Public health surveillance using population surveys

A methodological perspective

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Why are population health surveys important?

Population health surveys can be used to measure the prevalence of risk factors and healthy behaviours, monitor the effects of interventions, gauge community attitudes to health policy initiatives, as well as assess trends in health and disease outcomes. Evidence generated through health surveillance is integral to informing prevention of ill health in Australia. Essentially, policy makers need to know 'what works for whom and in what circumstances'[1].

Surveillance is a valuable tool for public health but the information extracted from a population surveillance system is only as good as the data it is based on. From a methodological perspective, questionnaires should contain measures that identify and describe factors associated with the health status of the population. The sampling methodology employed in data collection should produce reliable, robust estimates to support appropriate analysis and reporting. In addition, the way in which the data is weighted and analysed is also critical.

About the VicHealth Indicators Survey

The VicHealth Indicators Survey is a Victorian community wellbeing survey with a focus on social determinants of health. It complements other health survey work conducted in Victoria such as the Victorian Population Health Survey. The information generated from the VicHealth Indicators Survey provides local-level data to assist local governments with planning.

Data was collected using Computer Assisted Telephone Interviews (CATI). The survey was conducted over 15 weeks between May and August 2011 in each of Victoria's 79 Local Government Areas (LGAs). A sample of 25,075 participants aged over 18 years and an overall cooperation rate* of 53.5% was achieved. Each interview was on average 14.4 minutes in length. Respondent selection within a household was done using the next birthday methodology to ensure broad representation.

VicHealth Indicators Survey is a geocoded data set. Exact address details or the nearest intersection were collected from 75% respondents. A geocoded data set is important because it means analysis can be undertaken using all levels of geography from neighbourhood level through to LGA level. It also means that this data can be linked with other spatial data (such as the location of parks or community facilities), to enable data mapping and geospatial analysis.

Reports (to be launched in end 2012)

- Compendium of selected findings (crude rates)
- Local Government Area profiles (crude rates)
- Fact sheets on each survey topic area
- Interactive mapping using InstantAtlas

The future of large population health surveys: dual frame methodologies

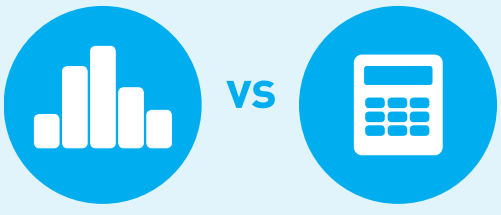
Prevention research has for some time used population-level survey techniques to inform prevention policy. However, in order to acquire a random sample of the population, large population surveys are generally done either by mail-out questionnaire or by CATI, the latter technique generally using a landline telephone sampling frame. Population surveys are becoming increasingly less representative when the sample is restricted to a landline-only methodology (almost 1 in 5 (19%) of Australians do not own a landline) (www.acma.gov.au). This means that certain segments of the population will be excluded. Those most likely to have mobile-only households include Indigenous Australians, renters, young people under 30 and people from low socioeconomic groups. Survey design in the future will need to incorporate dual frame methodologies to remain representative of the whole population.

Survey topics

VicHealth Indicators is a community health and wellbeing survey with a focus on the social determinants of health.

Methods for weighting data

Two techniques were explored for weighting the data to account for biases:



Matrix weight (Age and sex within LGA)

Rim weight (Age, sex and other demographics within LGA)

Survey results

Weighting techniques

Two techniques were explored. The first technique was a matrix technique that weighted respondents by the age and sex profile within each LGA. The second technique was rim (also known as raking) weighting. Rim weighting uses a mathematical algorithm to help provide an even distribution of results across the entire data set while balancing certain categories such as age or gender, as well as other demographic variables (educational attainment (university or above/other) and country of birth (Australia/other)) to predetermined totals. It weights the specified characteristics simultaneously and disturbs each variable as little as possible. Both techniques took into account the chance of selection within the household as a pre-weight. After trialling both techniques, it was decided that the best approach for the VicHealth Indicators Survey was to apply a matrix based weight. This decision was based on:

- parity with time-series data for Community Indicators Victoria, as some of the questions from the 2007 survey were replicated in current survey
- smaller effective base once the rim weight was applied in comparison to the matrix weight (which has implications for the confidence intervals of estimates and decreases statistical power).

Age standardisation

The primary purpose of this data set was to support local governments with integrated community planning and to assist policy making. A decision had to be made about whether to present crude rates or age-standardised rates. Age standardisation adjusts for effects of differences in the age compositions of different populations and allows for comparison between these populations. However, the data would be less useful to LGAs for planning because they do not reflect 'as is' values. Therefore, VicHealth decided to develop information for local governments based on crude rates.

Conclusion

It is important that population health surveys have a sound theoretical and analytical base that specifies the logic and foundation of the survey[1]. Ultimately, good population surveillance should include methods that provide evidence of changes, trends and is evolutionary in nature responding to emerging issues that allow for space and time aggregation[2].

For more information contact the Victorian Health Promotion Foundation (VicHealth): **indicators@vichealth.vic.gov.au**

References

1. Killoran, A. & Kelly, M. (2010) *Evidence-based Public Health: effectiveness and efficiency,* Oxford University Press, Oxford.
2. World Alliance for Risk Factor Surveillance (WARFS) (2010) *The International Union for Health Promotion and Education (IUHPE) WARFS Global Working Group "White Paper" on Surveillance and Health Promotion*, presented at the IUHPE Geneva Conference, July.

* American Association for Public Opinion Research outcome rate calculator, Version 2.1, May 2003

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