

# Exploring the Use of Interactive Voice Response as a Population Health Tool

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A thesis presented to the University of  
Newcastle in candidacy for the degree  
of Doctor of Philosophy.

July 2002

*I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution.*

(Signed)

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# Acknowledgements

I would like to thank my supervisor, Dr. Lynne Parkinson, for her unstinting support and intellectual integrity. I would also like to thank Associate Professor Kate D'Este for her critical examination of the thesis drafts, and Associate Professor Bob Gibberd for his advice and involvement.

I am also grateful to Judy Foulkes, Maria Rees and Sue Green, for volunteering their voices, Su Htun and Lucy Bates for numerous discussions about cervical screening, Penninah Oberdorfer for her interesting conversation, Amanda Turner for supplying her network skills, Karen Gillham for her assistance in obtaining hysterectomy rates, Sally Burrows and the other statisticians for their friendship, and the CATI interviewers, Megan Freund, Denise Kelly, Jenny Jackson, Beverly Parker, Jennifer Parsons, and Sally Mayhew, for their professionalism and indomitable humour. I am also grateful to the University for providing the support needed for the development of GEIS and to Dr S.J. Smith and Professor R.J. MacDonald, for their advice.

This project was made possible by grants from Hunter Medical Research, The University of Newcastle RMC scheme, and a University of Newcastle Postgraduate Scholarship, with additional operational funding from the Hunter Centre for Health Advancement.

Lastly, my greatest thanks are due to my wife, Judy Foulkes, whose support cannot be understated. Judy also edited the manuscript.

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# Synopsis

The research described in this thesis reviewed previous uses of Interactive Voice Response (IVR), developed appropriate software, and employed IVR to obtain self-report of sensitive issues in surveys and conduct brief public health interventions.

Chapter 1 introduces IVR and describes a systematic critical review of the use of IVR. IVR is a telephone interviewing technique where the human speaker is replaced by a high quality recorded interactive script to which the respondent provides answers by pressing the keys of a touch-telephone (touchphone). IVR has numerous advantages, including: economy, autonomy, confidentiality, access to certain population groups, improved data quality, standardised interviewing, multi-lingual interfaces, and detailed longitudinal assessments. Despite this, there have been few survey applications of IVR compared to alternative methods such as Computer-Assisted Telephone Interview (CATI). There has not been any evaluation of the use of IVR for asking sensitive questions in surveys or as a tool for health promotion at the community level.

A literature review, described in Chapter 2, was conducted to identify other methods of asking sensitive questions. The literature review identified 19 different methods. Those methods that were most successful were those that provided

the greatest degree of anonymity to the respondent. It was suggested that IVR may be a suitable method for community surveys.

As described in Chapter 3, a custom software called Generalized Electronic Interviewing System (GEIS) was developed. This provided both CATI and IVR interviewing modes. As described in Chapter 4, it was found that the response rate obtained using IVR was unacceptably low, and an alternative interviewing method, the Hybrid method was developed. In the Hybrid method the interview was initiated by the interviewer but completed using IVR with GEIS.

As described in Chapter 5, the IVR, CATI and Hybrid methods were used to investigate self-reported rates of alcohol and drug consumption within a telephone household survey of 2880 households. The self-report rates were compared to the National Drug Strategy Household Survey (NDSHS). Response rates did not differ significantly between the CATI and Hybrid methods, however the response rate for IVR was significantly less than the other methods. The Hybrid and IVR methods obtained significantly higher self-report consumption rates for alcohol and marijuana, and significantly higher hazardous drinking scores using Alcohol Use Disorders Identification Test (AUDIT).

In Chapter 6 a pilot of an IVR cervical screening brief advice interface is described. A total of 5000 households were contacted by the IVR system. The system randomly selected an eligible woman aged 18–69 per household and determined her cervical screening status. A total of 661 women listened to the IVR message. The IVR call was shown to be acceptable and inexpensive compared to a mail pamphlet intervention.

In Chapter 7 a randomized controlled trial of an IVR cervical screening brief advice involving 17,008 households is described. Cervical screening rate data



were obtained from the Health Insurance Commission (HIC) for a period spanning six months before and following the intervention. The cervical screening rate was increased in the intervention postcodes by 0.43% compared to the control postcodes, and the increase was greater for older women at 1.34%. This was a desirable outcome since this group is considered to be an at-risk group. The overall conclusion was that IVR technology could be feasibly used to contact women to deliver brief interventions aimed at increasing cervical screening rates, but the cost per screen was likely to be high. It is suggested that an IVR system could be linked to cervical screening registers to more directly and economically contact women, and provide an efficacious complementary approach to the existing letter reminder system.

# Thesis note

The main argument of this thesis is given in Chapters 1 through 7. Supporting materials for each chapter are shown in Appendices A through E.

Additional materials are provided in the document Supplementary Materials, included on the accompanying Compact Disk (CD) in the file **Supplementary-Materials.pdf**. The CD is inserted inside the back cover of the thesis. Sections of the supporting materials are referred to within the body of the thesis and these take the form “Supplementary Materials Section 5.1.1”. In particular, the survey scripts are included in the Supplementary Materials document due to their large size. This file is in Portable Data Format and may be viewed or printed with an Adobe® Acrobat® viewer or equivalent.

The GEIS software and its instruction manual are provided on the CD.

# Glossary of abbreviations

**AAPOR** American Association for Public Opinion Research.

**ABS** Australian Bureau of Statistics.

**AIDS** Acquired Immune Deficiency Syndrome.

**ARIA** Accessibility/Remoteness Index of Australia.

**ASGC** Australian Standard Geographical Classification.

**AUDIT** Alcohol Use Disorders Identification Test.

**CAPI** Computer-Assisted Personal-Interview.

**CASI** Computer-Assisted Self-Interview.

**CATI** Computer-Assisted Telephone Interview.

**CD** Census Collection District.

**CDRGP** Context-Determined Rule-Generated Pseudonym.

**GEIS** Generalized Electronic Interviewing System.

**HAHS** Hunter Area Health Service.

**HAREC** Hunter Area Research Ethics Committee.

**HCHA** Hunter Centre for Health Advancement.

**HIC** Health Insurance Commission.

**HREC** University of Newcastle Human Research Ethics Committee.

**IVR** Interactive Voice Response.

**LGA** Local Government Area.

**NDSHS** National Drug Strategy Household Survey.

**NLI** ABS National Localities Index.

**NSW** New South Wales.

**NWPC** Number of women aged 18–69 in each postcode.

**PABX** Private Automatic Branch Exchange.

- PCA** Principal Components Analysis
- PTR** Pap Test Register.
- RVS** Recorded Voice System.
- SAQs** Self-Administered Questionnaires.
- SD** Statistical Division.
- SED** Index of Socio-Economic Disadvantage.
- SEIFA** Socio-Economic Indexes for Areas.
- SLA** Statistical Local Area.
- SPS** Self-Protection Statement.
- SSD** Statistical Subdivision.
- STD** Subscriber Trunk Dialling.
- S/T** States and Territories.