability surveys). This means that rather than ask 'can non-probability surveys achieve robust findings', a better question is 'what design considerations need to be implemented for any survey (whether using probability or non-probability sampling) to collect data that is suitably robust to enable use of model-based inference'. This question should be asked of surveys using any type of sampling method, including online, face to face, mail and phone surveys, and those selecting a sample from a sample frame versus recruiting the sample in other ways. In other words, those conducting any survey need to carefully consider how to reach their target population, and identify the likely biases resulting from the use of different approaches to recruiting survey participants, whether they are probability or non-probability based.

In reality, many probability surveys are subject to similar types of selection bias that are the basis for concerns about quality of non-probability survey methods. Because of this, some argue that many surveys claiming to be probability based are in fact best treated as non-probability sampling - particularly if some parts of the target population are omitted or are sampled at levels too small to enable robust weighting of responses, or if there are overall very low response rates from some parts of the population (Vehovar et al. 2016). Conversely, some argue that non-probability sampling methods that achieve good coverage of all parts of the target population 'can turn to probability samples, particularly in case of volunteer samples (e.g. mail-in, web self-selection)' (Vehovar et al. 2016 p. 328). Both probability and non-probability based survey recruitment need to identify methods to address the risk of poor survey quality due to selection bias (those who are invited to participate not being representative of the target population) and response bias (those who opt to respond being systematically different to those who do not respond).

In recent years, a number of studies have examined how best to reduce risk of selection and response bias, as well as how to assess the quality of a study without relying solely on statistical inference theory that assumes sampling randomly with a known probability of selection into the sample will automatically eliminate most bias. Most studies evaluating non-probability surveys have used methods developed specifically to measure the quality of probability-based surveys. Mercer et al. (2017) argue that this leads to inappropriate conclusions. They developed a different approach to examining the quality of surveys that, rather than focusing on how the sample is recruited or response rates – both issues shown to have limited validity in many circumstances – uses principles developed in fields that seek to make causal inferences but often have to deal with observational, non-randomised data when doing so, such as epidemiology, political science and economics. They argue for use of a general framework 'that emphasizes the characteristics of the realized sample, regardless of how it was generated' (p. 251). This means that rather than evaluate a survey based on the methods by which participants were recruited into the survey and the success of that recruitment, survey quality should be assessed based on the characteristics of the resulting sample and whether it has the basic characteristics needed to address any identified biases in the sample when compared to the target population. Specifically, they propose that three aspects be assessed when determining whether the survey sample could 'lead to biased results:

- Exchangeability – Are all confounding variables known and measured for all sampling units?
- Positivity – does the sample include all of the necessary kinds of units in the target population, or are certain groups with distinct characteristics missing?
- Composition – does the sample distribution match the target population with respect to the confounding variables, or can it be adjusted to match?' (Mercer et al. 2017 p. 252)

Baker et al. (2013) also emphasised the importance of being able to adjust samples to match the target population, which in turn means it is critical to have clear theory driving how and why participants in a survey are selected, and that multiple theories can inform design of non-probability sampling, whereas probability sampling relies on a single theory (probability based sampling). They recommend the use of pseudo-designed-based inference (applying design-based methods in the absence of a probability based sample design), based on recognition that design based inference (ensuring survey recruitment methods are designed to maximise likelihood of a representative response) can still form part of non-probability approaches to survey samples (Buelens et al. 2018).

Vehovar et al. (2016) suggest that improving quality of any sample can be achieved through ensuring non-probability samples are 'spread as broadly as possible' – in other words, using methods that ensure all parts of the target population are reached and a sufficient sample achieved from each key part of the population; incorporating some probability sampling design principles where possible, such as clearly incorporating elements of randomization where possible in selection; and ensuring as equal a probability of being invited to participate in the study as possible.

In the *Living well* survey sample quality is addressed using both design-based inference and model-based inference. Design-based inference involves using probabilistic sampling where feasible and using pseudo-design-based inference approaches where non-probability sampling need to be used to reach population groups that are under-represented in sample frames. Each sampling method is designed using the principle of pseudo-design-based inference, with selection being as random as possible within the constraints of the sampling method (or probability based where a sample frame is available). Model-based inference is then used, with a superpopulation model developed and used to generate statistical weights that enabled inference to the population.

Challenges and opportunities of online surveys

The *Living well* survey collects data via both online and paper-based surveys, with participants able to choose to either complete surveys online or using a paper form. The large majority of survey participants complete the survey online. Given this, it is useful to briefly review the challenges and opportunities involved in collecting data online, and the distinction between use of an online survey platform (as is used in the *Living well* survey) and recruiting participants via online survey panels (which as of Wave 6 had not been done due to lack of sufficient sample living in the study region in available online survey panels).

Over the last few decades, the growth of the internet and associated ability to conduct online surveys has provided a way of conducting surveys at lower cost than phone, mail or face to face surveys. Online surveys have been used since the late 1990s as a survey method, and their use has grown rapidly, due in large part to their lower costs and ability to rapidly collect data compared to other methods (Callegaro et al. 2014, Blom et al. 2016). The growing use of online surveys has also been a response to the 'increasing difficulties that traditional modes, such as face to face or telephone interviews, are facing to obtain samples that achieve the highest quality standards' (Arcos et al. 2020).

This rapid growth and the growing cost and reducing efficacy of other survey methods mean that 'there are compelling reasons to expect that internet interviewing will become the dominant survey mode in the social sciences over the next few decades, largely replacing written, face-to-face, and telephone interviewing' (Blom et al. 2016 p. 9). While initially online surveys were inherently biased due to only a small proportion of the population having internet access of suitable capacity and speed to successfully complete a survey, the rapid adoption of high speed broadband and devices that can readily be used to participate in online surveys – including smart phones, tablets and computers – has changed this. As noted earlier, a much larger proportion of Australians now have access to internet at home than have a landline in their home.

While the risk of bias resulting from inability to access an online survey is reducing, it does remain. Not all households have access to the internet, and not all people have the ability to access and complete a survey online; in particular, internet speed and reliability remains poor in some communities in Australia. The simplest way to address technology-related bias is to ensure the survey can be completed on paper as well as online, and that not all survey recruitment methods rely on a person being online. Given this, the *Living well* survey is available both online and in paper form, and survey recruitment methods include both methods that relied on a person having good internet access (email and social media recruitment) and others that reached people who do not spend significant time online (mailed invitations to participate and, in Waves 1 and 2, unaddressed flyers delivered to letterboxes).

Worldwide, multiple large online survey panels have been established since the 1990s. As of January 2023, online survey panels had not been used to recruit participants for the *Living well* survey due to a lack of sufficient members of panels living in the study region to use this method. However, in future this may change, and as such it is useful to briefly review online survey panels and their potential for use.

An online survey panel is simply a group of people – often numbering in the thousands – who have volunteered to complete surveys online, usually in return for earning points that can be redeemed for rewards such as gift cards. These panels are not necessarily representative of the broader population, as the types of people who volunteer to be part of online panels will vary depending on

how the panel recruited its participants. Online survey panels are not in and of themselves a sampling method: instead, they are large groups of people who can be sampled using a range of methods, such as quota sampling. For example, a researcher may use data from a population census to identify the proportion of men, women and people of different ages in their target population, and require that the sample targeted from the online survey panel be representative of the population by those groups. This type of approach to sampling from an online survey panel is intended to address the likely bias in coverage of the target population by the online survey panel. These online panels are widely used to recruit participants for online surveys due to their low cost and rapid availability – survey participants can be recruited with low cost emails that take little time to send and do not incur phone or mailing costs (Blom et al. 2016). A key debate has been whether the large numbers of 'online survey panels' (online panels) developed by a range of research companies can produce robust data if sampled from appropriately.

A key issue with online panels is that they have recruited their participants in a wide range of ways. Many have simply advertised online, inviting people to become members of their panel through methods such as banner ads on websites, with all or almost all of those who sign up for the panel being accepted; many also use methods such as snowball sampling (providing incentives for existing members to recruit additional members) (Callegaro et al. 2014, Blom et al. 2016). Online panels are by nature 'opt in', meaning people volunteer to join them, and hence will be biased towards those who have more interest in completing surveys (Walter et al. 2019).

While methods of recruiting online panel members vary, in almost all cases members have been recruited using non-probability methods, and thus the panel (sample frame) will not be representative of the general population. For example, studies in the United States have identified that members of online panels are 'more diverse, younger, more educated, but more poorly paid than the general US population' (Walter et al. 2019 p. 426). However, in recent years, some panels have begun to use probability-based methods to recruit their members, such as sending invitations to a randomly selected set of households to become panel members: these still represent a minority of online panels (Callegaro et al. 2014, Blom et al. 2016).

While the members of most online panels will not be an exact representation of the general population, in many cases panels have a large number of members – thousands or, in some cases, tens of thousands of panel members. This large number means that they can provide a relatively large sample of any desired demographic. In most cases, researchers seeking to survey a target population using an online panel use quota sampling to try to achieve a sample representative of their target population. This involves specifying the number of people they wish to survey in different demographic groups, such as the number of people of different ages, gender, and cultural backgrounds. By using quota sampling, it is possible to achieve a sample that has similar demographic characteristics to the target population despite the online panel itself not having the same characteristics as the target population.

This approach relies on having benchmark data for the variables by which the sample is selected – which ideally should be those where responses have greatest risk of being biased. In reality, there are limits to the availability of benchmark data – in particular, there are often forms of likely response bias for which there are not benchmark data. For example, in the 2015 UK election, incorrect polling predictions were argued to result from bias in pre-election samples towards more engaged voters. Broadly, those polled were biased towards those who both did vote and towards those who stated they intended to vote but did not then do so (Mortimore et al. 2017). This highlights that risk of bias is variable depending on the type of questions being asked. Issues such as

social desirability bias (e.g. a voter stating they intend to vote in a poll because they feel they should be seen as active politically, when in reality they do not actually vote) are greater when people are asked about likely future behaviour, and somewhat less problematic when asking about past behaviour and actions, within limits. It is important to carefully consider what types of response bias may be present, to identify which can and cannot be addressed using quota sampling, and to evaluate whether model-based inference can reduce the effect of this bias.

A key question asked in many studies has been whether using quota sampling of online panels can achieve results that converge with data produced using conventional probability based phone or mail survey methods. Multiple studies have examined this question, and have produced divergent results. In general, however, more recent studies are identifying greater convergence of results, whereas earlier studies tended to find online panels did not produce data of as high quality as traditional survey methods. Callegaro et al. (2014), reviewing studies mostly conducted in the 2000s as online panels were first emerging, found that online panels could be used but in many cases had significant quality issues and produced results that did not converge with probability-based surveys. However, they also found that non-probability online panels did produce results that converged with probability based conventional surveys for one topic – pre-election polling. This likely reflected that this area of survey research had the best developed methods and online panels, and had this achieved better quality more rapidly compared to other areas of survey research. More recently, Walter et al. (2019) found that with suitable care in designing quota sampling used, online panel data 'has similar psychometric properties and produces criterion validities that generally fall within the credibility intervals of existing meta-analytic results from conventionally sourced data … with appropriate caution, OPD [online panel data] are suitable for many exploratory research questions' (p. 425). Their study examined the overall psychometric properties of responses, rather than whether responses estimating population-level properties were similar, but support the concept of well designed online panel surveys having high validity when used appropriately.

Some have raised concerns that online panel surveys may be at higher risk of 'insufficient effort responding' – poor quality responses resulting from people 'ticking and flicking' instead of taking time to carefully consider their survey answers. Most online panel respondents have low stakes in the survey topics and complete surveys for monetary incentives; the concern has been that this will lead to low effort to complete survey questions accurately. However, when reviewing studies that have examined this issue, Walter et al. (2019) found that no evidence of higher rates of insufficient effort in online panels compared to other surveys, and instead found evidence that, in those online panels that have instituted quality checking, there is likely to be *less* incidence of insufficient effort than is found in other surveys.

The findings of studies examining the quality of online panels highlights that the appropriate question is not whether online panels as a whole can produce quality data, but under what circumstances online panels produce quality data. Answering this question enables researchers to select the best quality online panel, and to avoid using online panels that have poor management or particularly problematic membership. Baker et al. (2013, p. 102) point out that:

> There is a tendency to lump all online samples from opt-in panels into the single bucket of online, as if opt-in panels were a sampling method. They are not. Users of opt-in panels may employ different sampling, data collection, and adjustment techniques. Research evaluations of older methods of non-probability sampling from panels may have little relevance to the current methods being used.

Callegaro et al. (2014) found that key factors influencing quality of online survey panels included how the company managing the panel invited members and managed panel member deletions – for

example, does the company check the quality of survey completions and remove people from the panel if there is evidence they are not providing meaningful answers to surveys? Some online panels do this, while others do not. A key challenge in assessing the quality of online survey panels is a lack of data on their processes and quality, with little transparency regarding their membership and internal processes of quality control for many panels (Callegaro et al. 2014). The quality of an online panel will depend in part on factors such as how well they retain participants after initially recruiting them, which in turn relies on how well the survey company interacts with their members and implements strategies such as use of incentives to retain them in the survey panel (Blom et al. 2016). This emphasises that rather than assume all online panels use particular recruitment methods or have similar quality, the focus should be on (i) selecting high quality online panels that can provide a robust sample that meets the needs of a given survey and its target population requirements, and (ii) carefully designing how the sample will be selected from the online panel and how responses will be adjusted post-sampling.

Overall, the growing literature examining online surveys suggests that well-designed online surveys can be as effective as well designed surveys using phone, mail or face to face methods, and also suggest that online panels can form part of sampling strategies. However, as online panels will not include people who have difficulty accessing online surveys or who do not prefer to join a panel, some recommend the use of mixed-mode surveys, which use a combination of survey panels and other methods of recruiting respondents to ensure all parts of their target population are reached (Blom et al. 2016). When using an online panel, care should be taken to use panels that demonstrate evidence of quality control, and of having clear methods for maintaining participation and where appropriate ‘refreshing’ the panel with new participants (Blom et al. 2016).