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

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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.

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Acknowledgements

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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.