

Evaluations of the 45-49 year old health check program in
Australian general practice

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Table of Contents

Table of Contents.....	i
Thesis abstract.....	vi
Declaration.....	x
List of publications contributing to this thesis.....	xi
List of conference presentations during candidature	xii
Acknowledgements.....	xiii
Abbreviations.....	xv
List of tables.....	xvii
List of figures.....	xviii
List of appendices	xix
CHAPTER 1: Introduction	1
1.1 Introduction to the 45-49 year old health check in Australia.....	2
1.2 Thesis objectives	3
1.3 Research questions and hypotheses	4
1.4 Overview of thesis structure and content	5
CHAPTER 2: Literature review	6
2.1 The scope of health check	7
2.2 Chapter outline	9
2.3 Background information	9
2.3.1 Global burden of chronic disease.....	9
2.3.2 Natural history of chronic disease	10
2.4 Preventive health care (PHC).....	10
2.5 The conceptual development of health checks.....	11
2.5.1 A brief history of health checks and their purposes.....	11
2.6 Important trials of health checks	13
2.6.1 Multiphasic screening trials in the 1960s	14
2.6.2 The Multifactorial trial in the 1970s	15
2.6.3 Health checks in the 1990s	16
2.7 Debates about general health checks in the 21 st century	18
2.7.1 Effectiveness of health checks.....	18
2.7.2 Adverse outcomes of health checks.....	20
2.7.3 Health checks in general practice	21

2.7.4	Economic considerations	22
2.7.5	Other objectives of health checks	22
2.8	Concurrent health check policies	25
2.8.1	England	26
2.8.2	The Netherlands	26
2.8.3	Australia.....	27
2.9	Health check research	28
2.9.1	Attendance at health checks.....	28
2.9.2	Effects of health checks	32
2.9.3	Economic evaluations of health check programs	34
2.10	Australian context	36
2.10.1	Burden of chronic disease in Australia	36
2.10.2	The 45-49 year old health check.....	36
2.11	Research rationale	41
CHAPTER 3: The effectiveness of general practice-based health checks: a systematic review and meta-analysis		43
3.1	Preface.....	44
3.2	Statement of Authorship	45
3.3	Article.....	46
3.3.1	Abstract.....	46
3.3.2	Introduction.....	47
3.3.3	Methods	49
3.3.4	Results.....	51
3.3.5	Discussion.....	61
CHAPTER 4: Cohort study design and methodology		66
4.1	Preface.....	67
4.2	Aims	67
4.3	Outline.....	68
4.4	Selection of study sites.....	68
4.5	Study process	69
4.5.1	Development of the study questionnaire	69
4.5.2	Piloting and finalizing the questionnaire	74
4.5.3	Selection of study participants.....	75
4.5.4	Study procedures.....	78

4.6	Ethics.....	79
4.7	Data management.....	81
4.8	Data analysis	81
CHAPTER 5: Factors influencing attendance at the 45-49 year health check: a questionnaire survey		83
5.1	Preface.....	84
5.2	Statement of Authorship	85
5.3	Abstract	86
5.4	Introduction	87
5.4.1	Theoretical frameworks	87
5.5	Methods.....	89
5.5.1	Study design and settings.....	89
5.5.2	Sample selection	89
5.5.3	Study procedures.....	90
5.5.4	Measures	90
5.5.5	Statistical analysis.....	93
5.6	Results	94
5.6.1	Characteristics of respondents	95
5.6.2	Predicting attendance intention.....	96
5.6.3	Predicting health check attendance.....	99
5.7	Discussion	102
5.7.1	Limitations	104
5.7.2	Implications	105
CHAPTER 6: Determinants of attendance at a 45-49 year old health check in Australian general practice: An observational cohort study.....		106
6.1	Preface.....	107
6.2	Statement of Authorship	108
6.3	Abstract	109
6.4	Introduction	110
6.5	Methods.....	111
6.5.1	Study design and settings.....	111
6.5.2	Sample selection	111
6.5.3	Study process	112
6.5.4	Data collection	112

6.5.5	Statistical analysis.....	113
6.6	Results.....	113
6.6.1	Health check attendance.....	118
6.6.2	Questionnaire response.....	118
6.7	Discussion.....	119
6.7.1	Strengths and limitations.....	122
6.7.2	Implications.....	123
CHAPTER 7: Effectiveness and cost estimates for the 45-49 year old health check in Australian general practice: a modelling study.....		125
7.1	Preface.....	126
7.2	Statement of Authorship.....	127
7.3	Abstract.....	128
7.4	Introduction.....	129
7.5	Methods.....	131
7.5.1	Procedures.....	131
7.5.2	Sensitivity analysis.....	137
7.6	Results.....	138
7.6.1	Short-term outcomes.....	138
7.6.2	Long-term costs and QALYs.....	138
7.6.3	Deterministic Sensitivity Analysis (DSA).....	139
7.6.4	Probabilistic Sensitivity Analysis (PSA).....	142
7.7	Discussion.....	142
7.7.1	Assumptions and Limitations.....	145
7.7.2	Strengths.....	147
7.7.3	Future studies.....	147
7.7.4	Implications.....	147
CHAPTER 8: Discussion and conclusion.....		149
8.1	Key findings and contributions.....	150
8.1.1	The effectiveness of general practice-based health checks.....	150
8.1.2	Determinants of attendance.....	152
8.1.3	Economic impact of the 45-49 year old health check.....	154
8.2	Strengths.....	155
8.3	Limitations.....	156
8.3.1	Cohort study.....	156

8.3.2	Modelling study	157
8.4	Future studies	158
8.5	Implications and recommendations.....	158
	Reference list	161
	Appendices.....	175
	Appendix 1: Checklist for 45-49 year old health check.....	175
	Appendix 2: Search strategy (Chapter 3)	176
	Appendix 3: Characteristics of included studies (Chapter 3).....	179
	Appendix 4: Study quality assessment (Chapter 3)	182
	Appendix 5: Subgroup analyses of recruitment strategy (Chapter 3).....	187
	Appendix 6: Subgroup analysis of length of follow-up (Chapter 3).....	190
	Appendix 7: Funnel plots (Chapter 3).....	194
	Appendix 8: Study questionnaire (Chapter 5).....	200
	Appendix 9: Pilot study questionnaire feedback sheet (Chapter 5)	206
	Appendix 10: Study information sheet (Chapter 5)	207
	Appendix 11: General practice endorsement statement (Chapter 5)	209
	Appendix 12: Questionnaire reminder letter (Chapter 5)	210
	Appendix 13: Health check invitation letter (Chapter 5).....	212
	Appendix 14: Invitation reminder (Chapter 5).....	213
	Appendix 15: ethics approval (Chapter 5 & Chapter 6)	214
	Appendix 16: Technical details of the modelling study.....	216
	Appendix 17: Publication.....	234

Thesis abstract

Background: A health check refers to the practice of comprehensive medical assessments to detect and manage risk factors and early chronic disease. Debate about the value of health checks has lasted for decades. A systematic review reported that general health checks in middle-aged populations did not reduce total mortality. Nevertheless, new government funded health check programs have recently been introduced in several developed countries. In 2006, Medicare Australia funded a 45-49 year old health check in Australian general practice for all people at risk of developing chronic disease. However, this program has not been fully evaluated. To date, research has taken the perspective of health care providers, investigating their perceptions about the feasibility and challenges in performing a health check. No study has yet investigated important questions arising from the perspective of patients or the government. Such research would provide a better understanding of which patients participate and why, and also the potential benefits and costs of this health check program.

Objectives: To investigate the effectiveness of general practice-based health checks; to understand patients' perceptions about general health checks and the psychological determinants of their attendance at a GP invited health check; to compare the demographic characteristics, past health service use including preventive health care of attendees and non-attendees at the 45-49 year old health check; to examine the long-term health effects of this health check program and to quantify its economic impact on the health care system.

Methods: A systematic review and meta-analysis was performed to determine the effectiveness of general practice-based health checks, using both surrogate and final outcome indicators.

A prospective cohort study was conducted in two general practices in the Adelaide metropolitan area. Patients who were eligible for the 45-49 year old health check program were identified from the two practices. A structured questionnaire was developed and sent to all eligible participants. Questions about demographic characteristics, self-reported medical history and perceptions about general health checks were included. After the return of study questionnaires, an invitation letter was sent to all participants, whether they had returned the questionnaire or not. Attendance at the health check in the following 6 months was recorded. Then, relevant medical records of all study participants from one year prior to the invitation were extracted from the electronic medical record system in each practice. Extracted data included gender, age, residential postcode; the number of general practice visits, pre-existing prescriptions and the uptake of preventive health care.

Finally, a Markov chain model was constructed to simulate the health check effects on a hypothetical cohort of 10,000 'healthy' Australians aged 45-49 years. The risk profiles of a baseline cohort were generated using data from the 2011 Australian National Health Survey. Intervention effects were simulated using data on risk factor changes after the health check (results from the systematic review). The Life-Years and Quality Adjusted Life Years (QALYs) gained over the cohort's remaining lifetime after a health check was estimated. The maximum acceptable costs for this health check program, including the initial consultation

and subsequent interventions, was calculated using a cost-effectiveness threshold of \$50,000 per QALY.

Results: The systematic review of general practice-based health checks demonstrated significant, albeit small improvement in most investigated surrogate outcomes (i.e. total cholesterol, systolic and diastolic blood pressure and body mass index) after the intervention, especially among high risk patients. No significant improvement in surrogate outcomes was observed in non-practice based health check studies. No difference in total mortality was found in either practice-based or non-practice based studies. However, most general practice-based studies were not originally designed or powered to evaluate mortality changes.

The cohort study recruited 515 eligible participants from two participating general practices. 293 of the 515 (56.9%) participants returned the study questionnaire and altogether 117 (22.7%) attended the health check within 6 months. In the questionnaire study, respondents who indicated a strong attendance intention ($p<0.01$), and self-reported no pre-existing biomedical risk factors ($p<0.01$) and less recent uptake of preventive health care ($p<0.01$) were significantly more likely to attend a health check. In the medical record analysis, no significant differences in age, gender or socio-economic status were observed between health check attendees and non-attendees. However, the questionnaire respondents were almost 3 times as likely to attend as non-respondents (31% vs 12%) and the characteristics that were associated with attendance were different in questionnaire respondents and non-respondents. Among the respondents, those with more pre-existing prescriptions and recent uptake of preventive health care

were slightly less likely to attend. Conversely, among non-respondents, individuals with two or more types of pre-existing prescriptions were significantly more likely to attend than those without ($p=0.03$).

The modelling study demonstrated that the 45-49 year old health check program would lead to 8.6 and 2.6 QALYs gained among 1,000 male and female attendees respectively in a lifelong projection (50 years). The threshold costs for the health check to be considered cost-effective were \$465 for a male and \$140 for a female patient using a threshold of \$50,000 per QALY.

Conclusions: For health checks to be most effective, they should be undertaken in general practice as opposed to other settings (e.g. community or workplace).

Tailored invitations could be employed to selectively invite patients who would most benefit from a health check (patients who are less proactive). Finally, the 45-49 year health check program is unlikely to be cost-effective among females in the current Australian context. Given these results, health policy changes such as delaying the health check by 5-10 years, introducing pre-screening procedures or targeting vulnerable patient groups should be considered to improve the effectiveness and cost-effectiveness of this health check program.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other institution. I affirm that to the best of my knowledge, the thesis contains no material previously published or written by another person, except where due reference is made in the text of thesis.

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Signed.....

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Date

List of publications contributing to this thesis

1. Si S, Moss JR, Sullivan TR, Newton SS, Stocks NP. Effectiveness of general practice-based health checks: a systematic review and meta-analysis. *BJGP*. 2014;64(618):e47-e53.
2. Si S, Moss JR, Giles LC, Stocks NP. Factors influencing attendance at the 45-49 year old health check: a questionnaire survey.
3. Si S, Moss JR, Giles LC, Stocks NP. Determinants of attendance at a 45-49 year old health check in Australian general practice: An observational cohort study.
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Abbreviations

ABB	Affective Behavioural Belief
ABHI	Australian Better Health Initiative
ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ANHS	Australian National Health Survey
AR-DRG	Australian Refined Diagnosis-Related Group
BB	Behavioural Belief
BEACH	Bettering the Evaluation and Care of Health
BI	Behavioural Intention
BMI	Body Mass Index
CB	Control Belief
CCA	Cost-consequence Analysis
CDM	Chronic Disease Management
CEA	Cost-effectiveness Analysis
CHD	Coronary Heart Disease
CMR health check	Cardio-Metabolic Risk health check
COAG	Council of Australian Governments
CVA	Cerebral Vascular Abnormality
CVD	Cardiovascular Disease
DBP	Diastolic Blood Pressure
DM	Diabetes Mellitus
DOB	Date of Birth
DoH	Department of Health
EPC	Enhanced Primary Care
FRE	Framingham Risk Equations
GP	General Practitioner
HDL	High-Density Lipoprotein
IBB	Instrumental Behavioural Belief
LDL	Low-Density Lipoprotein
MBS	Medicare Benefits Schedule
MCS	Monte-Carlo Simulation
MI	Myocardial Infarction
NB	Normative Belief
NHCDC	National Hospital Cost Data Collection
NHMD	National Hospital Morbidity Database
NHMS	National Health Measurement Survey
NHS health check	National Health Service health check
OR	Odds Ratio
PBC	Perceived Behavioural Control
PHC	Preventive Health Care
PHE	Periodic Health Examination

QALY	Quality Adjusted Life Year
QoL	Quality of Life
RACGP	Royal Australian College of General Practitioners
RCT	Randomized Controlled Trial
RR	Relative Risk
SA	Stable Angina
SBP	Systolic Blood Pressure
SD	Standard Deviation
SES	Socio-economic Status
SMR	Standard Mortality Rate
SN	Subjective Norm
TC	Total Cholesterol
TIA	Transient Ischemia Attack
TPB	Theory of Planned Behaviour
UA	Unstable Angina
WHO	World Health Organization

List of tables

Table 1: Thesis structure.....	5
Table 2: Meta-analysis of surrogate outcomes	55
Table 3: Risk categories	57
Table 4: Meta-analysis of the odds of patients remaining at high risk	58
Table 5: Meta-regression with practice and non-practice based studies	61
Table 6: Factor analysis and internal consistency tests of beliefs items	93
Table 7: Univariable logistic regression on intention and attendance	97
Table 8: Hierarchical multivariable logistic regression on intention and attendance	100
Table 9: Characteristics of health-check attendees and non-attendees	116
Table 10: Multiple logistic regression on health-check attendance.....	118
Table 11: Multiple logistic regression on questionnaire response	119
Table 12: Markov model inputs.....	135
Table 13: CVD incidence prevented in 5 years (FRE 5-year risks)	138
Table 14: The effectiveness and cost of the 45-49 year old health check	139
Table 15: Deterministic Sensitivity Analysis (DSA).....	141
Table 16: Probabilistic Sensitivity Analysis (PSA).....	142
Table 17: FRE coefficients for CHD and CVA incidence	218
Table 18: Age and sex specific proportional distribution of risk factors	220
Table 19: Health check effects (surrogate outcome changes).....	222
Table 20: Allocation of CVD events (Australia, 2010)	223
Table 21: Age and gender specific CVD incidence	225
Table 22: Age and gender specific annual mortality rates (all-cause mortality).....	225
Table 23: Standard Mortality Ratio (SMR) for CVD states	225
Table 24: Age and gender specific utility of healthy individuals.....	226
Table 25: Utility weights for acute CVD events.....	226
Table 26: Cost of acute CVD events and post-CVD states	227
Table 27: Age and gender specific risk factor distributions	230
Table 28: Model validation — Annual CVD incidence (45-54 year old Australians).....	232
Table 29: Comparisons of reference and alternative model estimates.....	232
Table 30: Threshold costs of the 45-49 year old health check program	233

List of figures

Figure 1: Study flow diagram (systematic review)	52
Figure 2: Summary of bias in included studies (systematic review)	54
Figure 3: Outcome: Mean difference in TC (by settings of health check)	55
Figure 4: Outcome: Mean difference in SBP (by settings of health check)	56
Figure 5: Outcome: Mean difference in DBP (by settings of health check)	56
Figure 6: Outcome: Mean difference in BMI (by settings of health check)	57
Figure 7: Outcome: High TC (by settings of health check).....	58
Figure 8: Outcome: High SBP (by settings of health check).....	59
Figure 9: Outcome: High DBP (by settings of health check)	59
Figure 10: Outcome: High BMI (by settings of health check).....	59
Figure 11: Outcome: Smoking status (by settings of health check)	60
Figure 12: Outcome: Total mortality (by settings of health check).....	60
Figure 13: Outcome: CVD mortality (by settings of health check).....	61
Figure 14: Study flowchart (cohort study)	77
Figure 15: Study timeline (cohort study)	80
Figure 16: Identification of study participants (questionnaire survey)	90
Figure 17: Significant pathways predicting intention and attendance	99
Figure 18: Study flow chart (medical record analysis)	114
Figure 19: Decision tree (short-term model)	133
Figure 20: Health states (Markov model)	135
Figure 21: Model streamline	217

List of appendices

Appendix 1: Checklist for 45-49 year old health check.....	175
Appendix 2: Search strategy (Chapter 3).....	176
Appendix 3: Characteristics of included studies (Chapter 3).....	179
Appendix 4: Study quality assessment (Chapter 3).....	182
Appendix 5: Subgroup analyses of recruitment strategy (Chapter 3)	187
Appendix 6: Subgroup analysis of length of follow-up (Chapter 3).....	190
Appendix 7: Funnel plots (Chapter 3)	194
Appendix 8: Study questionnaire (Chapter 5)	200
Appendix 9: Pilot study questionnaire feedback sheet (Chapter 5)	206
Appendix 10: Study information sheet (Chapter 5).....	207
Appendix 11: General practice endorsement statement (Chapter 5).....	209
Appendix 12: Questionnaire reminder letter (Chapter 5).....	210
Appendix 13: Health check invitation letter (Chapter 5)	212
Appendix 14: Invitation reminder (Chapter 5)	213
Appendix 15: ethics approval (Chapter 5 & Chapter 6).....	214
Appendix 16: Technical details of the modelling study.....	216
Appendix 17: Publication	234