BMJ Open

# The Regional South Australia Health Survey [RESONATE]: Study protocol

| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2017-019784 |
| Article Type: | Protocol |
| Date Submitted by the Author: | 25-Sep-2017 |
| Complete List of Authors: | Leach , Matthew ; University of South Australia, Department of Rural Health<br>Jones, Martin; University of South Australia, Department of Rural Health<br>Gillam, Marianne; University of South Australia, Department of Rural Health<br>May, Esther; University of South Australia, Division of Health Sciences |
| Primary Subject Heading: | Public health |
| Secondary Subject Heading: | Research methods |
| Keywords: | PUBLIC HEALTH, PRIMARY CARE, EPIDEMIOLOGY, STATISTICS & RESEARCH METHODS |
| | |

# The Regional South Australia Health Survey [RESONATE]: Study protocol

***Matthew J Leach****, Senior Research Fellow, Department of Rural Health, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Telephone: +61 8 8302 2413. Email: matthew.leach@unisa.edu.au

***Martin Jones***, Director: Department of Rural Health, University of South Australia, 111 Nicolson Avenue, Whyalla Norrie, South Australia, 5608, Australia. Email: martin.jones@unisa.edu.au

***Marianne Gillam***, Research Fellow, Department of Rural Health, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: marianne.gillam@unisa.edu.au

***Esther May***, Dean: Clinical Education and Equity, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: esther.may@unisa.edu.au

*Corresponding author

# The Regional South Australia Health Survey [RESONATE]: Study protocol

**ABSTRACT**

**Introduction**: Access to quality health care services is considered a moral right. However, for people living in regional, rural and remote locations, timely access to the services that they need may not always be possible because of structural and attitudinal barriers. This suggests that people living in regional areas may have unmet health care needs. The aim of this research will be to examine the health care needs, expectations and experiences of regional South Australians.

**Methods and analysis**: The Regional South Australia Health (RESONATE) survey is a cross-sectional study of adult health consumers living in any private or non-private dwelling, in any regional, rural, remote or very remote area of South Australia. Data will be collected using a 45-item, multi-dimensional, self-administered instrument, which has demonstrated acceptable psychometric properties, including good content validity and internal reliability, good test-retest reliability, and a high level of acceptability. The survey will be administered online and in hard-copy, with survey participants to be recruited over a seven-month period, using a comprehensive, multi-modal recruitment campaign.

Data will be descriptively analysed using frequency distributions and percentages, measures of central tendency and variability, or medians and the interquartile range, where appropriate. Subject to data type, differences between groups will be assessed using either independent samples t-tests / Mann–Whitney U test, chi-square test, or ANOVA / Kruskal-Wallis. Independent predictors of health service utilisation, expectations and experiences will be identified using regression analysis.

**Ethics and dissemination**: The study has been approved by the university Human Research Ethics Committee. Findings from this study will be disseminated via community forums, broadcast, print online and social media, participant summary reports, peer-reviewed journals and conferences.

***Key words***: experience; expectation; health; protocol; needs; regional; rural; survey.

**Strengths and limitations of the study**

- Potentially the largest health survey ever to be conducted in regional South Australia
- Provides new insights into the health service experiences, utilization and expectations of people living in regional South Australia
- Generates much-needed information for future health services and health workforce planning
- Potential limitations relate to selection bias

## INTRODUCTION

Almost 46% of the world's population live in regional/rural areas; these regions are often characterised by much lower population densities (i.e. global mean of 30.3 people per square kilometre) relative to urban areas (i.e. global mean of 1109.6 people per square kilometre).[1] In Australia, close to 33% of the nation's population live in regional/rural areas, with an estimated population density as low as 10.3 people per square kilometre.[2,3] The wide dispersion of the regional/rural Australian population creates a number of challenges for health care delivery; for instance, timely access to the services that regional/rural Australians need may not always be possible. This suggests that people living in regional/rural Australia may have unmet health care needs.

In Australia, and internationally, there is a mounting body of evidence supporting the view that conventional health care services are struggling to meet the health care needs of consumers, particularly those with chronic health conditions and those living in regional/rural areas.[4-10] The literature identifies a number of reasons why health consumer's needs are perhaps not being met.

These barriers and enablers of healthcare utilisation can be broadly represented under two themes: structural factors (i.e. accessibility, cost, time/availability, convenience), and attitude (i.e. not needing medical support, stigma, improving symptoms, poor relationship with healthcare provider).[10-14] For regional/rural communities, these factors can be prominent obstacles to health care access.[15-17]

Andersen and Newman [18] take a less simplistic view of health service use by viewing these determinants through a behavioural lens. Their construct, the Anderson Behavioural Model of health service use, identifies four key drivers of health care utilisation: predisposing factors (i.e. prevailing conditions that predispose an individual to use a health service), enabling factors (i.e. circumstances that either facilitate or hinder health service use), need factors (i.e. actual or perceived need for health services) and personal health practices (i.e. behaviours that influence health status). While many studies have used the Anderson Behavioural Model to investigate the use of health services, the range of variables reported to date has been limited and highly variable.[19] There is also a need to better understand how these determinants of health care utilisation differ across populations (e.g. between regional areas); the study described herein aims to address these knowledge gaps.

The impact of unmet health care need (i.e. the difference between services required and services received [9] at a systems level is not entirely clear. Several studies indicate that perceived unmet health care need is associated with higher rates of hospital admission, longer lengths of stay, and more frequent visits to emergency departments;[20-22] however, the evidence is not consistent.[23] Other studies suggest that those expressing an unmet health need access health care services less frequently;[5] this could have potential implications for consumer morbidity and mortality due to deficits in disease screening, monitoring, maintenance and risk reduction.[24]

At the individual level, the impact of unmet health care need can be substantial. Findings from several studies support an association between unmet health need and poorer quality of life,[25-27] worse mental health,[27] and psychological distress.[25] Although the direction of this association has yet to be elucidated, it does suggest that many health care systems have failed to some degree in meeting health consumer needs.

The significant implications of unmet patient need signify the importance of furthering our understanding of the needs of health consumers; this is particularly evident in regional populations where there are considerable barriers to health care access, as well as a large health workforce maldistribution; as is the case in regional Australia. A more detailed exploration of the determinants of health service utilisation at a State/Territory level may help to discern these needs. A population of particular importance is regional South Australia, which has one of the highest rates of chronic disease, co-morbidity, psychological distress, and fair/poor self-assessed health status of any State or Territory of Australia.[28] In addressing the abovementioned points, the proposed project will be the first known study to explore regional South Australian expectations and experiences in using diverse conventional and complementary health care services, with a view to better understanding the health care needs of this population.

## METHODS & ANALYSIS

**Study Design**: The Regional South Australia Health (RESONATE) survey employs a cross-sectional study design. An overview of the study procedures, from questionnaire development through to the reporting of survey findings, is illustrated in Figure 1.

**Figure 1. RESONATE flow chart**

*[Insert Figure 1 here]*

**Aim and objectives**: RESONATE aims to examine the health care needs, expectations and experiences of regional, rural and remote South Australians. The objectives of the study will be to:

1. Determine the prevalence of health conditions, surgical procedures and multi-morbidity among persons living in regional, rural and remote South Australia.
2. Examine the extent to which health services / treatments are used by persons living in regional, rural and remote South Australia.
3. Identify the information resources used to inform a person's decision to use a health service / treatment in regional, rural and remote South Australia.
4. Identify the barriers preventing persons from accessing health services / treatments in regional, rural and remote South Australia.
5. Ascertain the experiences of persons living in regional, rural and remote South Australia with various health services / treatments.
6. Determine the attitudes of persons living in regional, rural and remote South Australia toward various health services / treatments.
7. Determine the degree to which persons living in regional, rural and remote South Australia are satisfied with the health services / treatments they have received.
8. Identify the determinants of health service utilisation, expectations and experiences among persons living in regional, rural and remote South Australia.

**Sample & Setting**: The study will use non-probability (self-selection) sampling for economic and logistical reasons. The sample will comprise adult health consumers (i.e. a person over the age of 18 years who has used a health care service or received any health intervention within the last twelve months) living in any private or non-private dwelling, in any regional, rural, remote or very remote area of South Australia (a region that covers 99.7% of the land area of the state).[3] Participants also will be required to understand written English, and have either a fixed address

(for delivery of the hard-copy version of the survey) or access to the internet (to access the online version of the survey). Based on a target population of 290,290 adults, the study will need to survey at least 1,832 persons to achieve at worst ± 3% margin of error with 99% confidence for any individual item on the questionnaire.

**Questionnaire**: The consumer utilisation, expectations and experiences of health care instrument (CONVERSATIONS) is a multidimensional, self-administered questionnaire designed to measure health service utilisation, needs, expectations and experiences. The development, validation and description of the instrument are detailed below.

- *Development*: Development of the questionnaire was an iterative process that began with an extensive search of the health motivation literature, the interrogation of pertinent surveys,[28-33] and informal consultation with clinicians, researchers and consumers. This generated a large pool of potential survey items. Using the Andersen behavioural model of health service use [18] as the conceptual framework for the survey, potential questions were placed into one of four categories: predisposing factors, enabling factors, need factors and personal health practices (see Figure 2). The research team reviewed the items under each category to ensure questions adequately captured the construct of the framework (i.e. to confirm face validity), questions were clear in their meaning, response items were comprehensive, and any duplicate/overlapping items were removed. The list of items, comprising a combination of open questions (i.e. free text boxes) and closed questions (i.e. Likert scales, dichotomous items and nominal items), were then re-ordered to improve the flow of the survey, to simplify data analysis, and to be more meaningful to respondents.

**Figure 2. Conceptual framework of the CONVERSATIONS**
*[Insert Figure 2 here]*

- *Validation*: The preliminary 51-item CONVERSATIONS underwent a two-stage psychometric evaluation. The first stage recruited a purposive sample of 9 international academics with expertise in survey design and/or health service utilisation to assess the content validity of the survey. Academics were identified through online staff directories of major Australian and international Universities. The sample comprised 3 academics from Australia, 2 from the US, and 1 each from Spain, New Zealand, the UK and Israel, of whom 5/9 were female. Using the method described by Polit and Hungler,[34] respondents indicated the relevance of each survey item by assigning one of four responses to each item: (1) question is relevant, (2) question is relevant but needs minor alteration, (3) question is relevant but needs major alteration, and (4) question is not relevant to the survey construct (i.e. health service need). The mean percentage of items with a score of 3 or 4 was calculated (i.e. agreement of relevancy) for each subsection of the survey, and for the survey overall, with good content validity defined as a level of agreement of 80% or above.[34,35] After the removal of seven irrelevant questions, the CONVERSATIONS survey was shown to have good scale-level content validity (mean 85.3% ± SD 13.1%), and good subscale-level content validity (Part A 84.1% ± 17.9%; Part B 86.7% ± 8.6%; Part C 81.8% ± 12.1%; Part D 88.8% ± 9.6%; Part E 88.5% ± 0.9%). Of the retained questions, 16 items underwent minor editorial changes based on expert feedback.

In the second stage of evaluation, a purposive sample of 16 health consumers, of various age groups, and diverse cultural, educational and socio-economic backgrounds, were invited to complete the CONVERSATIONS, on two separate occasions, two-weeks apart. The purposive sample were identified through the research team's social network, and comprised 11 females and 5 males, aged between 21 and 66 years (mean age 42.9 ± 10.2 years), of whom

12 resided in Australia, 3 in the UK and 1 in Singapore. Data from the baseline survey were used to assess the acceptability (i.e. frequency of missing data, completion time) and internal consistency (i.e. Cronbach's alpha) of the instrument, while the baseline and week two data were used to measure test-retest reliability (using the intraclass correlation coefficient [absolute agreement, two-way mixed-effects model] for scale and ordinal data, and Cohen's Kappa for nominal data).

The analysis revealed a median completion time of 20 (IQR 15,30) minutes, and a high level of acceptability, with 15/16 (93.8%) participants submitting a fully-completed survey at baseline. The 6-item experience subscale and 16-item attitude subscale of the instrument demonstrated good to excellent internal reliability,[34] with values reported as follows: experience of conventional treatments (a component of Part C: α=0.92); experience of CAM treatments (a component of Part D: α=0.88); attitude toward conventional treatments (a component of Part C: α=0.90); and attitude toward CAM treatments (a component of Part D: α=0.88). There was also good to excellent agreement between baseline and week-2 scores for three out of five parts of the instrument (Mean reliability coefficients: Part A 0.962, 95% CI 0.950, 0.973; Part B 0.827, 95% CI 0.738, 0.917; Part C 0.768, 95% CI 0.701, 0.834), and moderate agreement between scores for two parts (Mean reliability coefficients: Part D 0.699, 95% CI 0.603, 0.795; Part E 0.741, 95% CI 0.408, 1.000). Overall, the CONVERSATIONS demonstrated good test-retest reliability (Overall mean reliability coefficient: 0.799, 95% CI 0.749, 0.849).[36]

Given the multi-dimensionality and multi-disciplinary nature of the survey, as well as the self-administered design, there was no similar instrument for which the CONVERSATIONS could be compared against; as such, it was not possible to measure convergent validity.

- *Description*: The final instrument was a 44-item questionnaire divided into five sections: (i) demographic characteristics [Part A; 16 items, including age, sex, level of education, marital status, caregiver status, religion, English language proficiency, health literacy, country of birth, number of dependent children, regional classification, employment status, occupation, annual household income, current postcode, years lived in postcode], (ii) health status and lifestyle [Part B; 10 items, including overall health rating, diagnosed health conditions, surgical history, sedentary duration, dietary intake, level of physical activity, alcohol consumption, smoking status, illicit drug use, health screening activity], (iii) use of conventional / mainstream health services [Part C; 8 items, including 12-month / lifetime use of conventional health services, frequency of visits to conventional health providers, satisfaction with the quality of care received by conventional health providers, utilisation of conventional health treatments / services, information resources impacting the decision to use conventional health care services, experience with using conventional health services, barriers to accessing conventional health services, attitude toward conventional health services], (iv) use of complementary / alternative / natural health and self-prescribed services [Part D; 9 items, including 12-month / lifetime use of complementary health services, frequency of visits to complementary health providers, satisfaction with the quality of care received by complementary health providers, utilisation of complementary and self-prescribed health treatments / services, information resources impacting the decision to use complementary health care services, experience with using complementary health services, barriers to accessing complementary health services, attitude toward complementary health services], and (v) other [Part E; 1 item, measuring preferred mix of health services]. A hard-copy version and online version (using the SurveyMonkey™ platform) of the CONVERSATIONS have been generated for this study.

**Recruitment/procedures**: The project will implement a comprehensive, multi-modal recruitment campaign. The strategies that will be employed are outlined in Table 1. The majority of these strategies will direct participants to the project website, which will contain further information about the study, the participant information sheet, a web enquiry form, and a link to the online survey. To facilitate recruitment, all participants who opt in will be entered into a draw to win one of 20 x $50 gift cards. Recruitment for the survey will take place between April 2017 and December 2017.

**Table 1: Recruitment strategies for the RESONATE survey**

| Category | Strategy | Platform / agency / medium |
|---|---|---|
| **Social media** | Social media advertising | Facebook Ads (targeting a regional SA audience) |
| | Social media posts (i.e. study information / invitations) | Facebook pages, LinkedIn, Twitter |
| **Broadcast media** | Region-specific media releases | All television and radio stations in regional SA |
| | Television classified advertising | All television stations in regional SA |
| **Print media** | Region-specific media releases | All newspapers in regional SA |
| | Letterbox drops (i.e. study postcards) | All households, businesses and post-office boxes in regional SA |
| | Study flyers | All local councils, public libraries and community agencies in regional SA |
| | Newsletter articles | All local councils, community groups, sporting groups, primary health networks and industry groups in regional SA |
| **Online media** | Project website | Dedicated project website with exclusive web address |
| | Email blasts | Distribution lists of local councils, community groups, sporting groups, health consumer agencies, primary health networks, regional development boards, industry groups and universities in regional SA |
| **Community engagement** | Public lectures | All University of South Australia Department of Rural Health major training sites; community groups. |

| | | |
|---|---|---|
| | Stakeholder group meetings | Country SA primary health network regional committees |

SA: South Australia

**Planned analysis**: Data will be exported from the SurveyMonkey platform into SPSS (v.22) for data cleaning and statistical analysis. Missing data will be prevented by enacting forced survey responses. Categorical data will be descriptively analysed using frequency distributions and percentages. Measures of central tendency and variability will be used for continuous data where values are normally distributed, whereas medians and the interquartile range will be used to describe data that is not normally distributed. Differences between groups will be assessed using independent samples t-tests or Mann–Whitney U test (for continuous variables), chi-square test (for categorical variables), and ANOVA or Kruskal-Wallis (where there are more than two groups). Independent predictors of health service utilisation (i.e. frequency of visits to health providers), expectations (i.e. health care attitude score) and experiences (i.e. health care experience score) will be identified using regression analysis. For estimates of prevalence, the survey sample distribution will be adjusted by applying weights to the age, sex and location distribution of the regional South Australian population, based on 2016 census data.

## ETHICS & DISSEMINATION

**Ethics*:*** The study has been reviewed and approved by the Human Research Ethics Committee of the University of South Australia, and will be conducted in accordance with the National Health & Medical Research Council (NHMRC) national statement on ethical conduct in research, as well as the approved study protocol.

**Dissemination**: The project will implement an extensive dissemination strategy to ensure findings from the project are effectively communicated to all key stakeholders, including the general

public, health consumers, clinicians, researchers, educators and policy makers. The strategy will include the generation and dissemination of peer-reviewed journal articles, the delivery of national and international conference presentations and community forums, the distribution of media releases via broadcast, print and social media, the publication of findings on the project website, and the circulation of summary reports to study participants and key stakeholders.

## DISCUSSION

Health inequalities and inadequate health service provision are major concerns facing regional Australia. In fact, living in regional locations of Australia is associated with poorer health outcomes, increased chronic disease mortality and lower life expectancy when compared with living in metropolitan locations.[37-40] An important first step in addressing these health status disparities is understanding the health care needs of the regional population. The RESONATE survey will explore these needs in detail, as well as gain new insights into the health care expectations and experiences of people living in regional South Australia.

In addition to shedding new light on the health care needs of regional South Australians, the findings of this research will make an important contribution to future health services planning. Using the needs-based health workforce planning framework, the health care needs of this population can be mapped against best practice care to estimate total health workforce requirements.[41] This model has already been applied to regional populations with diabetes [42] and mental illness,[43] and takes a far more “richer perspective on population needs” than other workforce planning approaches.[41] Given the considerable health workforce maldistribution in regional South Australia,[44-46] this is clearly an important next step for this research.

If the RESONATE study is able to reach, or even exceed its target of 1,832 participants, it will represent the largest health survey ever conducted in regional South Australia. Acknowledging that there are methodological differences between surveys (e.g. different sampling methods), this will surpass the regional SA sample sizes of the Australian Bureau of Statistics National Health Survey by 124% (estimated n=818) [28] and the National Regional Wellbeing Survey by 63% (n=1,126).[47] Consequently, as the largest health survey of regional South Australians, the RESONATE study may report findings with a relatively higher level of precision and a smaller margin of error than previous Australian health surveys;[48] it may also enable meaningful subgroup analyses to be performed to better inform local policy and strategy (e.g. comparing needs between regions and statistical areas).[49]

Despite its strengths, the RESONATE study does have a limitation - its susceptibility to self-selection bias. Whilst it is not possible to eliminate this bias entirely due to the use of non-probability (self-selection) sampling, the study has put in place multiple measures to help mitigate this risk and the risk of other biases. These strategies include the implementation of a comprehensive multi-modal recruitment campaign with extensive reach to the regional SA population; intensive community engagement; the provision of alternative survey administration methods; the use of an instrument with acceptable psychometric properties, and the weighting of sample data.[50]

## CONCLUSION

RESONATE will represent the largest health survey ever conducted in rural South Australia. The study will further our understanding of the state of health of rural South Australia, and will impart new insights into the health service experiences, utilization and expectations of this population. Accordingly, the findings of this research will help us to better understand the health care needs of

regional South Australians. An important next step of this research will be to map these needs against existing health workforce supply to enable policy makers, health care providers, researchers and educationalists to identify the health workforce required to better support the health of regional South Australians.

## DECLARATIONS

### Acknowledgements

This research will be supported by infrastructure provided by the Department of Rural Health, University of South Australia.

### Competing interests

The authors declare that they have no competing interests.

### Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

### Authors' contributions

ML conceptualised the project and drafted the manuscript. MJ, MG and EM reviewed and edited the manuscript. All authors read and approved the final manuscript.

## REFERENCES

1. The World Bank. World bank open data 2017. http://data.worldbank.org/. Accessed 10 Aug 2017.

2. Australian Bureau of Statistics. Regional Population Growth, Australia, 2016. Cat. No. 3218.0. Canberra, Australia: Australian Bureau of Statistics 2017.
3. Australian Bureau of Statistics. ABS.Stat. Canberra, Australia: Australian Bureau of Statistics 2017.
4. Ahern T, Gardner A, Courtney M. Exploring patient support by breast care nurses and geographical residence as moderators of the unmet needs and self-efficacy of Australian women with breast cancer: Results from a cross-sectional, nationwide survey. *Eur J Oncol Nurs* 2016;23:72-80.
5. Colman E, Missinne S, Bracke P. The Role of Perceived Helpfulness in Predicting Subjective Unmet Need and the Frequency of Health Care Use. *Arch Psych Nurs* 2014;28:43-49.
6. Dezetter A, Duhoux A, Menear M, et al. Reasons and Determinants for Perceiving Unmet Needs for Mental Health in Primary Care in Quebec. *Can J Psychiatr* 2015;60:284-293.
7. Ghuman SJ, Brackbill RM, Stellman SD, et al. Unmet mental health care need 10-11 years after 9/11 terrorist attacks: 2011-2012 results from the World Trade Center Health Registry. *BMC Public Health* 2014;14:491-499.
8. Ou L, Chen J, Hillman K. Socio-demographic disparities in the utilisation of general practice services for Australian children - Results from a nationally representative longitudinal study. *PLOS One* 2017;12:e0176563.
9. Pappa E, Kontodimopoulos N, Papadopoulos A, et al. Investigating Unmet Health Needs in Primary Health Care Services in a Representative Sample of the Greek Population. *Int J Environ Res Public Health* 2013;10:2017–2027.
10. Ronksley PE, Sanmartin C, Campbell DJT, et al. Perceived barriers to primary care among western Canadians with chronic conditions. *Stat Can* 2014;25:3-10.
11. Andrade LH, Alonso J, Mneimneh Z, et al. Barriers to mental health treatment: results from the WHO World Mental Health surveys. *Psychol Med* 2014;44:1303-17.

12. Allen H, Wright B J, Harding K, et al. The Role of Stigma in Access to Health Care for the Poor. *Milbank Q* 2014;92:289-318.

13. Monger M. Stigma: barrier to quality of life and health care. *HIV Clinician* 2011;23:1,4-5.

14. Sheikh-Mohammed M, MacIntyre CR, Wood NJ, et al. Barriers to access to health care for newly resettled sub-Saharan refugees in Australia. *Med J Aust* 2006;185:594-597.

15. Hull M, Fennell KM, Vallury K, et al. A comparison of barriers to mental health support-seeking among farming and non-farming adults in rural South Australia. *Aust J Rural Health* 2017; Epub ahead of print.

16. Stewart H, Jameson JP, Curtin L. The relationship between stigma and self-reported willingness to use mental health services among rural and urban older adults. *Psychol Serv* 2015;12:141-148.

17. Syed ST, Gerber BS, Sharp LK. Traveling towards disease: transportation barriers to health care access. *J Community Health* 2013;38:976-993.

18. Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. *Milbank Q* 2005;83:1-28.

19. Babitsch B, Gohl D, von Lengerke T. Re-revisiting Andersen's Behavioral Model of Health Services Use: a systematic review of studies from 1998–2011. *Psychosoc Med* 2012;9:Doc11.

20. Bindman AB, Grumbach K, Osmond D, et al. Preventable hospitalizations and access to health care. *J Am Med Assoc* 1995;274:305–311.

21. McCusker J, Roberge D, Lévesque JF, et al. Emergency department visits and primary care among adults with chronic conditions. *Med Care* 2010; 48: 972–980.

22. Zuckerman S, Shen YC. Characteristics of occasional and frequent emergency department users: Do insurance coverage and access to care matter. *Med Care* 2004;42:176–182.

23. Ronksley PE, Sanmartin C, Quan H, et al. Association between perceived unmet health care needs and risk of adverse health outcomes among patients with chronic medical conditions. *Open Med* 2013;7:e21-30.

24. Ayanian JZ, Weissman JS, Schneider EC, et al. Unmet Health Needs of Uninsured Adults in the United States. *J Am Med Assoc* 2000;284:2061-2069.

25. Hansen DG, Larsen PV, Holm LV, et al. Association between unmet needs and quality of life of cancer patients: A population-based study. *Acta Oncol* 2013;52:391-399.

26. Slade M, Leese M, Cahill S, et al. Patient-rated mental health needs and quality of life improvement. *Br J Psychiatry* 2005;187:256-261.

27. Smith AW, Parsons HM, Kent EE, et al. Unmet support service needs and health-related quality of life among adolescents and young adults with cancer: the AYA HOPE study. *Front Oncol* 2013;3:75.

28. Australian Bureau of Statistics. National Health Survey: First Results, 2014-15. Cat. No. 4364.0.55.001. Canberra: Australian Bureau of Statistics 2015.

29. Busato A, Donges A, Herren S, et al. Health status and health care utilisation of patients in complementary and conventional primary care in Switzerland - an observational study. *Fam Prac* 2006;23:116-124.

30. Chao M, Wade C, Kronenberg F, et al. Women's reasons for complementary and alternative medicine use: Racial/ethnic differences. *J Altern Complement Med* 2006;12:719-720.

31. Simoes-Wust A, Rist L, Dettling M. Self-reported health characteristics and medication consumption by cam users and nonusers: A swiss cross-sectional survey. *J Altern Complement Med* 2014;20:40-47.

32. Sirois FM. Motivations for consulting complementary and alternative medicine practitioners: A comparison of consumers from 1997–8 and 2005. *BMC Complement Altern Med* 2008;8:16.
33. Women's Health Australia. Australian Longitudinal Study on Women's Health: Surveys. 2015. http://www.alswh.org.au/for-researchers/surveys#. Accessed 23 Jul 2015.
34. Polit D, Hungler B. Nursing Research: Principles and Methods (seventh edition). Philadelphia, USA: Lippincott 2004.
35. Davis L. Instrument review: Getting the most from a panel of experts. *App Nurs Res* 1992;5:194-197.
36. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *J Chiropr Med* 2016;15:155-163.
37. Australian Institute of Health and Welfare (AIHW). Rural, regional and remote health - indicators of health system performance. Rural Health Series no. 10, cat. No. PHE103. AIHW: Canberra, Australia 2008.
38. Beckmann KR, Bennett A, Young GP, et al. Sociodemographic disparities in survival from colorectal cancer in South Australia: a population-wide data linkage study. *BMC Health Serv Res* 2016;16:24.
39. Chondur R, Li SQ, Lawton P. Does relative remoteness affect chronic disease outcomes? Geographic variation in chronic disease mortality in Australia, 2002–2006. *Aust NZ J Public Health* 2013;38:117-121.
40. Fox P, Boyce A. Cancer health inequality persists in regional and remote Australia. *Med J Aust* 2014;201:445-446.
41. Segal L, Leach MJ. An evidence-based health workforce model for primary and community care. *Implement Sci* 2011;6:93.

42. Segal L, Leach MJ, May E, et al. Regional primary care team to deliver best-practice diabetes care: a needs-driven health workforce model reflecting a biopsychosocial construct of health. *Diab Care* 2013;36:1898-1907.

43. Furber G, Segal L, Leach M, et al. Preventing mental illness: closing the evidence-practice gap through workforce and services planning. *BMC Health Serv Res* 2015;15:283.

44. Department of Health. The national health workforce dataset (NHWDS): Physiotherapy 2015. Canberra, Australia: Department of Health 2015.

45. Department of Health. Nurses and midwives 2016 fact sheet. Canberra, Australia: Department of Health 2017.

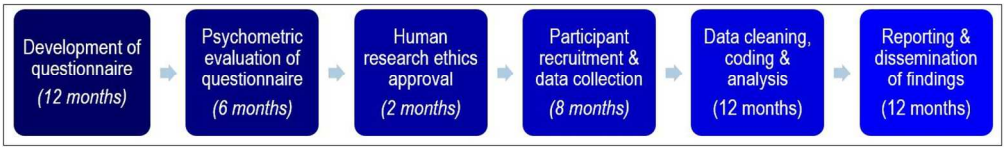
46. Tennant M, Kruger E, Shiyha J. Dentist-to-population and practice-to-population ratios: in a shortage environment with gross mal-distribution what should rural and remote communities focus their attention on? *Rural Remote Health* 2013;13:2518.

47. Centre for Research and Action in Public Health. 2015 regional wellbeing survey data tables: South Australia - natural resource management regions. University of Canberra: Canberra, Australia 2016.

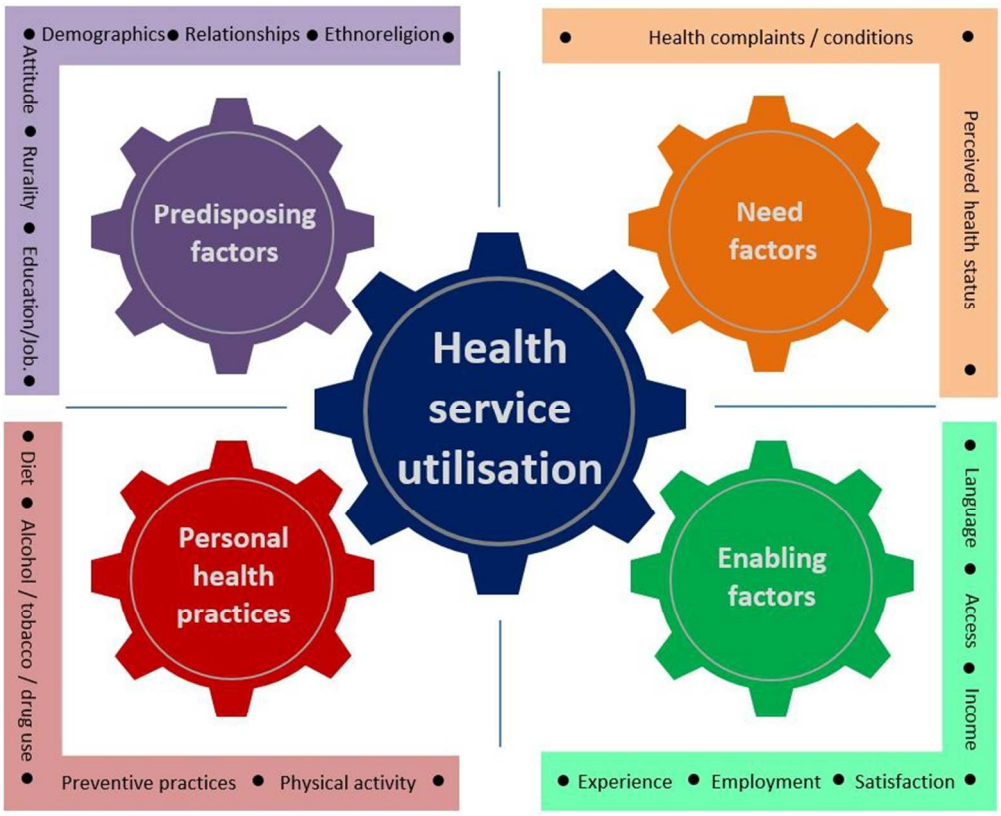
48. Biau DJ, Kerneis S, Porcher R. Statistics in brief: the importance of sample size in the planning and interpretation of medical research. *Clin Orthop Relat Res* 2008;466:2282-2288.

49. De Vaus D. Surveys in social research (sixth edition). Oxon, UK: Routledge 2014.

50. Keeble C, Law GR, Barber S, et al. Choosing a method to reduce selection bias: a tool for researchers. *Open J Epidemiol* 2015;5:155-162.




378x54mm (96 x 96 DPI)




239x194mm (96 x 96 DPI)

**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | 1 |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | NA |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 3-5 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | 5-6 |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | 5 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 6, 10-11 |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | 6 |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 9-10 |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 9-10 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 13-14 |
| Study size | 10 | Explain how the study size was arrived at | 6 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | NA |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 11-12 |
| | | (*b*) Describe any methods used to examine subgroups and interactions | 11-12 |
| | | (*c*) Explain how missing data were addressed | 11 |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy | 12 |
| | | (*e*) Describe any sensitivity analyses | NA |
| **Results** | | | |

| | | | |
|---|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | NA |
| | | (b) Give reasons for non-participation at each stage | NA |
| | | (c) Consider use of a flow diagram | NA |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | NA |
| | | (b) Indicate number of participants with missing data for each variable of interest | NA |
| Outcome data | 15* | Report numbers of outcome events or summary measures | NA |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | NA |
| | | (*b*) Report category boundaries when continuous variables were categorized | NA |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | NA |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | NA |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | NA |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 13-14 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | NA |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | NA |
| **Other information** | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 15 |

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

# The Regional South Australia Health Survey [RESONATE]: Study protocol



| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2017-019784.R1 |
| Article Type: | Protocol |
| Date Submitted by the Author: | 17-Dec-2017 |
| Complete List of Authors: | Leach , Matthew ; University of South Australia, Department of Rural Health<br>Jones, Martin; University of South Australia, Department of Rural Health<br>Gillam, Marianne; University of South Australia, Department of Rural Health<br>May, Esther; University of South Australia, Division of Health Sciences |
| Primary Subject Heading: | Public health |
| Secondary Subject Heading: | Research methods |
| Keywords: | PUBLIC HEALTH, PRIMARY CARE, EPIDEMIOLOGY, STATISTICS & RESEARCH METHODS |
| | |

# The Regional South Australia Health Survey [RESONATE]: Study protocol

***Matthew J Leach****, Senior Research Fellow, Department of Rural Health, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: matthew.leach@unisa.edu.au

***Martin Jones***, Director: Department of Rural Health, University of South Australia, 111 Nicolson Avenue, Whyalla Norrie, South Australia, 5608, Australia. Email: martin.jones@unisa.edu.au

***Marianne Gillam***, Research Fellow, Department of Rural Health, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: marianne.gillam@unisa.edu.au

***Esther May***, Dean: Clinical Education and Equity, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: esther.may@unisa.edu.au

*Corresponding author

# The Regional South Australia Health Survey [RESONATE]: Study protocol

**ABSTRACT**

***Background***: Access to quality health care services is considered a moral right. However, for people living in regional locations, timely access to the services that they need may not always be possible because of structural and attitudinal barriers. This suggests that people living in regional areas may have unmet health care needs. The aim of this research will be to examine the health care needs, expectations and experiences of regional South Australians.

***Methods***: The Regional South Australia Health (RESONATE) survey is a cross-sectional study of adult health consumers living in any private or non-private dwelling, in any regional, rural, remote or very remote area of South Australia, and with an understanding of written English. Data will be collected using a 45-item, multi-dimensional, self-administered instrument, designed to measure health care need, barriers to health care access, and health service utilisation, attitudes, experiences and satisfaction. The instrument has demonstrated acceptable psychometric properties, including good content validity and internal reliability, good test-retest reliability, and a high level of acceptability. The survey will be administered online and in hard-copy, with at least 1,832 survey participants to be recruited over a seven-month period, using a comprehensive, multi-modal recruitment campaign.

***Discussion***: RESONATE will provide a detailed description of the state of health of regional South Australia, as well as impart further insights into the health service experiences, utilization and expectations of this population. Accordingly, the findings of this research will help us to better understand the health care needs of regional South Australians. An important next step of this research will be to map these needs against existing health workforce supply to enable policy

makers, health care providers, researchers and educationalists to identify the health workforce required to better support the health of regional South Australians.

***Key words***: experience; expectation; health; protocol; needs; regional; rural; survey.

**Strengths and limitations of this study**

- This study will represent the largest survey ever conducted to examine the health care needs, expectations and experiences of regional South Australians.
- The use of non-probability sampling, whilst economically and logistically advantageous, will elevate the risk of self-selection bias.
- Multiple strategies will be put in place to mitigate the risk of sampling, undercoverage, recruitment and participation bias, as well as measurement error.

## BACKGROUND

Almost 46% of the world's population live in regional, rural, remote or very remote areas (hereafter referred to as regional); these regions are often characterised by much lower population densities (i.e. global mean of 30.3 people per square kilometre) relative to urban areas (i.e. global mean of 1109.6 people per square kilometre) [1]. In Australia, close to 33% of the nation's population live in regional areas, with an estimated population density as low as 10.33 people per square kilometre [2,3]. The wide dispersion of the regional Australian population creates a number of challenges for health care delivery; for instance, timely access to the services that regional Australians need may not always be possible. The complexity of the Australian health care system (i.e. the complex split of funding and responsibility across Federal, State and Territory governments, and across public and private sectors) amplifies the problem by creating additional

challenges to the coordination, integration and continuity of health care services, especially for people living with chronic, co-morbid conditions and in regional locations [4].

In Australia, and internationally, there is a mounting body of evidence supporting the view that conventional health care services are struggling to meet the health care needs of consumers, particularly those with chronic health conditions and those living in regional areas [5-11]. The literature identifies some reasons why health consumer's needs are perhaps not being met. These barriers and enablers of healthcare utilisation can be broadly represented under two themes: structural factors (i.e. accessibility, cost, time/availability, convenience), and attitude (i.e. not needing medical support, stigma, improving symptoms, poor relationship with healthcare provider) [11-15]. For regional communities, these factors can be prominent obstacles to health care access [16-18].

Andersen and Newman [19] take a less simplistic view of health service use by viewing these determinants through a behavioural lens. Their construct, the Anderson Behavioural Model of health service use, identifies four key drivers of health care utilisation: predisposing factors (i.e. prevailing conditions that predispose an individual to use a health service), enabling factors (i.e. circumstances that either facilitate or hinder health service use), need factors (i.e. actual or perceived need for health services) and personal health practices (i.e. behaviours that influence health status). While many studies have used the Anderson Behavioural Model to investigate the use of health services, the range of variables reported to date has been limited and highly variable [20]. There is also a need to better understand how these determinants of health care utilisation differ across populations (e.g. between regional areas); the study described herein aims to address these knowledge gaps.

The impact of unmet health care need (i.e. the difference between services required and services received) [10] at a systems level is not entirely clear. Several studies indicate that perceived unmet health care need is associated with higher rates of hospital admission, longer lengths of stay, and more frequent visits to emergency departments [21-23]; however, the evidence is not consistent [24]. Other studies suggest that those expressing an unmet health need access health care services less frequently [6]; this could have potential implications for consumer morbidity and mortality due to deficits in disease screening, monitoring, maintenance and risk reduction [25].

At the individual level, the impact of unmet health care need can be substantial. Findings from several studies support an association between unmet health need and poorer quality of life [26-28], worse mental health [28] and psychological distress [26]. Although the direction of this association has yet to be determined, it does suggest that many health care systems have failed to some degree in meeting health consumer needs.

The significant implications of unmet consumer need signify the importance of furthering our understanding of the needs of health consumers; this is particularly evident in regional populations where there are considerable barriers to health care access, as well as a large health workforce maldistribution; as is the case in regional Australia. A more detailed exploration of the determinants of health service utilisation at a State/Territory level may help to discern these needs. A population of particular importance is regional South Australia, which has one of the highest rates of chronic disease, co-morbidity, psychological distress, and fair/poor self-assessed health status of any State or Territory of Australia [29]. In addressing the abovementioned points, the proposed project will be the first known study to explore regional South Australian expectations and experiences in using diverse conventional and complementary health care services, with a view to better understanding the health care needs of this population.

## METHODS

***Study Design***: The Regional South Australia Health (RESONATE) survey employs a cross-sectional study design. An overview of the study procedures, from questionnaire development through to the reporting of survey findings, is illustrated in Figure 1.

***Aim and objectives***: RESONATE aims to examine the health care needs, expectations and experiences of regional South Australians. The objectives of the study will be to:

1. Determine the 12-month/lifetime prevalence of health conditions *(i.e. diagnosed or treated by a health professional)*, surgical procedures, and multi-morbidity *(measured using the multiple chronic condition index* [30]*)* among persons living in regional South Australia.
2. Examine the extent to which health services / treatments were used *(i.e. frequency of use in the previous twelve months)* by persons living in regional South Australia.
3. Identify the information resources *(e.g. internet, friend, health provider)* used in the previous twelve months to inform a person's decision to use a health service / treatment in regional South Australia.
4. Identify the extent *(using a 4-point frequency scale)* to which structural *(e.g. cost, distance)* and attitudinal *(e.g. stigma)* barriers prevent persons from accessing health services / treatments in regional South Australia.
5. Ascertain the experiences *(i.e. lifetime prevalence of adverse events, miscommunication, misunderstanding and disrespect, using a 4-point frequency scale)* of persons living in regional South Australia with various health services / treatments.
6. Determine the attitudes of persons living in regional South Australia toward various health services / treatments *(i.e. perceptions of the roles, values, accessibility and quality of a heath care service, using a 5-point Likert scale*).

7. Determine the degree *(using a 5-point Likert scale)* to which persons living in regional South Australia are satisfied with the quality of health services / treatments they have received.
8. Identify the determinants of health service utilisation, expectations and experiences among persons living in regional South Australia.

***Sample & Setting***: The study will use non-probability (self-selection) sampling for economic and logistical reasons. The sample will comprise adult health consumers (i.e. a person over the age of 18 years who has used a health care service or received any health intervention within the last twelve months) living in any private or non-private dwelling, in any regional, rural, remote or very remote area of South Australia (a region that covers 99.7% of the land area of the state [3]). Participants also must be able to read and understand written English, comprehend the information provided, and have either a fixed address (for delivery of the hard-copy version of the survey) or access to the internet (to access the online version of the survey). Excluded will be people with severe cognitive impairment, severe vision impairment, and those not able to provide consent. Based on a target population of 290,290 adults, the study will need to survey at least 1,832 persons; this is based on a ± 3% margin of error at the 99% confidence level.

***Questionnaire***: The consumer utilisation, expectations and experiences of health care instrument (CONVERSATIONS) is a multidimensional, self-administered questionnaire designed to measure health service utilisation, needs, expectations and experiences. The development, validation and description of the instrument are detailed below.

- *Development*: Development of the questionnaire was an iterative process that began with an extensive search of the health motivation literature, the interrogation of pertinent surveys [30-35], and informal consultation with clinicians, researchers and consumers. This

generated a large pool of potential survey items. Using the Andersen behavioural model of health service use [19] as the conceptual framework for the survey, potential questions were placed into one of four categories: predisposing factors, enabling factors, need factors and personal health practices (see Figure 2). The research team reviewed the items under each category to ensure questions adequately captured the construct of the framework (i.e. to confirm face validity), questions were clear in their meaning, response items were comprehensive, and any duplicate/overlapping items were removed. The list of items, comprising a combination of open questions (i.e. free text boxes) and closed questions (i.e. Likert scales, dichotomous items and nominal items), were then re-ordered to improve the flow of the survey, to simplify data analysis, and to be more meaningful to respondents.

- *Validation*: The preliminary 51-item CONVERSATIONS underwent a two-stage psychometric evaluation. The first stage recruited a purposive sample of 9 international academics with expertise in survey design and/or health service utilisation, as well as a track record in regional health research, to assess the content validity of the survey. Academics were identified through online staff directories of major Australian and international Universities. The sample comprised 3 academics from Australia, 2 from the US, and 1 each from Spain, New Zealand, the UK and Israel, of whom 5/9 were female. Using the method described by Polit and Hungler [36], respondents indicated the relevance of each survey item by assigning one of four responses to each item: (1) question is relevant, (2) question is relevant but needs minor alteration, (3) question is relevant but needs major alteration, and (4) question is not relevant to the survey construct (i.e. health service need). The mean percentage of items with a score of 3 or 4 was calculated (i.e. agreement of relevancy) for each subsection of the survey, and for the survey overall, with good content validity defined as a level of agreement of 80% or above [36,37]. After the removal of seven irrelevant questions, the

CONVERSATIONS survey was shown to have good scale-level content validity (mean 85.3% ± SD 13.1%), and good subscale-level content validity (Part A 84.1% ± 17.9%; Part B 86.7% ± 8.6%; Part C 81.8% ± 12.1%; Part D 88.8% ± 9.6%; Part E 88.5% ± 0.9%). Of the retained questions, 16 items underwent minor editorial changes based on expert feedback.

In the second stage of evaluation, a purposive sample of 16 health consumers, of various age groups, and diverse cultural, educational and socio-economic backgrounds (including one-third with lived experience in regional Australia), were invited to complete the CONVERSATIONS, on two separate occasions, two-weeks apart. The purposive sample was identified through the research team's social network, and comprised 11 females and 5 males, aged between 21 and 66 years (mean age 42.9 ± 10.2 years), of whom 12 resided in Australia, 3 in the UK and 1 in Singapore. Data from the baseline survey were used to assess the acceptability (i.e. frequency of missing data, completion time) and internal consistency (i.e. Cronbach's alpha) of the instrument. The baseline and week two data were used to measure test-retest reliability (using the intraclass correlation coefficient [absolute agreement, two-way mixed-effects model] for scale and ordinal data, and Cohen's Kappa for nominal data).

The analysis revealed a median completion time of 20 (IQR 15,30) minutes, and a high level of acceptability, with 15/16 (93.8%) participants submitting a fully-completed survey at baseline. The 6-item experience subscale and 16-item attitude subscale of the instrument demonstrated good to excellent internal reliability [36], with values reported as follows: experience of conventional treatments (a component of Part C: α=0.92); experience of CAM treatments (a component of Part D: α=0.88); attitude toward conventional treatments (a component of Part C: α=0.90); and attitude toward CAM treatments (a component of Part D:

α=0.88). There was also good to excellent agreement between baseline and week-2 scores for three out of five parts of the instrument (Mean reliability coefficients: Part A 0.962, 95% CI 0.950, 0.973; Part B 0.827, 95% CI 0.738, 0.917; Part C 0.768, 95% CI 0.701, 0.834), and moderate agreement between scores for two parts (Mean reliability coefficients: Part D 0.699, 95% CI 0.603, 0.795; Part E 0.741, 95% CI 0.408, 1.000). Overall, the CONVERSATIONS demonstrated good test-retest reliability (Overall mean reliability coefficient: 0.799, 95% CI 0.749, 0.849) [38].

Given the multi-dimensionality and multi-disciplinary nature of the survey, as well as the self-administered design, there was no similar instrument for which the CONVERSATIONS could be compared against; as such, it was not possible to measure convergent validity.

- *Description*: The final instrument was a 44-item questionnaire divided into five sections: (i) demographic characteristics [Part A; 16 items, including age, sex, level of education, marital status, caregiver status, religion, English language proficiency, health literacy, country of birth, number of dependent children, regional classification, employment status, occupation, annual household income, current postcode, years lived in postcode], (ii) health status and lifestyle [Part B; 10 items, including overall health rating, diagnosed health conditions, surgical history, sedentary duration, dietary intake, level of physical activity, alcohol consumption, smoking status, illicit drug use, health screening activity], (iii) use of conventional / mainstream health services [Part C; 8 items, including 12-month / lifetime use of conventional health services, frequency of visits to conventional health providers, satisfaction with the quality of care received by conventional health providers, utilisation of conventional health treatments / services, information resources impacting the decision to use conventional health care services, experience with using conventional health services,

barriers to accessing conventional health services, attitude toward conventional health services], (iv) use of complementary / alternative / natural health and self-prescribed services [Part D; 9 items, including 12-month / lifetime use of complementary health services, frequency of visits to complementary health providers, satisfaction with the quality of care received by complementary health providers, utilisation of complementary and self-prescribed health treatments / services, information resources impacting the decision to use complementary health care services, experience with using complementary health services, barriers to accessing complementary health services, attitude toward complementary health services], and (v) other [Part E; 1 item, measuring preferred mix of health services]. A hard-copy version and online version (using the SurveyMonkey™ platform) of the CONVERSATIONS have been generated for this study.

***Recruitment/procedures***: The project will implement a comprehensive, multi-modal recruitment campaign, and in accordance with a community-based participatory approach, will involve extensive community engagement. The strategies that will be employed are outlined in Table 1. The majority of these strategies will direct participants to the project website, which will contain further information about the study, the participant information sheet, a web enquiry form, and a link to the online survey. Participants who cannot (or prefer not to) complete the survey online will be advised to contact the research department, using the toll-free telephone number provided, to have the participant information sheet, survey and reply-paid envelope posted out to them. To facilitate recruitment, all participants who opt in will be entered into a draw to win one of 20 x $50 gift cards. Recruitment for the survey will take place between April 2017 and March 2018.

**Table 1: Recruitment strategies for the RESONATE survey**

| Category | Strategy | Platform / agency / medium |
|---|---|---|

| | | |
|---|---|---|
| **Social media** | Social media advertising | Facebook Ads (targeting a regional SA audience) |
| | Social media posts (i.e. study information / invitations) | Facebook pages, LinkedIn, Twitter |
| **Broadcast media** | Region-specific media releases | All television and radio stations in regional SA |
| | Television classified advertising | All television stations in regional SA |
| **Print media** | Region-specific media releases | All newspapers in regional SA |
| | Letterbox drops (i.e. study postcards) | All households, businesses and post-office boxes in regional SA |
| | Study flyers | All local councils, public libraries and community agencies in regional SA |
| | Newsletter articles | All local councils, community groups, sporting groups, primary health networks and industry groups in regional SA |
| **Online media** | Project website | Dedicated project website with exclusive web address |
| | Email blasts | Distribution lists of local councils, community groups, sporting groups, health consumer agencies, primary health networks, regional development boards, industry groups and universities in regional SA |
| **Community engagement** | Public lectures | All University of South Australia Department of Rural Health major training sites; community groups |
| | Stakeholder group meetings | Country SA primary health network regional committees; local councils |
| | Community / public events | Community fairs; Conferences; Exhibitions; Shopping centre displays |

SA: South Australia

***Planned analysis***: Data from hard-copy surveys will be directly entered into the online survey by the research team. On completion of the project, data will be exported from the SurveyMonkey platform into SPSS (v.24) for data cleaning and statistical analysis. Missing data will be prevented by enacting forced survey responses. Multiple responses from single participants will be managed using the de-duplication procedure for online surveys described by Konstan et al [39]. In brief, all responses will be screened for duplicate internet service provider (ISP) entries (including the first three quadrants of an ISP address). Any duplicate ISP entries that report matching demographic

data (i.e. age, sex, highest education and marital status) will be considered a duplicate response and subsequently excluded from the analysis (with only the first dated entry retained). Categorical data will be descriptively analysed using frequency distributions and percentages. Measures of central tendency and variability will be used for continuous data where values are normally distributed, whereas medians and the interquartile range will be used to describe data that is not normally distributed. Differences between groups will be assessed using independent samples t-tests or Mann–Whitney U test (for continuous variables), chi-square test (for categorical variables), and ANOVA or Kruskal-Wallis (where there are more than two groups). Independent predictors of health service utilisation (i.e. frequency of visits to health providers), expectations (i.e. health care attitude score) and experiences (i.e. health care experience score) will be identified using regression analysis. The representativeness of the sample to the base population will be cross-checked against regional South Australia demographic data derived from the 2016 Australian population census. To mitigate the self-selection bias, the survey sample distribution will be adjusted by applying weights to the age, sex and location distribution of the regional South Australian population; these weights will be based on 2016 Australian population census data.

***Ethics:*** The study has been reviewed and approved by the Human Research Ethics Committee of the University of South Australia, and will be conducted in accordance with the National Health & Medical Research Council (NHMRC) national statement on ethical conduct in research, as well as the approved study protocol. A detailed participant information sheet will preface each survey, with voluntary completion of the survey implying informed consent to participate. No personally identifiable information will be collected in order to maintain the anonymity of the survey.

## DISCUSSION

Health inequalities and inadequate health service provision are major concerns facing regional Australia. In fact, living in regional locations of Australia is associated with poorer health outcomes, increased chronic disease mortality and lower life expectancy when compared with living in metropolitan locations [40-43]. An important first step in addressing these health status disparities is understanding the health care needs of the regional population. The RESONATE survey will explore these needs in detail, as well as gain new insights into the health care expectations and experiences of people living in regional South Australia.

In addition to shedding new light on the health care needs of regional South Australians, the findings of this research will make an important contribution to future health services planning. Using the needs-based health workforce planning framework, the health care needs of this population can be mapped against best practice care to estimate total health workforce requirements [44]. This model has already been applied to regional populations with diabetes [45] and mental illness [46], and takes a far more "richer perspective on population needs" than other workforce planning approaches [44]. Given the considerable health workforce maldistribution in regional South Australia [47-49], this is an important next step for this research.

If the RESONATE study can reach, or even exceed its target of 1,832 participants, it will represent the largest health survey conducted in regional South Australia. Importantly, the study will complement the results of other large studies of regional South Australians, including the Australian Bureau of Statistics National Health Survey (estimated n=818) [30] and the National Regional Wellbeing Survey (n=1,126) [50], by reporting unique insights into the regional South Australian population not yet available. Further, the large sample will enable meaningful subgroup analyses to be performed to better inform local policy and strategy (e.g. comparing needs between regions and statistical areas) [51]. The latter is a particularly important point, as the

project is underpinned by a community-based participatory approach, whereby local communities will be actively involved in project promotion and implementation, as well as the dissemination and translation of research findings; this will ensure the research informs and facilitates meaningful change at the local level [52].

Despite its strengths, the RESONATE study does have a limitation - its susceptibility to self-selection bias. Whilst it is not possible to eliminate this bias entirely due to the use of non-probability (self-selection) sampling, the study has put in place multiple measures to help mitigate this risk and the risk of other biases. These strategies include the implementation of a comprehensive multi-modal recruitment campaign with extensive reach to the regional SA population (to minimise undercoverage bias); intensive community engagement (to maximise widespread community participation and reduce sampling bias); the provision of alternative survey administration methods (to mitigate recruitment bias); the use of an instrument with acceptable psychometric properties (to reduce measurement error), and the weighting of sample data (to adjust for an unrepresentative sample) [53].

## CONCLUSION

RESONATE will represent the largest health survey ever conducted in regional South Australia. The study will further our understanding of the state of health of regional South Australia, and will impart new insights into the health service experiences, utilization and expectations of this population. Accordingly, the findings of this research will help us to better understand the health care needs of regional South Australians. An important next step of this research will be to map these needs against existing health workforce supply to enable policy makers, health care providers, researchers and educationalists to identify the health workforce required to better support the health of regional South Australians.

## ABBREVIATIONS

ANOVA: Analysis of variance

CONVERSATIONS: Consumer utilisation, expectations and experiences of health care instrument

IQR: Interquartile range

RESONATE: Regional South Australia Health

## DECLARATIONS

### Ethics approval and consent to participate

The study was approved by the Human Research Ethics Committee of the University of South Australia [Protocol ID: 0000034611]. Participants will be informed about the study via the survey cover sheet and project website. Informed consent will be implied through completion of the survey.

### Consent for publication

Not applicable.

### Availability of data

Datasets used and/or analysed during the current study will be available from the corresponding author on reasonable request.

### Competing interests

The authors declare that they have no competing interests.

### Funding

Not applicable.

**Authors' contributions**

ML conceptualised the project and drafted the manuscript. MJ, MG and EM reviewed and edited the manuscript. All authors read and approved the final manuscript.

**Acknowledgements**

This research will be supported by infrastructure provided by the Department of Rural Health, University of South Australia.

**REFERENCES**

1. The World Bank. World bank open data. 2017. http://data.worldbank.org/. Accessed 10 Aug 2017.
2. Australian Bureau of Statistics. Regional Population Growth, Australia, 2016. Cat. No. 3218.0. Canberra, Australia: Australian Bureau of Statistics; 2017.
3. Australian Bureau of Statistics. ABS.Stat. Canberra, Australia: Australian Bureau of Statistics; 2017.
4. Organisation for Economic Co-operation & Development (OECD). OECD health policy overview: health policy in Australia. Paris, France: OECD; 2015.
5. Ahern T, Gardner A, Courtney M. Exploring patient support by breast care nurses and geographical residence as moderators of the unmet needs and self-efficacy of Australian women with breast cancer: Results from a cross-sectional, nationwide survey. Eur J Oncol Nurs. 2016;23:72-80.
6. Colman E, Missinne S, Bracke P. The Role of Perceived Helpfulness in Predicting Subjective Unmet Need and the Frequency of Health Care Use. Arch Psych Nurs. 2014;28:43-49.

7. Dezetter A, Duhoux A, Menear M, Roberge P, Chartrand E, Fournier L. Reasons and Determinants for Perceiving Unmet Needs for Mental Health in Primary Care in Quebec. Can J Psychiatr. 2015;60:284-293.
8. Ghuman SJ, Brackbill RM, Stellman SD, Farfel MR, Cone JE. Unmet mental health care need 10-11 years after 9/11 terrorist attacks: 2011-2012 results from the World Trade Center Health Registry. BMC Public Health. 2014;14:491-499.
9. Ou L, Chen J, Hillman K. Socio-demographic disparities in the utilisation of general practice services for Australian children - Results from a nationally representative longitudinal study. PLOS One. 2017;12:e0176563.
10. Pappa E, Kontodimopoulos N, Papadopoulos A, Tountas Y, Niakas D. Investigating Unmet Health Needs in Primary Health Care Services in a Representative Sample of the Greek Population. Int J Environ Res Public Health. 2013;10:2017–2027.
11. Ronksley PE, Sanmartin C, Campbell DJT, Weaver RG, Allan M, McBrien KA, et al. Perceived barriers to primary care among western Canadians with chronic conditions. Stat Can. 2014;25:3-10.
12. Andrade LH, Alonso J, Mneimneh Z, Wells JE, Al-Hamzawi G, Borges E, et al. Barriers to mental health treatment: results from the WHO World Mental Health surveys. Psychol Med. 2014;44:1303-17.
13. Allen H, Wright B J, Harding K, Broffman L. The Role of Stigma in Access to Health Care for the Poor. Milbank Q. 2014;92:289-318.
14. Monger M. Stigma: barrier to quality of life and health care. HIV Clinician. 2011;23:1,4-5.
15. Sheikh-Mohammed M, MacIntyre CR, Wood NJ, Leask J, Isaacs D. Barriers to access to health care for newly resettled sub-Saharan refugees in Australia. Med J Aust. 2006;185:594-597.

16. Hull M, Fennell KM, Vallury K, Jones M, Dollman J. A comparison of barriers to mental health support-seeking among farming and non-farming adults in rural South Australia. Aust J Rural Health. 2017; Epub ahead of print.
17. Stewart H, Jameson JP, Curtin L. The relationship between stigma and self-reported willingness to use mental health services among rural and urban older adults. Psychol Serv. 2015;12:141-148.
18. Syed ST, Gerber BS, Sharp LK. Traveling towards disease: transportation barriers to health care access. J Community Health. 2013;38:976-993.
19. Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. Milbank Q. 2005;83:1-28.
20. Babitsch B, Gohl D, von Lengerke T. Re-revisiting Andersen's Behavioral Model of Health Services Use: a systematic review of studies from 1998–2011. Psychosoc Med. 2012;9:Doc11.
21. Bindman AB, Grumbach K, Osmond D, Komaromy M, Vranizan K, Lurie N, et al. Preventable hospitalizations and access to health care. J Am Med Assoc. 1995;274:305–311.
22. McCusker J, Roberge D, Lévesque JF, Ciampi A, Vadeboncoeur A, Larouche D, et al. Emergency department visits and primary care among adults with chronic conditions. Med Care. 2010; 48: 972–980.
23. Zuckerman S, Shen YC. Characteristics of occasional and frequent emergency department users: Do insurance coverage and access to care matter. Med Care. 2004;42:176–182.
24. Ronksley PE, Sanmartin C, Quan H, Ravani P, Tonelli M, Manns B, et al. Association between perceived unmet health care needs and risk of adverse health outcomes among patients with chronic medical conditions. Open Med. 2013;7:e21-30.
25. Ayanian JZ, Weissman JS, Schneider EC, Ginsburg JA, Zaslavsky AM. Unmet Health Needs of Uninsured Adults in the United States. JAMA. 2000;284:2061-2069.

26. Hansen DG, Larsen PV, Holm LV, Rottmann N, Bergholdt SH, Søndergaard J. Association between unmet needs and quality of life of cancer patients: A population-based study. Acta Oncol. 2013;52:391-399.

27. Slade M, Leese M, Cahill S, Thornicroft G, Kuipers E. Patient-rated mental health needs and quality of life improvement. Br J Psychiatry. 2005;187:256-261.

28. Smith AW, Parsons HM, Kent EE, Bellizzi K, Zebrack BJ, Keel G, et al. Unmet support service needs and health-related quality of life among adolescents and young adults with cancer: the AYA HOPE study. Front Oncol. 2013;3:75.

29. Australian Bureau of Statistics. National Health Survey: First Results, 2014-15. Cat. No. 4364.0.55.001. Canberra: Australian Bureau of Statistics; 2015.

30. Falci L, Shi Z, Greenlee H. Multiple Chronic Conditions and Use of Complementary and Alternative Medicine Among US Adults: Results From the 2012 National Health Interview Survey. Prev Chronic Dis. 2016;13:150501.

31. Busato A, Donges A, Herren S, Widmer M, Marian F. Health status and health care utilisation of patients in complementary and conventional primary care in Switzerland - an observational study. Fam Prac. 2006;23:116-124.

32. Chao M, Wade C, Kronenberg F, Kalmuss D, Cushman L. Women's reasons for complementary and alternative medicine use: Racial/ethnic differences. J Altern Complement Med. 2006;12:719-720.

33. Simoes-Wust A, Rist L, Dettling M. Self-reported health characteristics and medication consumption by cam users and nonusers: A swiss cross-sectional survey. J Altern Complement Med. 2014;20:40-47.

34. Sirois FM. Motivations for consulting complementary and alternative medicine practitioners: A comparison of consumers from 1997–8 and 2005. BMC Complement Altern Med. 2008;8:16.

35. Women's Health Australia. Australian Longitudinal Study on Women's Health: Surveys. 2015. http://www.alswh.org.au/for-researchers/surveys#. Accessed 23 Jul 2015.
36. Polit D, Hungler B. Nursing Research: Principles and Methods (seventh edition). Philadelphia, USA: Lippincott; 2004.
37. Davis L. Instrument review: Getting the most from a panel of experts. App Nurs Res. 1992;5:194-197.
38. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med. 2016;15:155-163.
39. Konstan JA, Rosser BRS, Ross MW, Stanton J, Edwards WM. The story of subject naught: a cautionary but optimistic tale of Internet survey research. J Comput Mediat Commun. 2005;10:11.
40. Australian Institute of Health and Welfare (AIHW). Rural, regional and remote health - indicators of health system performance. Rural Health Series no. 10, cat. No. PHE103. AIHW: Canberra, Australia; 2008.
41. Beckmann KR, Bennett A, Young GP, Cole SR, Joshi R, Adams J, et al. Sociodemographic disparities in survival from colorectal cancer in South Australia: a population-wide data linkage study. BMC Health Serv Res. 2016;16:24.
42. Chondur R, Li SQ, Lawton P. Does relative remoteness affect chronic disease outcomes? Geographic variation in chronic disease mortality in Australia, 2002–2006. Aust NZ J Public Health. 2013;38:117-121.
43. Fox P, Boyce A. Cancer health inequality persists in regional and remote Australia. Med J Aust. 2014;201:445-446.
44. Segal L, Leach MJ. An evidence-based health workforce model for primary and community care. Implement Sci. 2011;6:93.

45. Segal L, Leach MJ, May E, Turnbull C. Regional primary care team to deliver best-practice diabetes care: a needs-driven health workforce model reflecting a biopsychosocial construct of health. Diab Care. 2013;36:1898-1907.

46. Furber G, Segal L, Leach M, Turnbull C, Procter N, Diamond M, et al. Preventing mental illness: closing the evidence-practice gap through workforce and services planning. BMC Health Serv Res. 2015;15:283.

47. Department of Health. The national health workforce dataset (NHWDS): Physiotherapy 2015. Canberra, Australia: Department of Health; 2015.

48. Department of Health. Nurses and midwives 2016 fact sheet. Canberra, Australia: Department of Health; 2017.

49. Tennant M, Kruger E, Shiyha J. Dentist-to-population and practice-to-population ratios: in a shortage environment with gross mal-distribution what should rural and remote communities focus their attention on? Rural Remote Health. 2013;13:2518.

50. Centre for Research and Action in Public Health. 2015 regional wellbeing survey data tables: South Australia - natural resource management regions. University of Canberra: Canberra, Australia; 2016.

51. De Vaus D. Surveys in social research (sixth edition). Oxon, UK: Routledge; 2014.

52. Hacker K. Community-based participatory research. Thousand Oaks, USA: Sage; 2013.

53. Keeble C, Law GR, Barber S, Baxter PD. Choosing a method to reduce selection bias: a tool for researchers. Open J Epidemiol. 2015;5:155-162.

**FIGURES**

Figure 1. RESONATE flow chart

Figure 2. Conceptual framework of the CONVERSATIONS

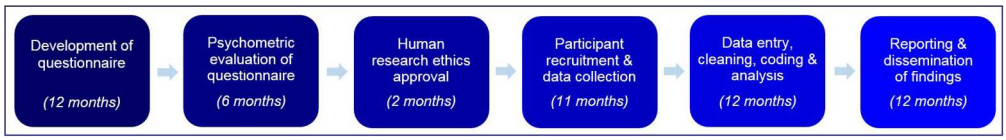



Figure 1. RESONATE flow chart

144x19mm (300 x 300 DPI)

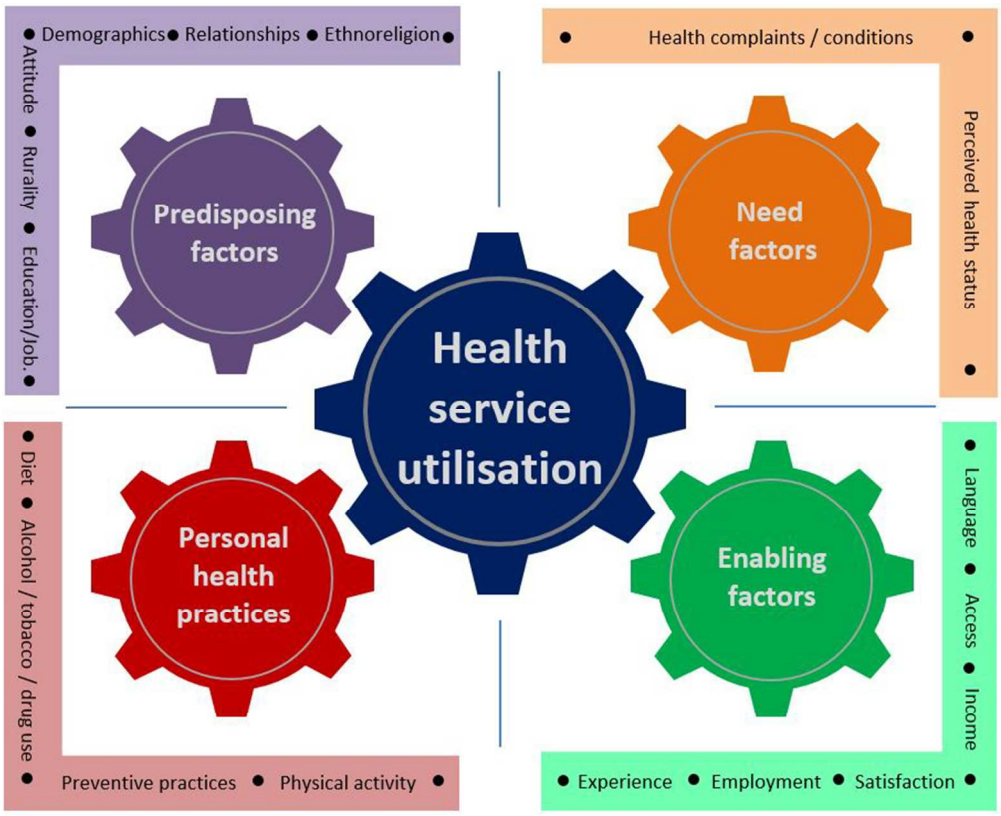



Figure 2. Conceptual Framework

76x62mm (300 x 300 DPI)

**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | 1 |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | NA |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 3-5 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | 5-6 |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | 5 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 6, 10-11 |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | 6 |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 9-10 |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 9-10 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 13-14 |
| Study size | 10 | Explain how the study size was arrived at | 6 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | NA |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 11-12 |
| | | (*b*) Describe any methods used to examine subgroups and interactions | 11-12 |
| | | (*c*) Explain how missing data were addressed | 11 |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy | 12 |
| | | (*e*) Describe any sensitivity analyses | NA |
| **Results** | | | |

| | | | |
|---|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | NA |
| | | (b) Give reasons for non-participation at each stage | NA |
| | | (c) Consider use of a flow diagram | NA |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | NA |
| | | (b) Indicate number of participants with missing data for each variable of interest | NA |
| Outcome data | 15* | Report numbers of outcome events or summary measures | NA |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | NA |
| | | (*b*) Report category boundaries when continuous variables were categorized | NA |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | NA |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | NA |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | NA |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 13-14 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | NA |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | NA |
| **Other information** | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 15 |

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

# The Regional South Australia Health Survey [RESONATE]: Study protocol

| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2017-019784.R2 |
| Article Type: | Protocol |
| Date Submitted by the Author: | 02-Feb-2018 |
| Complete List of Authors: | Leach , Matthew ; University of South Australia, Department of Rural Health<br>Jones, Martin; University of South Australia, Department of Rural Health<br>Gillam, Marianne; University of South Australia, Department of Rural Health<br>May, Esther; University of South Australia, Division of Health Sciences |
| Primary Subject Heading: | Public health |
| Secondary Subject Heading: | Research methods |
| Keywords: | PUBLIC HEALTH, PRIMARY CARE, EPIDEMIOLOGY, STATISTICS & RESEARCH METHODS |
| | |

# The Regional South Australia Health Survey [RESONATE]: Study protocol

***Matthew J Leach****, Senior Research Fellow, Department of Rural Health, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: matthew.leach@unisa.edu.au

***Martin Jones***, Director: Department of Rural Health, University of South Australia, 111 Nicolson Avenue, Whyalla Norrie, South Australia, 5608, Australia. Email: martin.jones@unisa.edu.au

***Marianne Gillam***, Research Fellow, Department of Rural Health, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: marianne.gillam@unisa.edu.au

***Esther May***, Dean: Clinical Education and Equity, Division of Health Sciences, University of South Australia, North Terrace, Adelaide, South Australia, 5000, Australia. Email: esther.may@unisa.edu.au

*Corresponding author

# The Regional South Australia Health Survey [RESONATE]: Study protocol

**ABSTRACT**

***Introduction***: Access to quality health care services is considered a moral right. However, for people living in regional locations, timely access to the services that they need may not always be possible because of structural and attitudinal barriers. This suggests that people living in regional areas may have unmet health care needs. The aim of this research will be to examine the health care needs, expectations and experiences of regional South Australians.

***Methods and Analysis***: The Regional South Australia Health (RESONATE) survey is a cross-sectional study of adult health consumers living in any private or non-private dwelling, in any regional, rural, remote or very remote area of South Australia, and with an understanding of written English. Data will be collected using a 45-item, multi-dimensional, self-administered instrument, designed to measure health care need, barriers to health care access, and health service utilisation, attitudes, experiences and satisfaction. The instrument has demonstrated acceptable psychometric properties, including good content validity and internal reliability, good test-retest reliability, and a high level of acceptability. The survey will be administered online and in hard-copy, with at least 1,832 survey participants to be recruited over a twelve-month period, using a comprehensive, multi-modal recruitment campaign.

***Ethics and dissemination***: The study has been reviewed and approved by the Human Research Ethics Committee of the University of South Australia. The results will be actively disseminated through peer-reviewed journals, conference presentations, social media, broadcast media, print media, the internet, and various community/stakeholder engagement activities.

***Key words***: experience; expectation; health; protocol; needs; regional; rural; survey.

**Strengths and limitations of this study**

- This study will represent the largest survey ever conducted to examine the health care needs, expectations and experiences of regional South Australians.
- The use of non-probability sampling, whilst economically and logistically advantageous, will elevate the risk of self-selection bias.
- Multiple strategies will be put in place to mitigate the risk of sampling, undercoverage, recruitment and participation bias, as well as measurement error.

## BACKGROUND

Almost 46% of the world's population live in regional, rural, remote or very remote areas (hereafter referred to as regional); these regions are often characterised by much lower population densities (i.e. global mean of 30.3 people per square kilometre) relative to urban areas (i.e. global mean of 1109.6 people per square kilometre) [1]. In Australia, close to 33% of the nation's population live in regional areas, with an estimated population density as low as 10.33 people per square kilometre [2,3]. The wide dispersion of the regional Australian population creates a number of challenges for health care delivery; for instance, timely access to the services that regional Australians need may not always be possible. The complexity of the Australian health care system (i.e. the complex split of funding and responsibility across Federal, State and Territory governments, and across public and private sectors) amplifies the problem by creating additional challenges to the coordination, integration and continuity of health care services, especially for people living with chronic, co-morbid conditions and in regional locations [4].

In Australia, and internationally, there is a mounting body of evidence supporting the view that conventional health care services are struggling to meet the health care needs of consumers,

particularly those with chronic health conditions and those living in regional areas [5-11]. The literature identifies some reasons why health consumer's needs are perhaps not being met. These barriers and enablers of healthcare utilisation can be broadly represented under two themes: structural factors (i.e. accessibility, cost, time/availability, convenience), and attitude (i.e. not needing medical support, stigma, improving symptoms, poor relationship with healthcare provider) [11-15]. For regional communities, these factors can be prominent obstacles to health care access [16-18].

Andersen and Newman [19] take a less simplistic view of health service use by viewing these determinants through a behavioural lens. Their construct, the Anderson Behavioural Model of health service use, identifies four key drivers of health care utilisation: predisposing factors (i.e. prevailing conditions that predispose an individual to use a health service), enabling factors (i.e. circumstances that either facilitate or hinder health service use), need factors (i.e. actual or perceived need for health services) and personal health practices (i.e. behaviours that influence health status). While many studies have used the Anderson Behavioural Model to investigate the use of health services, the range of variables reported to date has been limited and highly variable [20]. There is also a need to better understand how these determinants of health care utilisation differ across populations (e.g. between regional areas); the study described herein aims to address these knowledge gaps.

The impact of unmet health care need (i.e. the difference between services required and services received) [10] at a systems level is not entirely clear. Several studies indicate that perceived unmet health care need is associated with higher rates of hospital admission, longer lengths of stay, and more frequent visits to emergency departments [21-23]; however, the evidence is not consistent [24]. Other studies suggest that those expressing an unmet health need access health care

services less frequently [6]; this could have potential implications for consumer morbidity and mortality due to deficits in disease screening, monitoring, maintenance and risk reduction [25].

At the individual level, the impact of unmet health care need can be substantial. Findings from several studies support an association between unmet health need and poorer quality of life [26-28], worse mental health [28] and psychological distress [26]. Although the direction of this association has yet to be determined, it does suggest that many health care systems have failed to some degree in meeting health consumer needs.

The significant implications of unmet consumer need signify the importance of furthering our understanding of the needs of health consumers; this is particularly evident in regional populations where there are considerable barriers to health care access, as well as a large health workforce maldistribution; as is the case in regional Australia. A more detailed exploration of the determinants of health service utilisation at a State/Territory level may help to discern these needs. A population of particular importance is regional South Australia, which has one of the highest rates of chronic disease, co-morbidity, psychological distress, and fair/poor self-assessed health status of any State or Territory of Australia [29]. In addressing the abovementioned points, the proposed project will be the first known study to explore regional South Australian expectations and experiences in using diverse conventional and complementary health care services, with a view to better understanding the health care needs of this population.

## METHODS

***Study Design***: The Regional South Australia Health (RESONATE) survey employs a cross-sectional study design. An overview of the study procedures, from questionnaire development through to the reporting of survey findings, is illustrated in Figure 1.

***Aim and objectives***: RESONATE aims to examine the health care needs, expectations and experiences of regional South Australians. The objectives of the study will be to:

1. Determine the 12-month/lifetime prevalence of health conditions *(i.e. diagnosed or treated by a health professional)*, surgical procedures, and multi-morbidity *(measured using the multiple chronic condition index* [30]*)* among persons living in regional South Australia.
2. Examine the extent to which health services / treatments were used *(i.e. frequency of use in the previous twelve months)* by persons living in regional South Australia.
3. Identify the information resources *(e.g. internet, friend, health provider)* used in the previous twelve months to inform a person's decision to use a health service / treatment in regional South Australia.
4. Identify the extent *(using a 4-point frequency scale)* to which structural *(e.g. cost, distance)* and attitudinal *(e.g. stigma)* barriers prevent persons from accessing health services / treatments in regional South Australia.
5. Ascertain the experiences *(i.e. lifetime prevalence of adverse events, miscommunication, misunderstanding and disrespect, using a 4-point frequency scale)* of persons living in regional South Australia with various health services / treatments.
6. Determine the attitudes of persons living in regional South Australia toward various health services / treatments *(i.e. perceptions of the roles, values, accessibility and quality of a heath care service, using a 5-point Likert scale*).
7. Determine the degree *(using a 5-point Likert scale)* to which persons living in regional South Australia are satisfied with the quality of health services / treatments they have received.
8. Identify the determinants of health service utilisation, expectations and experiences among persons living in regional South Australia.

***Sample & Setting***: The study will use non-probability (self-selection) sampling for economic and logistical reasons. The sample will comprise adult health consumers (i.e. a person over the age of 18 years who has used a health care service or received any health intervention within the last twelve months) living in any private or non-private dwelling, in any regional, rural, remote or very remote area of South Australia (a region that covers 99.7% of the land area of the state [3]). Participants also must be able to read and understand written English, comprehend the information provided, and have either a fixed address (for delivery of the hard-copy version of the survey) or access to the internet (to access the online version of the survey). Excluded will be people with severe cognitive impairment, severe vision impairment, and those not able to provide consent. Based on a target population of 290,290 adults, the study will need to survey at least 1,832 persons; this is based on a ± 3% margin of error at the 99% confidence level.

***Questionnaire***: The consumer utilisation, expectations and experiences of health care instrument (CONVERSATIONS) is a multidimensional, self-administered questionnaire designed to measure health service utilisation, needs, expectations and experiences. The development, validation and description of the instrument are detailed below.

- *Development*: Development of the questionnaire was an iterative process that began with an extensive search of the health motivation literature, the interrogation of pertinent surveys [30-35], and informal consultation with clinicians, researchers and consumers. This generated a large pool of potential survey items. Using the Andersen behavioural model of health service use [19] as the conceptual framework for the survey, potential questions were placed into one of four categories: predisposing factors, enabling factors, need factors and personal health practices (see Figure 2). The research team reviewed the items under each category to ensure questions adequately captured the construct of the framework (i.e. to

confirm face validity), questions were clear in their meaning, response items were comprehensive, and any duplicate/overlapping items were removed. The list of items, comprising a combination of open questions (i.e. free text boxes) and closed questions (i.e. Likert scales, dichotomous items and nominal items), were then re-ordered to improve the flow of the survey, to simplify data analysis, and to be more meaningful to respondents.

- *Validation*: The preliminary 51-item CONVERSATIONS underwent a two-stage psychometric evaluation. The first stage recruited a purposive sample of 9 international academics with expertise in survey design and/or health service utilisation, as well as a track record in regional health research, to assess the content validity of the survey. Academics were identified through online staff directories of major Australian and international Universities. The sample comprised 3 academics from Australia, 2 from the US, and 1 each from Spain, New Zealand, the UK and Israel, of whom 5/9 were female. Using the method described by Polit and Hungler [36], respondents indicated the relevance of each survey item by assigning one of four responses to each item: (1) question is relevant, (2) question is relevant but needs minor alteration, (3) question is relevant but needs major alteration, and (4) question is not relevant to the survey construct (i.e. health service need). The mean percentage of items with a score of 3 or 4 was calculated (i.e. agreement of relevancy) for each subsection of the survey, and for the survey overall, with good content validity defined as a level of agreement of 80% or above [36,37]. After the removal of seven irrelevant questions, the CONVERSATIONS survey was shown to have good scale-level content validity (mean 85.3% ± SD 13.1%), and good subscale-level content validity (Part A 84.1% ± 17.9%; Part B 86.7% ± 8.6%; Part C 81.8% ± 12.1%; Part D 88.8% ± 9.6%; Part E 88.5% ± 0.9%). Of the retained questions, 16 items underwent minor editorial changes based on expert feedback.

In the second stage of evaluation, a purposive sample of 16 health consumers, of various age groups, and diverse cultural, educational and socio-economic backgrounds (including one-third with lived experience in regional Australia), were invited to complete the CONVERSATIONS, on two separate occasions, two-weeks apart. The purposive sample was identified through the research team's social network, and comprised 11 females and 5 males, aged between 21 and 66 years (mean age 42.9 ± 10.2 years), of whom 12 resided in Australia, 3 in the UK and 1 in Singapore. Data from the baseline survey were used to assess the acceptability (i.e. frequency of missing data, completion time) and internal consistency (i.e. Cronbach's alpha) of the instrument. The baseline and week two data were used to measure test-retest reliability (using the intraclass correlation coefficient [absolute agreement, two-way mixed-effects model] for scale and ordinal data, and Cohen's Kappa for nominal data).

The analysis revealed a median completion time of 20 (IQR 15,30) minutes, and a high level of acceptability, with 15/16 (93.8%) participants submitting a fully-completed survey at baseline. The 6-item experience subscale and 16-item attitude subscale of the instrument demonstrated good to excellent internal reliability [36], with values reported as follows: experience of conventional treatments (a component of Part C: α=0.92); experience of CAM treatments (a component of Part D: α=0.88); attitude toward conventional treatments (a component of Part C: α=0.90); and attitude toward CAM treatments (a component of Part D: α=0.88). There was also good to excellent agreement between baseline and week-2 scores for three out of five parts of the instrument (Mean reliability coefficients: Part A 0.962, 95% CI 0.950, 0.973; Part B 0.827, 95% CI 0.738, 0.917; Part C 0.768, 95% CI 0.701, 0.834), and moderate agreement between scores for two parts (Mean reliability coefficients: Part D 0.699, 95% CI 0.603, 0.795; Part E 0.741, 95% CI 0.408, 1.000). Overall, the CONVERSATIONS

demonstrated good test-retest reliability (Overall mean reliability coefficient: 0.799, 95% CI 0.749, 0.849) [38].

Given the multi-dimensionality and multi-disciplinary nature of the survey, as well as the self-administered design, there was no similar instrument for which the CONVERSATIONS could be compared against; as such, it was not possible to measure convergent validity.

- *Description*: The final instrument was a 44-item questionnaire divided into five sections: (i) demographic characteristics [Part A; 16 items, including age, sex, level of education, marital status, caregiver status, religion, English language proficiency, health literacy, country of birth, number of dependent children, regional classification, employment status, occupation, annual household income, current postcode, years lived in postcode], (ii) health status and lifestyle [Part B; 10 items, including overall health rating, diagnosed health conditions, surgical history, sedentary duration, dietary intake, level of physical activity, alcohol consumption, smoking status, illicit drug use, health screening activity], (iii) use of conventional / mainstream health services [Part C; 8 items, including 12-month / lifetime use of conventional health services, frequency of visits to conventional health providers, satisfaction with the quality of care received by conventional health providers, utilisation of conventional health treatments / services, information resources impacting the decision to use conventional health care services, experience with using conventional health services, barriers to accessing conventional health services, attitude toward conventional health services], (iv) use of complementary / alternative / natural health and self-prescribed services [Part D; 9 items, including 12-month / lifetime use of complementary health services, frequency of visits to complementary health providers, satisfaction with the quality of care received by complementary health providers, utilisation of complementary and self-

prescribed health treatments / services, information resources impacting the decision to use complementary health care services, experience with using complementary health services, barriers to accessing complementary health services, attitude toward complementary health services], and (v) other [Part E; 1 item, measuring preferred mix of health services]. A hard-copy version and online version (using the SurveyMonkey™ platform) of the CONVERSATIONS have been generated for this study.

***Recruitment/procedures***: The project will implement a comprehensive, multi-modal recruitment campaign, and in accordance with a community-based participatory approach, will involve extensive community engagement. The strategies that will be employed are outlined in Table 1. The majority of these strategies will direct participants to the project website, which will contain further information about the study, the participant information sheet, a web enquiry form, and a link to the online survey. Participants who cannot (or prefer not to) complete the survey online will be advised to contact the research department, using the toll-free telephone number provided, to have the participant information sheet, survey and reply-paid envelope posted out to them. To facilitate recruitment, all participants who opt in will be entered into a draw to win one of 20 x $50 gift cards. Recruitment for the survey will take place between April 2017 and March 2018.

**Table 1: Recruitment strategies for the RESONATE survey**

| Category | Strategy | Platform / agency / medium |
|---|---|---|
| **Social media** | Social media advertising | Facebook Ads (targeting a regional SA audience) |
| | Social media posts (i.e. study information / invitations) | Facebook pages, LinkedIn, Twitter |
| **Broadcast media** | Region-specific media releases | All television and radio stations in regional SA |
| | Television classified advertising | All television stations in regional SA |
| **Print media** | Region-specific media releases | All newspapers in regional SA |

| | | |
|---|---|---|
| | Letterbox drops (i.e. study postcards) | All households, businesses and post-office boxes in regional SA |
| | Study flyers | All local councils, public libraries and community agencies in regional SA |
| | Newsletter articles | All local councils, community groups, sporting groups, primary health networks and industry groups in regional SA |
| **Online media** | Project website | Dedicated project website with exclusive web address |
| | Email blasts | Distribution lists of local councils, community groups, sporting groups, health consumer agencies, primary health networks, regional development boards, industry groups and universities in regional SA |
| **Community engagement** | Public lectures | All University of South Australia Department of Rural Health major training sites; community groups |
| | Stakeholder group meetings | Country SA primary health network regional committees; local councils |
| | Community / public events | Community fairs; Conferences; Exhibitions; Shopping centre displays |

SA: South Australia

***Planned analysis***: Data from hard-copy surveys will be directly entered into the online survey by the research team. On completion of the project, data will be exported from the SurveyMonkey platform into SPSS (v.24) for data cleaning and statistical analysis. Missing data will be prevented by enacting forced survey responses. Multiple responses from single participants will be managed using the de-duplication procedure for online surveys described by Konstan et al [39]. In brief, all responses will be screened for duplicate internet service provider (ISP) entries (including the first three quadrants of an ISP address). Any duplicate ISP entries that report matching demographic data (i.e. age, sex, highest education and marital status) will be considered a duplicate response and subsequently excluded from the analysis (with only the first dated entry retained). Categorical data will be descriptively analysed using frequency distributions and percentages. Measures of central tendency and variability will be used for continuous data where values are normally

distributed, whereas medians and the interquartile range will be used to describe data that is not normally distributed. Differences between groups will be assessed using independent samples t-tests or Mann–Whitney U test (for continuous variables), chi-square test (for categorical variables), and ANOVA or Kruskal-Wallis (where there are more than two groups). Independent predictors of health service utilisation (i.e. frequency of visits to health providers), expectations (i.e. health care attitude score) and experiences (i.e. health care experience score) will be identified using regression analysis. The representativeness of the sample to the base population will be cross-checked against regional South Australia demographic data derived from the 2016 Australian population census. To mitigate the self-selection bias, the survey sample distribution will be adjusted by applying weights to the age, sex and location distribution of the regional South Australian population; these weights will be based on 2016 Australian population census data.

## DISCUSSION

Health inequalities and inadequate health service provision are major concerns facing regional Australia. In fact, living in regional locations of Australia is associated with poorer health outcomes, increased chronic disease mortality and lower life expectancy when compared with living in metropolitan locations [40-43]. An important first step in addressing these health status disparities is understanding the health care needs of the regional population. The RESONATE survey will explore these needs in detail, as well as gain new insights into the health care expectations and experiences of people living in regional South Australia.

In addition to shedding new light on the health care needs of regional South Australians, the findings of this research will make an important contribution to future health services planning. Using the needs-based health workforce planning framework, the health care needs of this

population can be mapped against best practice care to estimate total health workforce requirements [44]. This model has already been applied to regional populations with diabetes [45] and mental illness [46], and takes a far more "richer perspective on population needs" than other workforce planning approaches [44]. Given the considerable health workforce maldistribution in regional South Australia [47-49], this is an important next step for this research.

If the RESONATE study can reach, or even exceed its target of 1,832 participants, it will represent the largest health survey conducted in regional South Australia. Importantly, the study will complement the results of other large studies of regional South Australians, including the Australian Bureau of Statistics National Health Survey (estimated n=818) [30] and the National Regional Wellbeing Survey (n=1,126) [50], by reporting unique insights into the regional South Australian population not yet available. Further, the large sample will enable meaningful subgroup analyses to be performed to better inform local policy and strategy (e.g. comparing needs between regions and statistical areas) [51]. The latter is a particularly important point, as the project is underpinned by a community-based participatory approach, whereby local communities will be actively involved in project promotion and implementation, as well as the dissemination and translation of research findings; this will ensure the research informs and facilitates meaningful change at the local level [52].

Despite its strengths, the RESONATE study does have a limitation - its susceptibility to self-selection bias. Whilst it is not possible to eliminate this bias entirely due to the use of non-probability (self-selection) sampling, the study has put in place multiple measures to help mitigate this risk and the risk of other biases. These strategies include the implementation of a comprehensive multi-modal recruitment campaign with extensive reach to the regional SA population (to minimise undercoverage bias); intensive community engagement (to maximise

widespread community participation and reduce sampling bias); the provision of alternative survey administration methods (to mitigate recruitment bias); the use of an instrument with acceptable psychometric properties (to reduce measurement error), and the weighting of sample data (to adjust for an unrepresentative sample) [53].

In summary, RESONATE will represent the largest health survey ever conducted in regional South Australia. The study will further our understanding of the state of health of regional South Australia, and will impart new insights into the health service experiences, utilization and expectations of this population. Accordingly, the findings of this research will help us to better understand the health care needs of regional South Australians. An important next step of this research will be to map these needs against existing health workforce supply to enable policy makers, health care providers, researchers and educationalists to identify the health workforce required to better support the health of regional South Australians.

## ETHICS AND DISSEMINATION

The study has been reviewed and approved by the Human Research Ethics Committee of the University of South Australia [Protocol ID: 0000034611], and will be conducted in accordance with the National Health & Medical Research Council (NHMRC) national statement on ethical conduct in research, as well as the approved study protocol. A detailed participant information sheet will preface each survey, with voluntary completion of the survey implying informed consent to participate. No personally identifiable information will be collected in order to maintain the anonymity of the survey.

The findings of the survey will be communicated using a comprehensive dissemination strategy. The strategy will utilise various forms of media to reach out to a diverse range of stakeholder

groups and individuals, at the local, national and international level; this will include the use of academic media (i.e. peer-reviewed journal articles, national and international conference presentations), social media (i.e. Facebook, Twitter), print media (i.e. newspaper), broadcast media (i.e. radio, television), the internet (i.e. links to study reports on the Department of Rural Health website), electronic and postal mail (i.e. posting of study findings to participants and stakeholders) and community/stakeholder engagement activities (i.e. community forums, stakeholder meetings).

## ABBREVIATIONS

ANOVA: Analysis of variance

CONVERSATIONS: Consumer utilisation, expectations and experiences of health care instrument

IQR: Interquartile range

RESONATE: Regional South Australia Health

## DECLARATIONS

### Ethics approval and consent to participate

The study was approved by the Human Research Ethics Committee of the University of South Australia [Protocol ID: 0000034611]. Participants will be informed about the study via the survey cover sheet and project website. Informed consent will be implied through completion of the survey.

### Consent for publication

Not applicable.

### Availability of data

Datasets used and/or analysed during the current study will be available from the corresponding author on reasonable request.

**Competing interests**

The authors declare that they have no competing interests.

**Funding**

Not applicable.

**Authors' contributions**

ML conceptualised the project and drafted the manuscript. MJ, MG and EM reviewed and edited the manuscript. All authors read and approved the final manuscript.

**Acknowledgements**

This research will be supported by infrastructure provided by the Department of Rural Health, University of South Australia.

**REFERENCES**

1. The World Bank. World bank open data. 2017. http://data.worldbank.org/. Accessed 10 Aug 2017.
2. Australian Bureau of Statistics. Regional Population Growth, Australia, 2016. Cat. No. 3218.0. Canberra, Australia: Australian Bureau of Statistics; 2017.
3. Australian Bureau of Statistics. ABS.Stat. Canberra, Australia: Australian Bureau of Statistics; 2017.
4. Organisation for Economic Co-operation & Development (OECD). OECD health policy overview: health policy in Australia. Paris, France: OECD; 2015.

5. Ahern T, Gardner A, Courtney M. Exploring patient support by breast care nurses and geographical residence as moderators of the unmet needs and self-efficacy of Australian women with breast cancer: Results from a cross-sectional, nationwide survey. Eur J Oncol Nurs. 2016;23:72-80.
6. Colman E, Missinne S, Bracke P. The Role of Perceived Helpfulness in Predicting Subjective Unmet Need and the Frequency of Health Care Use. Arch Psych Nurs. 2014;28:43-49.
7. Dezetter A, Duhoux A, Menear M, Roberge P, Chartrand E, Fournier L. Reasons and Determinants for Perceiving Unmet Needs for Mental Health in Primary Care in Quebec. Can J Psychiatr. 2015;60:284-293.
8. Ghuman SJ, Brackbill RM, Stellman SD, Farfel MR, Cone JE. Unmet mental health care need 10-11 years after 9/11 terrorist attacks: 2011-2012 results from the World Trade Center Health Registry. BMC Public Health. 2014;14:491-499.
9. Ou L, Chen J, Hillman K. Socio-demographic disparities in the utilisation of general practice services for Australian children - Results from a nationally representative longitudinal study. PLOS One. 2017;12:e0176563.
10. Pappa E, Kontodimopoulos N, Papadopoulos A, Tountas Y, Niakas D. Investigating Unmet Health Needs in Primary Health Care Services in a Representative Sample of the Greek Population. Int J Environ Res Public Health. 2013;10:2017–2027.
11. Ronksley PE, Sanmartin C, Campbell DJT, Weaver RG, Allan M, McBrien KA, et al. Perceived barriers to primary care among western Canadians with chronic conditions. Stat Can. 2014;25:3-10.
12. Andrade LH, Alonso J, Mneimneh Z, Wells JE, Al-Hamzawi G, Borges E, et al. Barriers to mental health treatment: results from the WHO World Mental Health surveys. Psychol Med. 2014;44:1303-17.

13. Allen H, Wright B J, Harding K, Broffman L. The Role of Stigma in Access to Health Care for the Poor. Milbank Q. 2014;92:289-318.

14. Monger M. Stigma: barrier to quality of life and health care. HIV Clinician. 2011;23:1,4-5.

15. Sheikh-Mohammed M, MacIntyre CR, Wood NJ, Leask J, Isaacs D. Barriers to access to health care for newly resettled sub-Saharan refugees in Australia. Med J Aust. 2006;185:594-597.

16. Hull M, Fennell KM, Vallury K, Jones M, Dollman J. A comparison of barriers to mental health support-seeking among farming and non-farming adults in rural South Australia. Aust J Rural Health. 2017; Epub ahead of print.

17. Stewart H, Jameson JP, Curtin L. The relationship between stigma and self-reported willingness to use mental health services among rural and urban older adults. Psychol Serv. 2015;12:141-148.

18. Syed ST, Gerber BS, Sharp LK. Traveling towards disease: transportation barriers to health care access. J Community Health. 2013;38:976-993.

19. Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. Milbank Q. 2005;83:1-28.

20. Babitsch B, Gohl D, von Lengerke T. Re-revisiting Andersen's Behavioral Model of Health Services Use: a systematic review of studies from 1998–2011. Psychosoc Med. 2012;9:Doc11.

21. Bindman AB, Grumbach K, Osmond D, Komaromy M, Vranizan K, Lurie N, et al. Preventable hospitalizations and access to health care. J Am Med Assoc. 1995;274:305–311.

22. McCusker J, Roberge D, Lévesque JF, Ciampi A, Vadeboncoeur A, Larouche D, et al. Emergency department visits and primary care among adults with chronic conditions. Med Care. 2010; 48: 972–980.

23. Zuckerman S, Shen YC. Characteristics of occasional and frequent emergency department users: Do insurance coverage and access to care matter. Med Care. 2004;42:176–182.

24. Ronksley PE, Sanmartin C, Quan H, Ravani P, Tonelli M, Manns B, et al. Association between perceived unmet health care needs and risk of adverse health outcomes among patients with chronic medical conditions. Open Med. 2013;7:e21-30.

25. Ayanian JZ, Weissman JS, Schneider EC, Ginsburg JA, Zaslavsky AM. Unmet Health Needs of Uninsured Adults in the United States. JAMA. 2000;284:2061-2069.

26. Hansen DG, Larsen PV, Holm LV, Rottmann N, Bergholdt SH, Søndergaard J. Association between unmet needs and quality of life of cancer patients: A population-based study. Acta Oncol. 2013;52:391-399.

27. Slade M, Leese M, Cahill S, Thornicroft G, Kuipers E. Patient-rated mental health needs and quality of life improvement. Br J Psychiatry. 2005;187:256-261.

28. Smith AW, Parsons HM, Kent EE, Bellizzi K, Zebrack BJ, Keel G, et al. Unmet support service needs and health-related quality of life among adolescents and young adults with cancer: the AYA HOPE study. Front Oncol. 2013;3:75.

29. Australian Bureau of Statistics. National Health Survey: First Results, 2014-15. Cat. No. 4364.0.55.001. Canberra: Australian Bureau of Statistics; 2015.

30. Falci L, Shi Z, Greenlee H. Multiple Chronic Conditions and Use of Complementary and Alternative Medicine Among US Adults: Results From the 2012 National Health Interview Survey. Prev Chronic Dis. 2016;13:150501.

31. Busato A, Donges A, Herren S, Widmer M, Marian F. Health status and health care utilisation of patients in complementary and conventional primary care in Switzerland - an observational study. Fam Prac. 2006;23:116-124.

32. Chao M, Wade C, Kronenberg F, Kalmuss D, Cushman L. Women's reasons for complementary and alternative medicine use: Racial/ethnic differences. J Altern Complement Med. 2006;12:719-720.
33. Simoes-Wust A, Rist L, Dettling M. Self-reported health characteristics and medication consumption by cam users and nonusers: A swiss cross-sectional survey. J Altern Complement Med. 2014;20:40-47.
34. Sirois FM. Motivations for consulting complementary and alternative medicine practitioners: A comparison of consumers from 1997–8 and 2005. BMC Complement Altern Med. 2008;8:16.
35. Women's Health Australia. Australian Longitudinal Study on Women's Health: Surveys. 2015. http://www.alswh.org.au/for-researchers/surveys#. Accessed 23 Jul 2015.
36. Polit D, Hungler B. Nursing Research: Principles and Methods (seventh edition). Philadelphia, USA: Lippincott; 2004.
37. Davis L. Instrument review: Getting the most from a panel of experts. App Nurs Res. 1992;5:194-197.
38. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med. 2016;15:155-163.
39. Konstan JA, Rosser BRS, Ross MW, Stanton J, Edwards WM. The story of subject naught: a cautionary but optimistic tale of Internet survey research. J Comput Mediat Commun. 2005;10:11.
40. Australian Institute of Health and Welfare (AIHW). Rural, regional and remote health - indicators of health system performance. Rural Health Series no. 10, cat. No. PHE103. AIHW: Canberra, Australia; 2008.

41. Beckmann KR, Bennett A, Young GP, Cole SR, Joshi R, Adams J, et al. Sociodemographic disparities in survival from colorectal cancer in South Australia: a population-wide data linkage study. BMC Health Serv Res. 2016;16:24.

42. Chondur R, Li SQ, Lawton P. Does relative remoteness affect chronic disease outcomes? Geographic variation in chronic disease mortality in Australia, 2002–2006. Aust NZ J Public Health. 2013;38:117-121.

43. Fox P, Boyce A. Cancer health inequality persists in regional and remote Australia. Med J Aust. 2014;201:445-446.

44. Segal L, Leach MJ. An evidence-based health workforce model for primary and community care. Implement Sci. 2011;6:93.

45. Segal L, Leach MJ, May E, Turnbull C. Regional primary care team to deliver best-practice diabetes care: a needs-driven health workforce model reflecting a biopsychosocial construct of health. Diab Care. 2013;36:1898-1907.

46. Furber G, Segal L, Leach M, Turnbull C, Procter N, Diamond M, et al. Preventing mental illness: closing the evidence-practice gap through workforce and services planning. BMC Health Serv Res. 2015;15:283.

47. Department of Health. The national health workforce dataset (NHWDS): Physiotherapy 2015. Canberra, Australia: Department of Health; 2015.

48. Department of Health. Nurses and midwives 2016 fact sheet. Canberra, Australia: Department of Health; 2017.

49. Tennant M, Kruger E, Shiyha J. Dentist-to-population and practice-to-population ratios: in a shortage environment with gross mal-distribution what should rural and remote communities focus their attention on? Rural Remote Health. 2013;13:2518.

50. Centre for Research and Action in Public Health. 2015 regional wellbeing survey data tables: South Australia - natural resource management regions. University of Canberra: Canberra, Australia; 2016.

51. De Vaus D. Surveys in social research (sixth edition). Oxon, UK: Routledge; 2014.

52. Hacker K. Community-based participatory research. Thousand Oaks, USA: Sage; 2013.

53. Keeble C, Law GR, Barber S, Baxter PD. Choosing a method to reduce selection bias: a tool for researchers. Open J Epidemiol. 2015;5:155-162.

**FIGURES**

Figure 1. RESONATE flow chart

Figure 2. Conceptual framework of the CONVERSATIONS

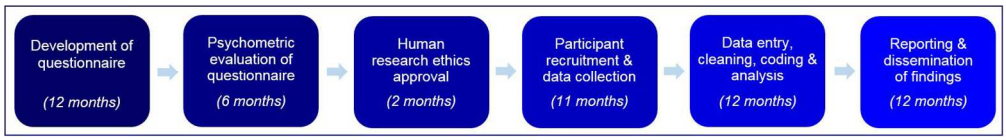



Figure 1. RESONATE flow chart

144x19mm (300 x 300 DPI)

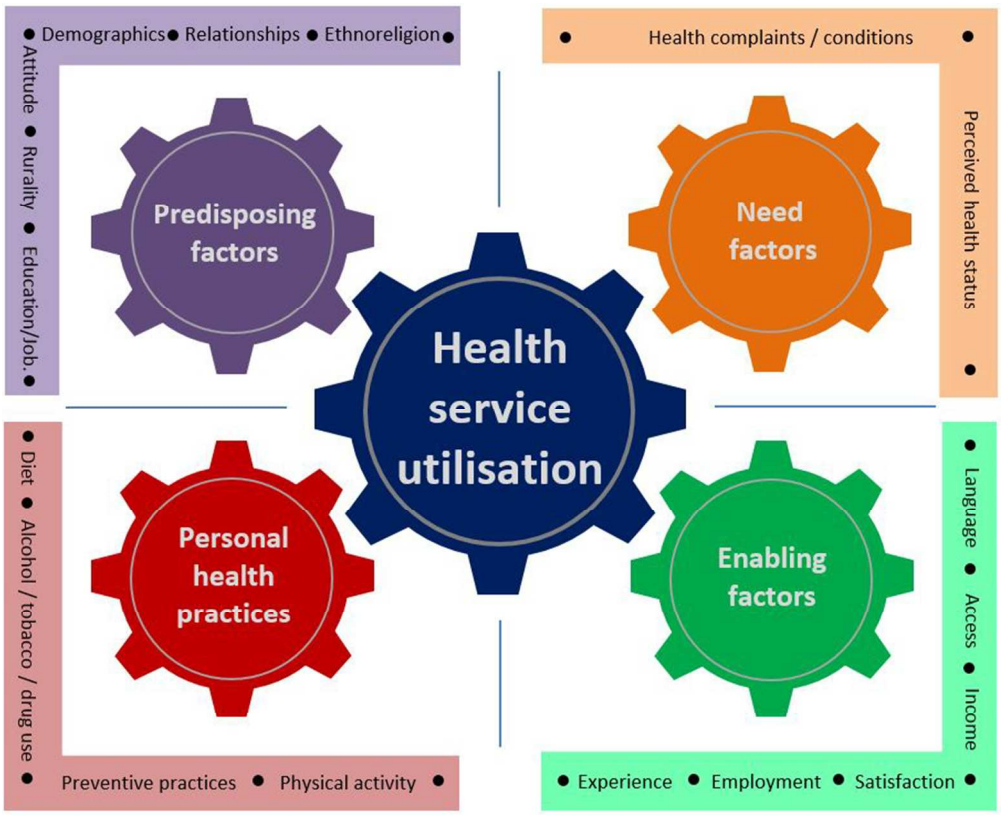



Figure 2. Conceptual Framework

76x62mm (300 x 300 DPI)

**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | 1 |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | NA |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 3-5 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | 5-6 |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | 5 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 6, 10-11 |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | 6 |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 9-10 |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 9-10 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 13-14 |
| Study size | 10 | Explain how the study size was arrived at | 6 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | NA |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 11-12 |
| | | (*b*) Describe any methods used to examine subgroups and interactions | 11-12 |
| | | (*c*) Explain how missing data were addressed | 11 |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy | 12 |
| | | (*e*) Describe any sensitivity analyses | NA |
| **Results** | | | |

| | | | |
|---|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | NA |
| | | (b) Give reasons for non-participation at each stage | NA |
| | | (c) Consider use of a flow diagram | NA |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | NA |
| | | (b) Indicate number of participants with missing data for each variable of interest | NA |
| Outcome data | 15* | Report numbers of outcome events or summary measures | NA |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | NA |
| | | (*b*) Report category boundaries when continuous variables were categorized | NA |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | NA |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | NA |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | NA |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 13-14 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | NA |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | NA |
| **Other information** | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 15 |

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.