Place in Health

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Table of Contents

Table of Contents............................................................................................................. 1

List of Figures ..................................................................................................................... 7

List of Tables ....................................................................................................................... 9

Conference Presentations ................................................................................................. 10

Abstract ............................................................................................................................. 11

Disclosure ........................................................................................................................... 13

Acknowledgements ........................................................................................................... 14

List of Abbreviations ....................................................................................................... 15

Chapter 1: Introduction ................................................................................................... 17

The Place-SES-Health Association................................................................................... 17

Property Value SES Measure .......................................................................................... 18

Health and Physical Activity ......................................................................................... 19

Built Environment and Walkability ............................................................................. 20

Modifiable Areal Unit Problem ..................................................................................... 21

Place-Health Research ................................................................................................. 22

Conceptual Framework ................................................................................................. 22

Research Aims ................................................................................................................ 26

Chapter 2: Literature Review ......................................................................................... 28

SES and Health ................................................................................................................. 29

Measuring SES............................................................................................................... 37
Wealth as an SES Measure.................................................................40
Place, SES and Health......................................................................46
Residential Property as an SES Measure ...........................................51
Built Environment Walkability............................................................56
Conclusion..........................................................................................76

Chapter 3: Data....................................................................................78
Introduction ........................................................................................78
Study Area .........................................................................................80
PLACE Study .....................................................................................80
PLACE Data .......................................................................................82
  Intersections ..................................................................................82
  Dwelling Density ..........................................................................83
  Land Use Mix ...............................................................................83
  Retail Footprint ............................................................................84
  Walkability Index .........................................................................85
  Walkability Index Revisited 2012................................................85
North West Adelaide Health Study.........................................................85
Relative Location Factor .....................................................................88
Scopus Sciverse Search .......................................................................89
Conclusion..........................................................................................91

Chapter 4: Paper 1: The Property Wealth Metric As A Measure Of Socio-Economic Status..........................................................................................92
Statement of Authorship......................................................................93
Chapter 6: Paper 3: Is Walkability associated with a lower cardiometabolic risk? ....... 150

Statement of Authorship ........................................................................................................ 152

Abstract .................................................................................................................................. 154

Keywords .................................................................................................................................. 154

Introduction .............................................................................................................................. 155

Methods .................................................................................................................................... 157

Study Area .................................................................................................................................. 157

Study Cohort .............................................................................................................................. 158

Measures .................................................................................................................................... 159

Cardiometabolic Risk Score ...................................................................................................... 159

Walkability Index ...................................................................................................................... 160

Data ........................................................................................................................................... 160

Dwelling Density ....................................................................................................................... 161

Intersection Density ................................................................................................................. 161

Land Use Mix ........................................................................................................................... 161

Net Retail Area ......................................................................................................................... 162

Walkability Index Score ......................................................................................................... 162

Spatial Units ............................................................................................................................. 162

Covariates .................................................................................................................................. 165

Statistical Analysis ................................................................................................................... 166

Results ...................................................................................................................................... 166

Sample Characteristics ............................................................................................................ 166
- Walkability Index and Cardiometabolic Risk Score .................................................. 167
- Discussion ...................................................................................................................... 168
- Limitations .................................................................................................................... 171
- Conclusion .................................................................................................................... 172
- Chapter 7: Discussion .................................................................................................. 181
  - Place-SES-Health Research ......................................................................................... 181
  - GIS in Health Research ............................................................................................... 184
  - The Contribution of RLF ............................................................................................ 186
  - RLF and Health Analysis ............................................................................................ 189
  - The Importance of Spatial Unit Choice ......................................................................... 190
- Chapter 8: Limitations and Future Research. ................................................................. 194
  - Causality and Self-Selection ......................................................................................... 194
  - RLF Data ...................................................................................................................... 195
  - RLF Scale .................................................................................................................... 197
  - RLF Dwelling Type ...................................................................................................... 198
  - RLF GIS Interpolation ................................................................................................. 199
  - Walkability .................................................................................................................. 200
  - Walkability Spatial Unit Choice ................................................................................... 202
  - Conclusion .................................................................................................................... 203
- Chapter 9: Conclusion .................................................................................................. 204
- Reference List ............................................................................................................... 207
List of Figures

Figure 1.1: World Health Organisation Social Determinants of Health Conceptual Framework .......................................................... 24

Figure 1.2: Extended Health Conceptual Framework .......................................................... 25

Figure 2.1: Booth’s Poverty Map of London, 2002 GIS Version. ........................................... 32

Figure 2.2: Scopus Sciverse Health and Behaviour Search Results, 1961-2013 ...................... 34

Figure 2.3: Scopus Sciverse Place and Health Search Results, 1965-2012 .......................... 47

Figure 2.4: Scopus Sciverse Physical Activity and Health Search Results, 1948-2012 ......... 57

Figure 2.5: Scopus Sciverse Built Environment, Walking, Health and Walkability Search Results, 1970-2012.................................................................................. 63

Figure 3.1: Study Area ........................................................................................................ 79

Figure 3.2: Scopus Sciverse Smoking Search Results, 1901-2012................................. 90

Chapter 4: Paper One.

Figure 1: Study Area ........................................................................................................ 102

Figure 2: Relative Location Factor Surface. ........................................................................ 108

Figure 3: Difference between RLF Decile and ABS SEIFA Decile................................... 109

Figure 4: Spatial Distribution of RLF Decile and SEIFA Decile Difference .................... 111

Figure 5: Property Level RLF and CD level SEIFA. ......................................................... 113

Chapter 5: Paper Two.

Figure 1: Study Area ........................................................................................................ 133
Chapter 6: Paper Three.

Figure 1: Study Area .......................................................... 158

Figure 2: Geographic Scale Variation Across the Study Spatial Units, NWAHS, 2001 .......................................................... 164
List of Tables

Table 2.1: Socioeconomic Status Measures. ................................................................. 39
Table 2.2: Comparison of Spatial Unit Choice. .............................................................. 68
Table 2.3: Place Spatial Unit Summary. ........................................................................ 70
Table 2.4: Research Agenda.......................................................................................... 73

Chapter 4: Paper One.

Table 1: Ordinary Least Squares Model Input Data...................................................... 103
Table 2: Ordinary Least Squares Model Variables......................................................... 103

Chapter 5: Paper Two.

Table 1: Descriptive Characteristics of the Individual Survey Sample (n=3585) ... 138
Table 2: Parameter Estimates for Associations Between RLF and Cardiometabolic Risk Factors and Cardiometabolic Risk Score (n=3585) ......................................................... 139

Chapter 6: Paper Three.

Table 1: Descriptive Statistics for Spatial Units, According to Buffer Area or Unit. .......................................................................................................................... 165
Table 2: Descriptive Characteristics of the Sample (n=3593).................................. 167
Table 3: Parameter Estimates for Associations Between Cardiometabolic Risk Score and Spatial Unit Walkability Score (n=3593) .......................................................... 168
Conference Presentations


Abstract

This research contributes to expanding the awareness and importance of place in health research. As a thesis by publication it features three peer reviewed published papers which provide methodological developments for the application of spatial techniques to health research. These papers constitute a response to the critique by a number of researchers on how spatial techniques are applied in some health research.

Place has been implicated in health research for centuries. Among the place-health literature there are two research streams that are the focus of this thesis; 1) the relationship between place and socioeconomic status (SES); and 2) the impact of the built environment on physical activity and chronic disease.

Place has an association with SES and SES has an accepted relationship with health, and therefore place may impact on health through its relationship with SES. An emerging research area used property values to represent wealth as an alternative or complementary SES measure. Two recent studies have used property value as an SES measure and reported a strong association with obesity and reported that property value was more predictive of fair/poor health status than area-level SES measures. This emerging research area is the focus of the first two papers which developed a property value SES measure that reflected place and wealth. The first paper provided the methodology to develop a residential property value measure (RLF) and the second paper tested the association between RLF and six chronic health outcomes, central obesity, hypertriglyceridemia, reduced high density lipoprotein (HDL), hypertension, impaired fasting glucose, and high low density lipoprotein (LDL) plus cumulative score of these chronic health outcomes. A statistically significant
association with the cumulative CMR score and all but one of the risk factors (high LDL) was found, and in all cases except high LDL, participants in the most advantaged and intermediate group had a lower relative risk (RR) for cardio-metabolic diseases.

The third paper focused upon the built environment and walkability and the methodology used to spatially represent walkability. Whilst this paper used the Australian adaptation of the walkability index used for the IPEN project (www.ipenproject.org), the outcome was not walking behaviour but the cumulative cardiometabolic risk score used in paper two. The third paper used predetermined administrative spatial units and road network buffers. This approach was chosen to provide further evidence that the choice of spatial unit matters in health research and that selecting an inappropriate spatial unit could mask or hide an association. There was no statistically significant association between walkability and the predetermined spatial units, but there was a modest statistically significant association between the road network buffers and lower RR of cardiometabolic risk.

Taken individually, the first two papers provide a spatially based measure for SES-health research which was statistically associated with chronic health outcomes and the third added to the literature on health associations with walkability and highlighted the need for appropriate spatial unit selection. Cumulatively, these papers add to the growing literature and demonstrated a more informed application of spatial methods to health research.
Disclosure

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ASD</td>
<td>Adelaide Statistical Division</td>
</tr>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>ASGC</td>
<td>Australian Standard Geographic Classification</td>
</tr>
<tr>
<td>CD</td>
<td>census collection district</td>
</tr>
<tr>
<td>CMR</td>
<td>cardiometabolic risk</td>
</tr>
<tr>
<td>CTVB</td>
<td>Council Tax Valuation Bands</td>
</tr>
<tr>
<td>DCDB</td>
<td>digital cadastre database</td>
</tr>
<tr>
<td>GEE</td>
<td>Generalised Estimating Equations</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
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<tr>
<td>GIS</td>
<td>geographic information system</td>
</tr>
<tr>
<td>HDL</td>
<td>high density lipoprotein</td>
</tr>
<tr>
<td>IPEN</td>
<td>the International Physical Activity and Environment Network</td>
</tr>
<tr>
<td>IDW</td>
<td>inverse distance weighted</td>
</tr>
<tr>
<td>LGA</td>
<td>local government areas</td>
</tr>
<tr>
<td>LOTS</td>
<td>land ownership and tenure system</td>
</tr>
<tr>
<td>LDL</td>
<td>low density lipoprotein</td>
</tr>
<tr>
<td>MAUP</td>
<td>modifiable area unit problem</td>
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<tr>
<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
</tr>
<tr>
<td>NDVI</td>
<td>normalised difference vegetation index</td>
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<tr>
<td>NQLS</td>
<td>Neighbourhood Quality of Life Study</td>
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<tr>
<td>NWAHS</td>
<td>North West Adelaide Health Study</td>
</tr>
<tr>
<td>PC</td>
<td>personal computer</td>
</tr>
<tr>
<td>PLACE</td>
<td>Physical activity in localities and community environments</td>
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