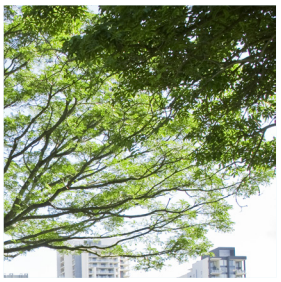
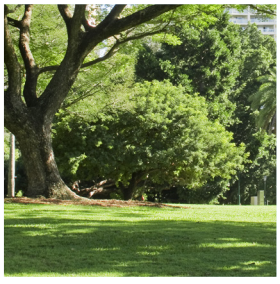
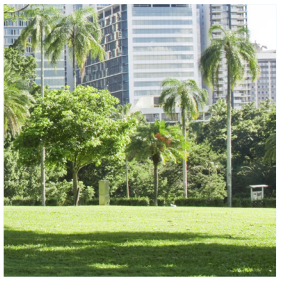
The Australian National Liveability Study final report

Development of policy-relevant liveability indicators relating to health and wellbeing recommendations for their dissemination

Mavoa, S, Badland H, Learnihan V, Boruff B, Pettit C, Astell-Burt T, Feng X, Hooper P, Rachele J, Eagleson S, David S, Giles-Corti B.

2016

McCaughey VicHealth
Community Wellbeing Unit

DISCLAIMER

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The Australian National Liveability Study final report:

Development of policy-relevant liveability indicators relating to health and wellbeing recommendations for their dissemination

Mavoa S[1], Badland H[1], Learnihan V[2], Boruff B[3], Pettit C[4], Astell-Burt T[5], Feng X[5], Hooper P[3], Rachele J[6], Eagleson S[1], David S[1], Giles-Corti B[1] (2016).

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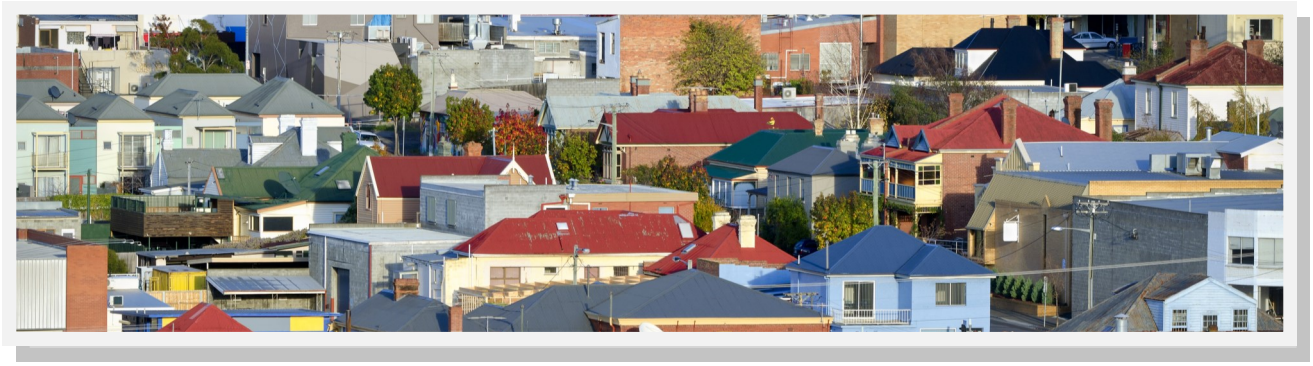
TABLE OF CONTENTS

ABBREVIATIONS

ABS	Australian Bureau of Statistics
ACECQA	Australian Children's Education & Care Quality Authority
ACT	Australian Capital Territory
AURIN	Australian Urban Research Infrastructure Network
BMI	Body mass index
CIV	Community Indicators Victoria
CVD	cardiovascular disease
HABITAT	How Areas in Brisbane Influence Health and Activity study
MVPA	moderate-vigorous physical activity
NGO	non-government organisation
NHMRC	National Health and Medical Research Council
NSW	New South Wales
POS	public open space
PSMA	Public Sector Mapping Agency
QLD	Queensland
RESIDE	Residential Environment study
SA1	Statistical Areas Level 1
SURE	Secure Unified Research Environment
TAPPC	The Australian Prevention Partnership Centre
VGO	Valuer General's Office
VIC	Victoria
VISTA	Victorian Integrated Survey of Travel and Activity
WA	Western Australia
WT	walking for transport



EXECUTIVE SUMMARY

Recognising the importance of city design for public health, The Australian Prevention Partnership Centre (TAPPC) funded The Australian National Liveability Study to develop and validate a set of spatial liveability indicators for major cities in Australia that are associated with non-communicable disease risk behaviours and/or outcomes. The goal was to provide a practical mechanism for organisations to measure the impact of activities by creating indicators that are: (a) aligned with Australian-state urban planning policy; (b) developed using readily available data; (c) standard and consistent over time; (d) standard and consistent across Australian major cities; (e) suitable for monitoring progress towards creating more liveable and sustainable communities; and (f) validated as being associated with chronic disease risk factors and/or health outcomes. The study limited its focus to adults liveability in major cities.

We adopted the following definition of a 'liveable' community: "a safe, socially cohesive and environmentally sustainable, with affordable housing linked via public transport, walking and cycling infrastructure to employment, education, shops and services; public open space, and social, cultural and recreational opportunities." From this definition, The Australian National Liveability Study team and Advisory Group identified five 'liveability' domains related to chronic disease to focus on: alcohol, food, public open space, transport, and walkability.

We then conducted a review of policies relating to these five domains across five states/territories (NSW, VIC, WA, ACT, QLD). The review identified 65 policies that could operationalised spatially, with more found for transport (n=9), walkability (n=40) and public open space (n=16) domains, than for alcohol (n=0) and food (n=0)[1] domains. Next, these 65 policies were operationalised within geographic information systems for urban areas of Sydney (food), Melbourne (alcohol, walkability), Perth (public open space), and Brisbane (transport). Where no appropriate policies could be identified, alternative evidence-based measures were developed based on research best practice measures and consultation with relevant experts and relevant local data authorities (e.g. NSW Ministry of Health).

Both the policy-based and evidence-based spatial measures were created with high quality state-level spatial data and tested against health-related behaviours and outcomes using a range of health and travel population survey data. Our results showed relationships between our spatial measures and self-rated health, moderate-vigorous physical activity, walking for transport, and body mass index (BMI).

Specifically:

- For those living in more disadvantaged areas, not having off-licenses available within 800 m, or on-licenses available within 400 m were protective of self-rated health.
- Living in suburbs with ≥95% of dwellings located within a 400 m catchment of any park was associated with a three-fold increased odds of doing any moderate-vigorous physical activity in the neighbourhood.

[1]Since the review, one additional Victorian policy has been identified which requires that 80-90% of households should be within 1km of a town centre of sufficient size to allow for provision of a supermarket.

- Access to at least one green grocer and/or a supermarket within 1600 m, but no fast food outlet within the same distance, was associated with lower BMI. Ratios of fast food outlets to green grocers and/or supermarkets of 1:4 or higher within 1600 m were associated with higher BMI.
- Greater levels of walking for transport were associated with more highly connected streets, greater residential density, shorter distances to activity centres, better access to destinations, smaller average block areas, lower traffic volume, the presence of public transport stops and having at least two public transport services per hour. Conversely, cul-de-sac lengths less than 80 m and 120 m had lower levels of walking for transport.

From the state-level results we identified nine liveability indicators across the five liveability domains that were associated with health (alcohol = 2, food = 1, public open space = 1, transport = 3, walkability = 2). The final set of recommended indicators is:

- count of off-licenses within 800 m;
- count of on-licenses within 400 m;
- ratio of fast food outlets to green grocers and/or supermarkets less than 1:4;
- percentage of residential dwellings within 400 m of public open space;
- pedshed ratio (the ratio of the area accessible within a road network buffer to the area ;accessible in a straight-line buffer) within a Statistical Area 1;
- count of public transport stops within a Statistical Area 1;
- public transport frequency within a Statistical Area 1;
- dwelling density within 1600 m; and
- access to local living destinations within 1600 m;

Where state-level spatial data differed from national spatial data, measures that were associated with health outcomes were calculated and tested with national spatial data to ensure that similar results were obtained with national data. This testing showed that eight of the nine liveability indicators could be replicated with national data. The only measure unable to be replicated nationally was the public open space measure.

Therefore, while it may be possible to develop a national measure of public open space access, the current lack of detailed public open space data across Australia means that it is not possible to create a national indicator that reflects current public open space policy standards.

A number of challenges were faced in The Australian National Liveability Study. These include sourcing and licensing accurate national spatial data that could be used to create the liveability domain indicators, and identifying appropriate scales at which to calculate the indicators.

The next stages of the liveability work build on this project and arise from some of the challenges faced. The proposed next stages of the liveability work are as follows:

1. Methodological investigations on appropriate scale for dissemination of liveability indicators
2. Calculate liveability indicators for the urban areas of Australian Capital Cities (Adelaide, Brisbane, Canberra, Darwin, Hobart, Melbourne, Perth, Sydney).
3. Disseminate the liveability indicators across a number of formats including document (PDF), spreadsheet (CSV), map (Shapefile and GeoJSON) format via a range of websites, portals and reports.
4. Link the indicators to national data sets to demonstrate the value of linking spatial data to population health survey data through a set of illustrative examples.
5. Develop a national spatial platform that will allow users to upload geographic coordinates or areas of interest to a website, run geospatial analyses and queries using a national, clean spatial database, and download results.

Feedback on the feasibility and utility of these next stages was elicited from a range of stakeholders and will inform the plan for the proposed work, which will be funded through a range of sources including The Australian Prevention Partnership Centre, McCaughey VicHealth Community Wellbeing Unit, and the Clean Air and Urban Landscapes Hub funded by the Department of the Environment and Energy.

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POPULATION HEALTH AND TRAVEL SURVEY DATA CUSTODIANS

- The 45 and Up Study: The Sax Institute.
- HABITAT study (funded by NHMRC# 497236, 339718, 1047453): Institute for Health & Ageing, Australian Catholic University.
- RESIDE study was funded by grants from the Western Australian Health Promotion Foundation (Healthway) (#11828), the Australian Research Council (ARC) (#LP0455453) and supported by an Australian National Health & Medical Research Council (NHMRC) Capacity Building Grant (#458688). Centre for the Built Environment and Health, University of Western Australia.
- Department of Health Preventive Health Survey [PHS 2012/13], Melbourne, Victoria: Victorian Department of Health and Human Services.
- Victorian Integrated Survey of Travel and Activity (2009, VISTA): Victorian Department of Economic Development, Jobs, Transport and Resources.

SPATIAL DATA CUSTODIANS

- Australian Bureau of Statistics (ABS)
- Australian Children's Education and Care Quality Authority (ACECQA)
- Australian National Health Services Directory
- Australian Population and Migration Research Centre (University of Adelaide)
- Australian Urban Research Infrastructure Network (AURIN)
- Brisbane City Council
- Callpoint Spatial Ltd
- McCaughey VicHealth Community Wellbeing Unit, The University of Melbourne
- Pitney Bowes
- PSMA
- Public Transport Victoria
- Sensis Pty Ltd
- Translink (Department of Transport and Main Roads, Queensland Government)
- Victorian Commission for Gambling and Liquor Regulation
- Victorian Department of Economic Development, Jobs, Transport and Resources
- Victorian Valuer General's Office (VGO)

SOFTWARE

BetterBusBuffers (ESRI)

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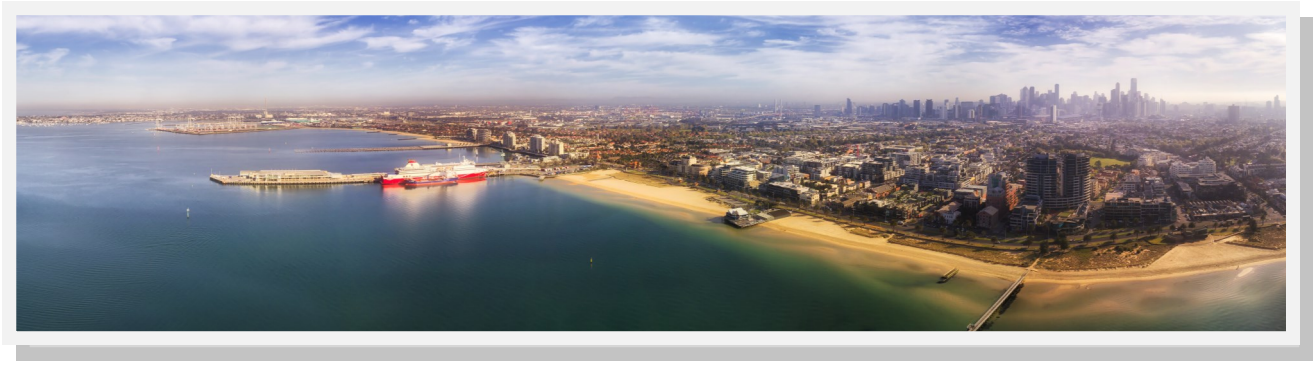


1. INTRODUCTION

The Australian Prevention Partnership Centre (TAPPC) was established to "improve the availability and quality of research evidence for policy makers" [1]. Its Chief Investigators are drawn from over 20 universities, institutes and health departments across Australia. TAPPC funds a number of projects aimed at investigating how we can "build an effective, efficient and equitable system for the prevention of lifestyle-related chronic disease" [1]. In 2013, TAPPC funded The Australian National Liveability Study to develop and validate a set of national spatial liveability indicators associated with selected non-communicable disease risk behaviours and/or outcomes [2].

THE AUSTRALIAN NATIONAL LIVEABILITY STUDY

Recognition that city design impacts public health was established in the 19th century in response to outbreaks of infectious diseases; however, links between planning and health have attenuated. Recently there have been calls for public health and planning disciplines to reconnect to *create healthy cities* that facilitate health-enhancing behaviours that reduce the risk of chronic diseases. Urban forms promoting walking, cycling and public transport are now being recommended by multiple sectors including public health, transport, and planning, and the creation of 'liveable and sustainable' communities is a priority within national and international urban policy. Hence, the Australian National Liveability Study was designed to be aligned with contemporary urban planning issues.

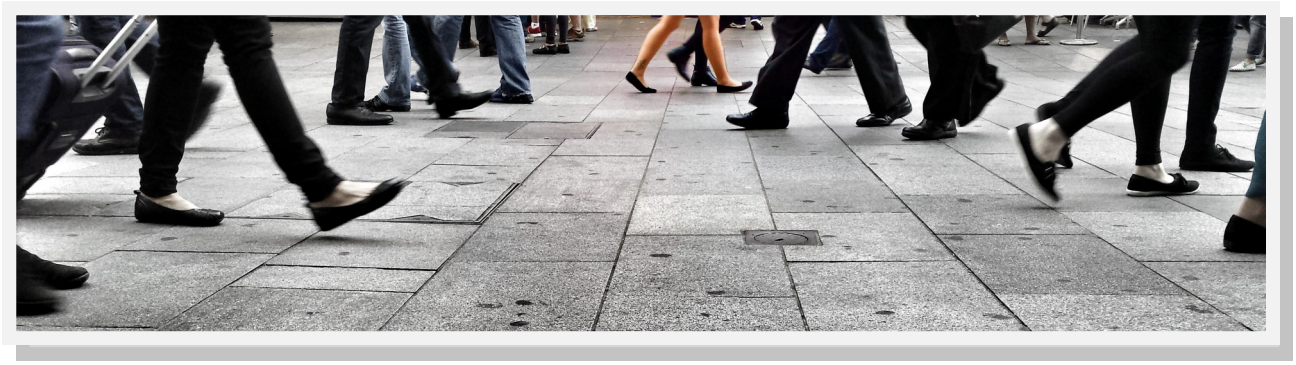
Although widely used, 'liveability' is generally poorly defined in the literature. Hence, in previous research, using a social determinants of health lens our team defined a 'liveable' community as one that is: safe, socially cohesive and environmentally sustainable, with affordable housing linked via public transport, walking and cycling infrastructure to employment, education, shops and services; public open space, and social, cultural and recreational opportunities [3, 4]. Our team's earlier research identified eleven domains of liveability [4], which were subsequently consolidated to seven domains as underlying social determinants of health: employment, food environment, housing, public open space, social infrastructure, transport, and walkability [5].

The aims of the Australian National Liveability Study were to develop and validate state and national sets of spatially-derived liveability built environment indicators that impact on chronic disease risk behaviours and/or health outcomes. For this project, the liveability indicators were to be: (a) aligned with urban policy; (b) developed using readily available data; (c) standard and consistent over time; (d) suitable for monitoring progress towards creating more liveable and sustainable communities; and (e) validated as being associated with chronic disease risk factors and/or health outcomes. The study limited its focus to adult liveability in major cities.

REPORT PURPOSE

The purpose of this report is to: (1) summarise The Australian National Liveability Study methods and results; (2) recommend strategies for disseminating the resulting national liveability indicators; and (3) explore the potential for the creation of a national spatial platform of liveability indicators that can be used for state and national research.

In preparing this report we sought feedback on the dissemination of liveability indicators, and the potential of creating a national spatial platform from a variety of stakeholders. These included spatial data providers, population health survey researchers, and groups working in similar areas, such as those providing spatial data and indicators through websites and spatial data portals. The comments from these stakeholders are integrated throughout the report.



2. THE AUSTRALIAN NATIONAL LIVEABILITY STUDY METHODS

Figure 1 provides an overview of the seven stages in The Australian National Liveability Study. Stage one – the selection of priority liveability domains – occurred at a national workshop with the research team and the Advisory Group, which consisted of systems investigators and stakeholders. With Advisory Group guidance, it was decided that The Australian National Liveability Study would focus on five liveability domains specifically related to chronic disease: (1) walkability; (2) access to public transport; 3) public open space; (4) food; and (5) alcohol. Four of these domains came from the seven previously identified liveability domains. The alcohol domain was included because it was deemed that its impact was spatial, it related to urban planning and chronic disease, and it was of particular interest and relevance to the system investigators and stakeholders. It was also decided that it was critical to, where possible, ensure any indicators of liveability developed be linked to current Australian state urban planning policies. Therefore, the proposed methods were modified to include a review of planning policy and to ensure that where possible the liveability indicators were operationalised based on planning policy.

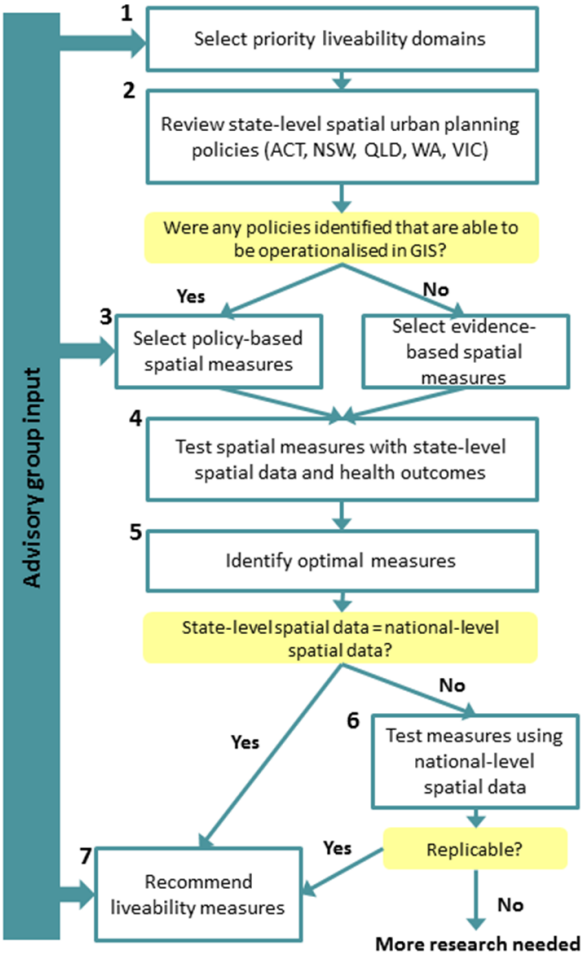


Figure 1. The Australian National Liveability Study stages.

Stage two was a rapid review of state-level Australian urban planning policies from five states: ACT, NSW, QLD, WA, VIC. The purpose of the review was to identify spatial planning policies for each domain. Inclusion and exclusion criteria for each domain are listed in Table 1.

Table 1. Policy review inclusion and exclusion criteria.

Domain	Inclusions	Exclusions
Alcohol	Licensed premises (pubs, bars), off-license premises, on-license premises, late-night premises. Restaurants (if referred to under licensed premises)	Policies relating to individual -level alcohol purchasing restrictions (e.g. age) cost/price and discounting
Food	Fast food outlets, supermarkets, convenience stores, butchers, fishmongers, grocers, bakers, markets, restaurants	Policies relating to food labelling, cost, hygiene and health certification, cost/price and discounting, cultural appropriateness
Public open space	Pocket parks, local parks, regional parks, plazas	None
Transport	Car, public transport, and active travel	Freight
Walkability	Street networks (incl block length), residential density, land use mix, variety of places to access within a given distance, retail-floor-area ratio, location/amount of car parking, big block vs strip shopping, density of retail and housing	Policies related to micro-level measures such as roundabouts, zebra crossings, walking school buses

Stage three identified policies that could be operationalised spatially within geographic information systems (GIS). Where no appropriate policies could be identified, alternative evidence-based measures were developed based on research best practice measures and consultation with relevant experts and relevant local data authorities (e.g. NSW Ministry of Health). Both the policy and evidence based measures were assessed by the Advisory Group prior to moving to the next stage.

Stage four used GIS to implement the spatial measures identified in stage three, and then calculated these measures around the residential addresses of participants in population health surveys (Table 2). The health-related outcomes were selected based on our hypotheses of how the built environment measures impact health and data availability, which was limited (Table 2).

Associations between the GIS-based liveability measures and a variety of health behaviours and outcomes were then tested with statistical modelling. Multinomial logistic regression was used for the alcohol domain. Multilevel linear regression was used to analyse BMI in relation to food environment. Logistic regression models with generalised estimating equations (GEE) for the public open space domain. Multi-level multinomial logistic regression was used for the transport and walking domains.

Based on the results of the statistical modelling, stage five identified optimal measures for each liveability domain. Of these, those measures where the state-level spatial data matched national data were taken forward as the recommended liveability indicators (stage seven). Where the optimal measures were created with state-level spatial data that did not match national data, the measures were tested with national data (stage six). Optimal measures that were not able to be replicated with national data require further work to develop/ source appropriate data in the future.

Table 1. Final liveability domains, health and wellbeing behaviours and outcomes, and population health datasets

Liveability domain	Health and wellbeing behaviours and outcomes	Dataset containing health outcome	State tested in
Alcohol	Self-rated health	Department of Health and Human Services Preventive Health Survey (2012-13) [6]	VIC
Food	Body Mass Index (BMI)	45 and Up study (baseline), and mini follow-up (SEEF) [7]	NSW
Public open space	Walking for recreation and moderate-vigorous physical activity within the neighbourhood	RESIDential Environment Study (RESIDE; baseline) [8]	WA
Transport[a]	Walking for transport	How Areas in Brisbane Influence healTh And activiTy (HABITAT; wave 3, 2011) [9]	QLD
Walkability	Walking for transport	Victorian Integrated Survey of Travel and Activity (VISTA; 2009-10) [10]	VIC

[a] The transport domain originally intended to investigate cycling for transport, however this was not possible due to a small sample size.

Two important methodological decisions were made during the study: (1) restricting analysis and indicator development to urban areas of major cities (defined using Sections of State [11] and Metropolitan boundaries), and (2) acknowledging that appropriate scales for the indicators may vary and were unknown, and therefore measures were created and tested at a range of scales.

3. RESULTS

POLICY REVIEW AND LIVEABILITY MEASURE DEVELOPMENT

The policy review yielded a total of 65 policies that were identified as being able to be implemented in GIS. More were found for transport (n=9), walkability (n=40) and public open space (n=16) domains, than alcohol (n=0) and food (n=0) domains.

Table 3 lists the relevant policies and spatial measures that were developed for testing with health outcomes. There was some overlap with the policies identified under the transport and walkability domains, specifically for "street connectivity" and "street block length". For completeness each domain developed and tested street connectivity and street block length measures. However, the implementation of these measures varied slightly. The transport domain implemented street connectivity as a pedshed ratio: a commonly used metric of walkability that is the ratio of the area accessible within a road network buffer to the area accessible in a straight-line buffer. However, the walkability domain implemented connectivity as the density of intersections since this metric is used in the walkability index commonly used in research [12]. While the transport domain implemented street block lengths as lengths, the walkability domain implemented street block length as average block area due to differences in block data.

[2]Since the review, one additional Victorian policy has been identified which requires that 80-90% of households should be within 1km of a town centre of sufficient size to allow for provision of a supermarket.

Table 3. Policy and evidence based spatial measures to be tested

Domain	Policy	Spatial measure
Alcohol[a]	None	SA1 level density of on-licenses per capita (total population) SA1 level density of on-licenses per capita (drinking age) Count of on-licenses within road network buffers Distance to closest on-license SA1 level density of off-licenses per capita (total population) SA1 level density of off-licenses per capita (drinking age) Count of off-licenses within road network buffers Distance to closest off-license
Food	None	Count of fast food outlets within network distances of 400m, 800m, 1600m, 3200m (conceptualised as providing limited or no healthy food options) Count of supermarkets and green grocers within network distances of 400m, 800m, 1600m, 3200m (conceptualised as providing at least some healthy food options) Ratio of supermarkets and green grocers to fast food outlets within network distances of 400m, 800m, 1600m, 3200m
Public Open Space	Public open space equivalent to 10 per cent of the gross subdivisible area: A minimum of eight per cent active and passive recreational purposes [13]. In residential areas, approximately 10 per cent of the Net Developable Area (NDA) is to be allocated for public open space [14]. 6 per cent of the "Net developable area" is to be allocated for active open space (NB: active open space = parks ≥8ha in size) [14]. All parks = 2.83ha/1000 persons [15]. 'Local recreational' (minimum area = 0.75-1.5ha) = 1.0 - 1.2ha per 1000 residents [16]. 'District recreational' (minimum area = 3 -6ha) = 1.0 - 1.4 ha per 1000 residents [16]. Total recreational (parks 0.75ha - 6ha) = 2.0-2.6ha/1000 residents [16]. Local sporting (minimum area = 3-5ha) = 0.8 - 1 ha per 1000 residents [16]. District sporting (minimum area = 7 – 10 ha) = 1 - 1.4 ha per 1000 residents [16].	Total area of all parks within participants' suburb ÷ subdivisible land area of the suburb (= residential zoned land + POS area) Total area of all parks within participants' 1.6km RNSA ÷ subdivisible land area of the 1.6km RNSA (= residential zoned land + POS area) Total area of all parks within participants' suburb ÷ Net Developable Area land area of the suburb (=gross service area – road cadastre area) Total area of all parks within participants' 1.6km RNSA ÷ Net Developable Area land area of the 1.6km road network service area (=gross service area - road cadastre area) Total area of all ACTIVE parks within participants' suburb ÷ Net Developable Area land area of the suburb (=gross service area - road cadastre area) Total area of all ACTIVE parks within participants' 1.6km RNSA ÷ Net Developable Area land area of the 1.6km RNSA (=gross service area - road cadastre area) (Total area of PARKS within participants suburb ÷ suburb population) x 1000 (Total area of all parks ≥0.75 - <3ha within participants' suburb ÷ suburb population) x 1000 (Total area of all parks ≥3ha ≤6ha within participants' suburb ÷ suburb population) x 1000 (Total area of all parks≥0.75 - ≤6 ha within participants' suburb ÷ suburb population) x 1000 (Total area of all parks ≥3 ha - <7 ha within participants' suburb ÷ suburb population) x 1000 (Total area of all parks ≥7 ha - ≤10 ha within participants' suburb ÷ suburb population) x 1000

Table 3 continued. Policy and evidence based spatial measures to be tested

Domain	Policy	Spatial measure
Transport	*Street connectivity* High proportion of potential 400 metre walking catchment is walkable [17]	Pedshed ratio[a] within 400 m 400m pedshed ratio around population weighted centroid[b] of SA1
	Cul-de-sac length Maximum cul-de-sac length is less than or equal to 120 metres	Maximum cul-de-sac length (≤ 120m) within 400 m Service Area Maximum cul-de-sac length (≤ 120m) per SA1
	Maximum cul-de-sac length is less than or equal to 80 metres	Maximum cul-de sac length (≤ 80m) within 400m Service Area Maximum cul-de-sac length (≤ 80m) per SA1
	Street block length Blocks of substantial length (i.e. > 80 m) have mid-block pedestrian links[18] Provide street blocks between 120 - 240 m in length and 60 - 120 m wide[19] Neighbourhood permeability should be provided by using street block length < 240 m[20]	Average Block Length (m) for 400m Service Area Average Block Length (m) for SA1
	Traffic volume 85% of households should be located on a road with a traffic volume less than 1500 vehicles per day	Traffic volume[a] within a 800m buffer from residence Traffic volume[a] for SA1
	Public transport stops 400 metre street walking distance around each existing or proposed bus stop >= 60% of dwellings should be in a safe 400 m walk from a neighbourhood or town centre, or an existing or potential bus stop Every household should be within 400 m of a bus stop	Distance (m) to nearest bus stop Count of bus stops within SA1 (with 50m buffer)
	Public transport frequency Every household should be within 400 m of a bus stop, with at least 1 service every 30 minutes	Mean number of transit trips per stop that the nearest stop (within 1.6km) between 7am and 7pm on a weekday Mean number of transit trips per stop that visit this SA1 between 7am and 7pm on a weekday

Table 3 continued. Policy and evidence based spatial measures to be tested

Domain	Policy	Spatial measure
Walkability[a]	*Street connectivity* High proportion of potential 400 metre walking catchment is walkable [17]	Number of intersections with 3 or more legs per km^2
	Street block length Blocks of substantial length (i.e. > 80 m) have mid-block pedestrian links[18] Provide street blocks between 120 - 240 m in length and 60 - 120 m wide[19] Neighbourhood permeability should be provided by using street block length < 240 m[20]	Average block area
	Dwelling density New residential areas > 15 dwellings / hectare [18, 21] Target density of 25 dwellings / hectares within 200 m of all activity centres [18] Higher density housing (> 30 dwellings) / net developable hectare [22] Lower density housing (< 10 dwellings) / net developable hectare [22] In typical walkable neighbourhoods, a residential density of 20 dwellings / hectare [20] In strategic areas close to higher order centres and railway stations, residential densities of 30-40 dwellings / site hectare within 400 m, and sometimes 800 m [20]	Number of dwellings per hectare
	Land use mix and diversity Importance of increasing housing and employment opportunities for the growing population [17, 23] '20-minute' neighbourhoods where access to local shops, schools, parks, jobs and a range of community services is ≤ 20-minute walking trip from home [24]	Number of "daily living" destination types present (convenience store, public transport stop, supermarket) Number of "local living" destination types present (convenience store, public transport stop, supermarket, specialty food (butcher/greengrocer), bank, pharmacy, dentist, doctor/medical centre, library, community hall, post office, childcare)
	Access to activity centre 80-90% of households < 1 km of a town centre of sufficient size to allow for provision of a supermarket [22] Larger neighbourhood centres comprise a centre with a single full-sized supermarket anchor and limited non-retail businesses [20]	Distance to closest activity centre (activity centre represented by supermarkets located in activity centres)

[a]Road network buffer distances were 400, 800, and 1600 m
[b]Refer to Appendix 1

ASSOCIATIONS BETWEEN LIVEABILITY MEASURES AND HEALTH OUTCOMES

Table 4 summarises the liveability measures where a statistically significant association was detected with a health outcome. A brief description of the results are presented for each domain in text below the table.

Table 4. Liveability indicator measures associated with health outcomes (associations in the unexpected direction are in italics)

Domain	Liveability measures	Associated with	Direction of association
Alcohol	Off-license outlets within 800 m	Self-rated health[a]	-
	On- license outlets within 400 m	Self-rated health[a]	-
Food	Ratio of supermarkets and green grocers to fast food outlets within a network distance of 1600m	Body Mass Index (BMI)	-
POS[b]	% residential dwellings within 400m of POS	Levels of neighbourhood MVPA[c]	+
Transport	Pedshed ratio[d] within 400m and SA1	Levels of WT[e]	+
	Public transport stops within 400 m and SA1	Levels of WT[e]	+
	Frequency of public transport within SA1	Levels of WT[e]	+
	Cul-de-sac length within SA1	*Levels of We[d]*	*+*
Walkability[f]	Dwelling density	Any neighbourhood WT[e]	+
	Street connectivity	Any neighbourhood WT[e]	+
	Distance to closest activity centre	Any neighbourhood WT[e]	-
	Access to destinations for daily living	Any neighbourhood WT[e]	+
	Access to destinations for local living	Any neighbourhood WT[e]	+

[a]For those living in more disadvantaged areas only.
[b]POS = public open space
[c]MVPA = moderate-vigorous physical activity
[d]Pedshed ratio is defined as the 400m network distance defined area surrounding a study participant address divided by the crow flies distance area
[e]WT = walking for transport
[f]All walkability measures were significant at all scales (400, 800, 1600m)

Alcohol

In the main fully adjusted model the only significant relationship existed for off-license outlet access within 800 m of home. Unexpectedly, the density of on-license alcohol outlets was negatively related to poorer self-rated health [25]. We theorise that this is because on-license alcohol outlets (e.g. restaurants, cafes) could be a proxy measure of mixed land use hubs. These hubs provide destinations for people to walk to, and also represent locations for socialisation and physical activity [26, 27], which are positively associated with self-rated health [28].

We also examined interactions between alcohol outlet spatial measures and area-level disadvantage with poorer self-rated health. Having more off-licenses within 800 m and more on-licenses within 400 m was associated with lower self rated health for those living in disadvantaged areas only [25]. Therefore, the recommended alcohol indicators are: (1) count of off-licenses within 800 m and (2) count of on-licenses within 400 m.

Food

Spatial indicators of local food environment were constructed for the geocodes of 15,229 Australian adults aged 45 years and older [29]. Restrictions to the sample had been made to help eliminate potential biases, with this particular sample characterised by (i) only those participants living in Sydney's metropolitan area; (ii) only those surveyed at baseline and follow-up; and (iii) only those who remained resident within the same SA2 (Statistical Area 2) at baseline and follow-up. Evidence was not strong ($p>0.05$) for an association

between BMI and univariate counts of fast food outlets (unhealthy) or supermarkets and green grocers (healthy choices) within 400m, 800m, 1600m or 3200m. Recognising that univariate counts do not acknowledge that food purchasing occurs within the context of the local food environment, we constructed ratios of fast food outlets to supermarkets and green grocers [29]. At 1600 m, higher ratios of fast food outlets to supermarkets and green grocers were associated with higher BMI ($p<0.05$). In particular, ratios of 1:4 or greater were associated with higher BMI. The lowest BMI was observed among participants living in areas characterised by 1 or more supermarkets and/green grocers without a single fast food outlet within the same distance ($p<0.05$). Testing of the same ratios calculated for 400 m, 800 m and 3200 m distances did not provide convincing evidence ($p>0.05$) [29]. Henceforth, the recommended food environment indicator for the National Liveability Index is a ratio of fast food outlets to supermarkets and/or green grocers less than 1:4.

Public Open Space

The space-based guidelines related to the percentage of POS or the provision of space/head of population were not found to be associated with either recreational walking or MVPA [30]. Nevertheless, one measure based on a Victorian policy guideline, was associated with a health outcome and this related to 95% of residents living within 400 m of a park [30]. RESIDE participants living in suburbs with this level of access, had a three-fold increased odds of doing any MVPA in their neighbourhood on a weekly basis [30]. Therefore, the recommended public open space indicator is: (1) percentage of residential dwellings within 400 m of public open space.

Transport

Greater levels of walking for transport were associated with more highly connected streets and the presence of public transport stops both within a 400 m buffer and within a Statistical Area 1 (SA1) [31]. Having at least two public transport services per hour within an SA1 was associated with greater levels of walking [31]. Unexpectedly, cul-de-sac lengths less than 80 m and 120 m (within an SA1) were associated with lower levels of walking for transport [31]. This unexpected finding may be due to an absence of footpath data in this study since longer culs-de-sac could have pedestrian paths at the end, providing greater improved transport walking conditions through greater connectivity and less traffic. There was no evidence of associations between walking for transport and street block lengths less than 240 m [31]. Therefore, the recommended transport indicators are: (1) pedshed ratio within an SA1, (2) count of public transport stops within an SA1, and (3) public transport frequency within an SA1.

Walkability

All walkability measures were significantly associated with greater odds of neighbourhood walking for transport when included in separate models at all three scales (400, 800, 1600 m) [32]. However, All walkability measures were significantly associated with greater odds of neighbourhood walking for transport when included in separate models at all three scales (400, 800, 1600 m) [32]. However, only measures relating to dwelling density and land use mix and diversity remained significant across the three scales when all aspects of the built environment were included in a single model [32]. This suggests that the dwelling density and local living measures capture aspects of street connectivity, average block area, and distance to nearest activity centre. In the combined model the strongest associations were detected at the 1600 m scale [32].

Published results

Publications specific to each domain arising from the Australian National Liveability Study are listed in Appendix 2. In summary, in line with our definition of liveability we found that the design of areas that were more supportive of the health outcomes and behaviours examined in this study were characterized by higher dwelling density, more connected streets, shorter distances to public open spaces and daily living destinations, and areas with a green grocer and/or a supermarket but no fast food outlet within 1600m, and with greater distances to on and off-license alcohol outlets.

RECOMMENDED LIVEABILITY INDICATORS

The set of nine recommended liveability indicators are listed below:

- count of off-licenses within 800 m
- count of on-licenses within 400 m
- ratio of fast food outlets to supermarkets and green
- grocers less than 1:4 within 1600m
- percentage of residential dwellings within 400 m of public open space.
- street connectivity (pedshed ratio within an SA1 or intersection density)

[3]Statistical area level 1s are designed by the Australian Bureau of Statistics as the smallest unit for releasing Census data. SA1s have an average population of 400 persons.

- count of public transport stops within an SA1
- public transport frequency within an SA1
- dwelling density within 1600 m
- access to local living destinations within 1600 m

Note that both the transport and walkability domains implemented slightly different measures of street connectivity. Both measures were associated with walking for transport behaviour. Therefore, as part of the next stage of this research - The Australian National Liveability Study II – we will test the different measures of connectivity and select a single measure that is most appropriate.

EXAMPLE: HOW THE LIVEABILITY INDICATORS CAN BE APPLIED IN FUTURE

It will be possible to map the liveability indicators to assess inequities across and between cities [33]. Figure 2 provides an example of how this might be done by mapping the local living indicator. The local living indicator was developed for the walkability domain and was found to relate to whether or not travel survey participants walked in their local neighbourhood. Local living is a score of 0-12 that indicates the presence/ absence of a variety of destinations – within a specified area - to which people might regularly walk. The destinations included in the local living indicator are convenience (convenience stores, petrol stations, newsagents), supermarkets, fresh food (butchers, fishmongers, and fruit and vegetable shops), banks, post offices, libraries, community centres, general practitioners, dentists, pharmacies, childcare, and public transport stops (train, tram, and bus) A value of 0 indicates that none of the twelve destinations are present within the specified area. A value of 12 (represented as dark blue in Fig 2) indicates that all destinations were present.

The local living indicator was calculated for areas within 800m walkable distance of the population weighted centroids of Statistical Area 1s (SA1s) within Metropolitan Melbourne. Consistent with the ABS, SA1s with low residential population counts were excluded [12]. The map in Figure 2 illustrates the spatial patterning of access to destinations in Melbourne. It shows that the central business district and locations along train lines have greater access to local living destinations than areas further from the city centre. Taken with the result that by adding additional types of local living destinations the odds of transport walking in the neighbourhood increases [32], this map illustrates the areas that are more supportive of walking for transport.

This map also illustrates how each of the liveability indicators could be mapped for each major city, which would allow within and between city comparisons.

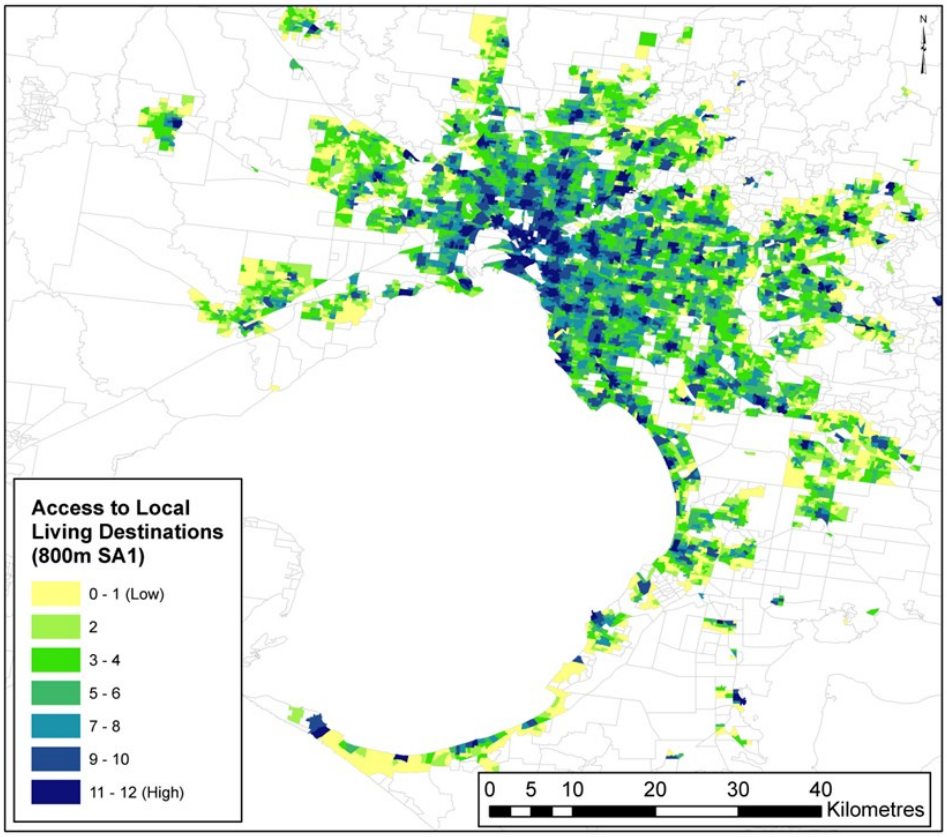


Figure 2. Example liveability indicator map. Access to local living destinations calculated within 800 m walkable distance of SA1 population weighted centroids.

LIMITATIONS

There were several limitations associated with the Australian National Liveability Study. First, due to resource constraints, only five domains of liveability were investigated. While these domains were selected as priority domains, the other domains of liveability (e.g., housing, employment, natural environment) are also important and should be included in a suite of national liveability indicators in the future. This could be informed by research in Victoria that covers a wider range of liveability domains [5]. Second, due to resource constraints and the lack of access to survey data with a wide range of health measures, each domain was only tested in a single state, for limited health behaviours and outcomes and for specific population groups (e.g., adults, movers, people aged 45 years and older). It is plausible that associations between different liveability measures and health vary in different locations, population groups and health outcomes. Therefore, future research should examine the relationships between liveability and a broader range of health behaviours and outcomes (e.g., mental health, chronic disease) and in broader contexts. National health survey data such as the Australian Health Survey [34], AusDiab [35] and Ten to Men [36], could be useful in testing broader contexts and health behaviours and outcomes.

CHALLENGES AND OPPORTUNITIES

The Australian National Liveability Study faced a number of challenges, which represent opportunities to improve policy, practice, data, and research. These are discussed below.

Lack of relevant spatially-specific policies

A first task of the project was a policy review, to enable us to identify spatial state-level urban planning policies related to each domain. However, we were unable to identify appropriate spatial policies for the alcohol domain. For the alcohol domain there were policies available, but most were not spatially-specific enough to operationalize in GIS or test with health outcomes. Most policies relating to the location or density of alcohol premises presented general guidelines for assessing each license application (e.g., the responsible authority must consider the cumulative impact of any existing licensed premises and the proposed licensed premises on the amenity of the surrounding area;[19]). The one exception was spatial policies that precluded the location of alcohol outlets within a certain distance of sensitive venues, such as schools. Although important, as this study focused on adults, this policy was not considered in this study. Of note, each of the five states included in the policy survey had temporally-specific policies for permitted liquor trading hours for on- and off -license premises.

The food domain also had limited spatially implementable policies. While some states had policies regarding the permitted size of various food outlets such as supermarkets and convenience stores, these policies were screened out prior to stage 3 since they could not be implemented or tested due to lack of building floor area data at both the state and national level.

In these circumstances, The Australian National Liveability Study team instead used research best-practice to inform the development of relevant spatial measures. The lack of spatially-specific policies represents an opportunity for more research in this area to help define appropriate 'spatial' policies, and for TAPPC stakeholders' to advocate for spatially-specific alcohol and food planning policies.

Health and behavioural data

We assessed the liveability measures in relation to population data on health related behaviours and outcomes. The relevant health measures were based on our hypotheses of how the built environment measures impacted health. However, we were limited by the availability of appropriate health and behaviour data. In order to allow measurement of the residential environment any health and behaviour survey data required residential address information. This limitation also represents an opportunity to improve the availability of geocoded health survey data and linkage to liveability and other measures of the environment. Improved data linkage could occur through a number of mechanisms. For example, linking liveability measures to the ABS's Australian Health Survey and/or providing tools to enable linking of health and liveability measures such as our proposed national spatial data platform, which is discussed in Section 5.

Spatial data

One of the main challenges faced in The Australian National Liveability Study related to obtaining appropriate, accurate, nationally-consistent spatial data of the environment. These data are essential for calculating comparable national liveability measures. Sourcing, assessing, cleaning, preparing and aggregating the consistent spatial data required to calculate the national liveability measures was time consuming, expensive, and required considerable spatial expertise. Furthermore, significant time was required to negotiate data license agreements, and the development and calculation of the liveability measures from the spatial data also required significant spatial expertise. Where possible we sourced spatial data from the Australian Urban Research Infrastructure Network (AURIN), however in many instances AURIN did not hold the required datasets.

In addition, many data sets sourced from authoritative data providers contained significant errors and/or omissions, or were not useful for this research. Data access was a significant impediment in deriving nationally consistent indicators.

These data issues raise important opportunities for TAPPC. It might be possible for TAPPC to use The Australian National Liveability Study as a basis from which to advocate for high quality spatial data and improved access to spatial data. Team members undertook spatial data advocacy throughout this project, which is an additional outcome of The Australian National Liveability Study. Examples of spatial data advocacy undertaken, or are currently underway include:

- May 2016 - Vincent Learnihan led The Australian National Liveability Study team's response providing feedback from The Australian National Liveability Study team to the Draft Standard for Road Management and Investment in Australia and New Zealand developed by Austroads in April, 2016.
- Jul 2016 – Suzanne Mavoa & Vincent Learnihan led The Australian National Liveability Study team's response to the Productivity Commission Inquiry into Data Availability & Use.
- Ongoing – the team advocates with AURIN regarding useful datasets and data quality.
- Ongoing – Suzanne Mavoa has provided feedback on quality/potential improvements of PSMA data (features of interest, road centerlines) to Callpoint Spatial to feedback to PSMA.
- Ongoing – Suzanne Mavoa represents The Australian National Liveability Study team in liaising with the ABS geospatial team regarding improvements to ABS spatial data products from a health research perspective. As a result ABS will consider modifying future meshblock datasets to include more detailed land use information. ABS has also recently attached an indicator of access to greenspace to the National Health Survey.

The Australian National Liveability Study therefore represents a significant intellectual and financial investment in identifying and preparing nationally consistent spatial data for use in calculating built environment measures. This aligns well with the UN Habitat and WHO's call for unmasking inequities within cities, which is only possible if cities and researchers have access to high quality data [33].

There is an opportunity to build on the foundation created by The Australian National Liveability Study, to enable researchers and policy makers across Australia to benefit from this work. A logical next step is to develop a national platform of cleaned built environment spatial data that can be shared by researchers and policy makers across Australia, to reduce costs and duplicated effort in sourcing and creating, clean spatial data and calculating liveability measures.

Creation of a national spatial platform of cleaned built environment spatial data will also address one of the main limitations of The Australian National Liveability Study i.e., that it only tested Creation of a national spatial platform of cleaned built environment spatial data will also address one of the main limitations of The Australian National Liveability Study i.e., that it only tested associations between the liveability measures and a limited number of specific health behaviours and outcomes in single states rather than examining associations with multiple outcomes in multiple states. The creation of a national spatial database would facilitate the data to be linked to temporally relevant survey data and facilitate more research in this area. Section 5 of this report further explores the idea of a national spatial platform to support research.

Scale

A major challenge confronted by The Australian National Liveability Study was identifying appropriate scales at which to calculate and disseminate the indicators. It is well established that the choice of boundary and scale can make a difference to research results [37]. Comprehensive testing of different scales for different outcomes was beyond of the scope of the project. Therefore, for The Australian National Liveability Study all analyses were replicated at a limited number of scales (sensitivity analyses), primarily 400, 800, and 1,600m road network distance from a residence.

Before the national liveability indicators are calculated and disseminated it is important to undertake additional sensitivity tests to ensure that each of the indicators are presented at appropriate scales, that is, at scales that are relevant to health and wellbeing behaviours and outcomes. This additional methodological research on scale also presents an opportunity to contribute to the broader built environment and health literature.

NEXT STEPS

The Australian National Liveability Study developed liveability indicators and validated them with health and wellbeing outcomes within a single state. Based on these results it, and recommended a suite of indicators. However, it did not calculate the recommended indicators for all Australian major cities. Therefore, an important next step will be to calculate these indicators nationally. This, along, with the opportunities arising from the challenges identified above present logical next steps (Table 5). The next two sections of this report relate to two of these tasks. Next, recommendations for the dissemination of the national liveability indicators are presented. Finally, the potential for developing a national spatial platform is explored.

Table 5. Next steps.

Tasks	Timeline	Funding source
Methodological testing of scale	2016	The Australian National Liveability Study II
Calculating national liveability indicators	2016-17	The Australian National Liveability Study II McCaughey VicHealth Community Wellbeing Unit Clean Air and Urban Landscapes
Disseminating national liveability indicators	2016-17	The Australian National Liveability Study II
Development of proposal/funding for a national spatial platform (including demonstration of value)	2016-18	The Australian National Liveability Study II
Advocacy (policy, spatial data, uptake of indicators by Government)	Ongoing	N/A

4. RECOMMENDATIONS FOR DISSEMINATION OF THE NATIONAL LIVEABILITY INDICATORS

NATIONAL LIVEABILITY STUDY WORKSHOP ON DISSEMINATION OF INDICATORS

On Friday 27th May 2016, The Australian National Liveability Study held a workshop for stakeholders at The University of Melbourne. Stakeholders included representatives from the National Heart Foundation, the Victorian Department of Health and Human Services, the Sax Institute, the Victorian Metropolitan Planning Authority, ACT Health, and the Planning Institute of Australia. The Federal Government collaborators were unable to participate in the liveability workshops as the Government was in caretaker government mode. The full list of stakeholders is provided in Appendix 4. As part of the all day workshop we ran a session designed to elicit feedback on potential dissemination strategies.

The dissemination session consisted of small table discussions around the following questions:

1. What are the strengths and weaknesses of indicators being used to benchmark and monitor policy?
2. Who are the types of people and organisations likely to use the liveability indicators?
3. What is the best way of disseminating the indicators?
4. What would help and hinder people using the indicators?

Each table consisted of a mix of The Australian National Liveability Study team and stakeholders.

Results

Details of the full day workshop, including the session on dissemination of indicators, are presented in Appendix 5. Key feedback on the dissemination of indicators are summarised below.

What are the strengths and weaknesses of indicators being used to benchmark and monitor policy?

Strengths

Participants said that indicators are a way to use **evidence** to **measure/benchmark** where we are at with urban policy, to **monitor** progress towards a goal, and to **highlight inequities** and assist local and state governments in exploring how these can be overcome. Indicators were noted as being more than just a measurement tool, and operate as a platform through which to articulate and discuss our **values** as a society. They could also be an **integrating** mechanism to link various planning schemes.

Weaknesses

Indicators present some difficulties. They will need to be continually **maintained** and evaluated. Their utility is **reliant on good data quality and strong supporting evidence**, which is not always available. They are however, potentially **politically sensitive**, revealing when targets are not being met or when policies are being over or under-delivered.

There was widespread agreement that the indicators are important and relevant. This sentiment was summarised by a participant from the planning sector: ***what you don't measure you don't do***.

[4]The Australian Prevention Partnership Centre has funded the National Liveability Study II to provide support for undertaking the next stages of this research.

Who are the types of people and organisations likely to use the liveability indicators?

- Government (local, state, federal) – especially local governments without resource
- ABS
- NGOs (e.g. Heart Foundation)
- Universities
- Private companies (e.g. real estate)
- Planning and policy makers (infrastructure, transport, precinct level)
- Citizen groups
- Media
- International organisations (e.g., UN)

Although not represented at the workshop, it was also discussed that it may also be possible for the Turnbull Coalition Government to use the indicators as part of its Smart Cities Policy. At the time of the workshop, the Turnbull Government had indicated it would negotiate "City deals" with state and local governments. It is plausible that the indicators could be used to identify areas that require interventions; and to monitor the impact of this policy over time.

What is the best way of disseminating the indicators?

Participants emphasized the importance of not re-inventing the wheel and where possible to use **existing websites** and spatial portals to disseminate the indicators. Specific suggestions included AURIN, National Map, CIV, National Health Survey, or a special release from ABS.

It was also suggested that data products i.e. indicators should be made as open as possible. This would align with the Turnbull's government support of open government and driven by an open data agenda (https://www.data.gov.au/) which has also been adopted in many states across Australia, see for example Victoria (https://www.data.vic.gov.au/) and NSW (http://data.nsw.gov.au/) .

The importance of good communication was also highlighted. This includes good metadata, a marketing strategy, clear communication of the differences between the national liveability indicators, and other similar data, and providing end users with enough knowledge to use and interpret the data in meaningful ways.

Participants asked how dissemination was going to be funded; and this will need to be considered.

What would help people using the indicators?

- Relevance to end-users
- Ability to upload own areas of interest
- Good metadata and methods
- Being able to map, graph and tabulate the indicators graphically
- Little or no restriction to download and access
- Stories from lived experiences
- Policy linkages

What would hinder people using the indicators?

- Perceived risk in using indicators to create league tables to compare places, particularly where results are negative or stigmatizing
- Risk of exposing underlying datasets
- Not knowing what to do with the indicators

Other considerations for the indicators?

- There may be different levels of users
- Licensing issues
- Cost – free versus a cost recovery model. Recommendation to do whatever Community Indicators Victoria is currently doing (free at certain level, cost recovery at smaller scale).
- The indicators will highlight problem areas. How will any problems highlighted by the indicators be fixed?

Response to feedback

The importance of liveability indicators for monitoring progress, highlighting inequities and potentially assisting state and local governments to address these inequities highlights the need to make the indicators accessible to a wide variety of users in a timely manner. Therefore, we will need to prioritise indicator dissemination, which means that the first part of The Australian National Liveability Study II will be to focus on identifying appropriate scales at which to calculate indicators, then calculating and disseminating the indicators.

Stakeholder feedback also highlighted the need for good communication so that users understand how the indicators were calculated and how they should or could be used. Taking this feedback on board, we propose a range of communication products from the technical metadata describing methods, through to plain English summary sheets for each indicator (see proposed dissemination strategy below). We also acknowledge that maps are a form of communication and that all indicator maps are designed to facilitate ease of understand. Similarly all data products (e.g. excel spreadsheets), should have associated metadata and contain logical labels and column headings.

We acknowledge that the liveability indicators could potentially be used to create league tables. However, it is not possible to make the data available for use to improve inequities without also making it possible to create league tables.

For more than a decade, our team has been involved in disseminating indicators through Community Indicators Victoria, and to our knowledge, these have not been used to create league tables. Rather the indicators have been promoted to, and used by, Local Government to assist in municipal planning and to generate positive health outcomes. However, to address this issue, we will ensure good communication over appropriate indicator use.

Since the indicators are made as a secondary dataset that we created, exposing underlying datasets is not likely to be an issue. However this will be assessed as part of The Australian National Liveability Study II, and for indicators where we are concerned that could be an issue, we will follow standard protocols to de-identify data . Licenses for the spatial data were negotiated with the dissemination of indicators in mind, however, the license agreements will be checked prior to indicator dissemination. The liveability indicators will be made available under a creative commons license and a doi (document object identifier) will be assigned to each dataset to allow citation. Other potential hindrances such as cost will be considered when devising the dissemination strategy.

PROPOSED DISSEMINATION STRATEGY

We propose creating the following products for dissemination:

- National indicator maps (in PDF and/or shapefile format).
- Datasets (in Excel spreadsheet format).
- Datasets as data services (open APIs)
- Metadata – technical metadata.
- User guides – provides plain English descriptions of how the indicators were calculated and guidance about their use and interpretation.
- "Liveable City Policy Report Card" summary - where applicable, a one page summary sheet describing whether or not the city is meeting the tested policy and mapping the locations where the policy is/is not being met.

These products will be created for each liveability indicator for the urban areas of each major city (Adelaide, Brisbane, Canberra, Darwin, Hobart, Melbourne, Perth, Sydney) in Australia at an appropriate scale as determined by the scale analyses (e.g., Statistical Area 2, Local Government Area).

We propose disseminating these liveability products through a range of existing websites and spatial data portals (Figure 3), with the Place, Health, and Liveability website being the authoritative location for maintaining and downloading of PDF maps, datasets, metadata, user guides, and the "Liveable Policy Report Card" summary sheets. Other websites can link to the Place, Health, and Liveability website. Additionally, the liveability maps should be compatible with and made available on two key spatial data mapping portals: National Map, and AURIN map. These portals will allow users to interact with the data in map form. These portals will also link back to the Place, Health and Liveability website.

As the Federal Cities Program is a partner in the project, there is also the potential for dissemination of the liveability indicators via the State of Australian Cities reports. This option will be investigated as part of the Australian National Liveability Study II. As part of the Australian National Liveability Study II we will also work with TAPPC to devise and fund the dissemination strategy.

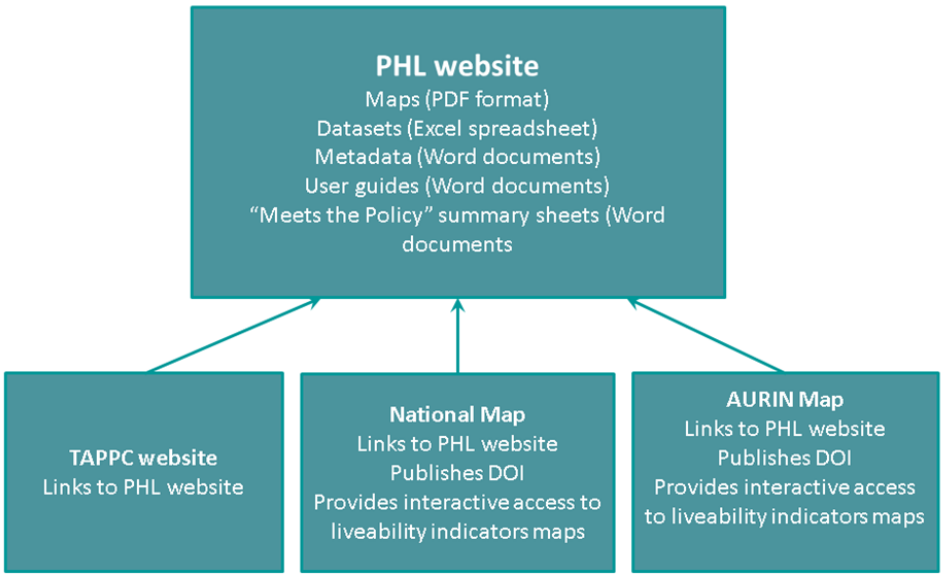


Figure 3. Proposed dissemination of liveability indicators and relevant materials.

5. EXPLORING THE POTENTIAL FOR THE DEVELOPMENT OF A NATIONAL SPATIAL DATA PLATFORM

The Australian National Liveability Study considered issues around use of national spatial datasets, and developing spatial methods to create policy relevant indicators of liveability. Earlier in this report (Section 3), we identified an opportunity to develop a national spatial data platform of cleaned spatial liveability and build environment data. This platform that would allow researchers across Australia to benefit from the National Liveability project work, reducing costs and duplicated effort in establishing clean spatial data and the calculation liveability measures.

As discussed earlier, the creation of a national spatial data platform will also address one of the main limitations of The Australian National Liveability Study i.e., that it only tested associations between the liveability measures and health in single states and for specific health outcomes. It is plausible that associations between different liveability measures and health vary in different locations, population groups and health outcomes. The creation of a national spatial database would facilitate the data to be linked to temporally relevant survey data and facilitate more research in this area.

The remainder of this section describes the vision for a national spatial platform, presents feedback from a range of stakeholders consulted about the feasibility and utility of a national spatial platform, and outlines key issues and proposed next steps.

VISION FOR A NATIONAL SPATIAL PLATFORM

It is envisioned that the national spatial platform will provide a national spatial database and tools through which users can upload points (e.g., residential addresses) or areas of interest, calculate measures of the built environment (e.g., percentage area in public open space, distance to the nearest school, count of fast food outlets in an area), and download the measures for use in further analysis (e.g., statistical modelling). A national, cleaned spatial database – with license agreements and costs negotiated – will be used to calculate the measures. Users will be able to select spatial scales of interest (e.g., count of fast food outlets within 800 m), and, where data are available, the relevant years of spatial data to use when calculating the measures.

A national spatial platform has a number of potential advantages. First, it could increase the number of people who are able to create and use liveability and built environment measures

It would facilitate research because the skills and knowledge required to prepare spatial data and calculate robust measures of the built environment are highly specialized. Potential users of liveability and built environment measures include researchers with population health survey data who would find value in liveability and built environment measures but who do not have access to these specialist skills.

Sharing cost/effort required to source and prepare spatial data of appropriate quality

Potential users with and without specialized spatial skills may also benefit from substantially reduced costs and the time typically required to source, license, and prepare spatial data required to calculate liveability and built environment measures. This represents a potential major saving to research and analysis budgets that could be re-allocated to other tasks.

Providing tools to make it easier and cost-effective for other researchers to fill in some of The Australian National Liveability Study "gaps"

The liveability measures of each domain were only tested in a single context (state) for limited health outcomes and population groups. It is possible that different liveability measures may be relevant for different health outcomes/contexts/population groups, and plausibility that some liveability measures are detrimental to other health outcomes and/or population groups. Creating a National Liveability Spatial Data Platform would facilitate research enabling this to be further explored.

Providing tools to aid consistency in data and measures in built environment and health research

Within the built environment and health literature, researchers are beginning to observe that choice of measure can determine results of the research study [37]. The lack of consensus and consistency in the spatial measures used, makes it difficult to compare studies and come to a consensus on the evidence around built environment and health. The National Liveability Spatial Platform could include tools that could be used across multiple studies facilitating comparative analyses.

Preliminary feedback on a national spatial platform

Feedback on the potential of a national spatial platform was sought through two mechanisms. First, feedback from stakeholders at The Australian National Liveability Study workshop (previously described) was elicited through small group exercises. Second, a range of potential stakeholders were consulted about issues around the development of a national spatial platform (see Appendix 6). Three different types of stakeholders were consulted: 1) health researchers, the potential users of a national spatial data platform; 2) data providers, who would potentially contribute to a national spatial platform; and 3) health geographers, who have expertise in linking spatial data to health surveys. Descriptions of the results from the workshop and meetings with stakeholders are presented below.

Note that this feedback is the result of initial discussions. Ongoing discussions with stakeholders will continue as part of The Australian National Liveability Study II, where the idea for a national spatial platform will be further developed.

Feedback from ongoing discussions with stakeholders

Discussions occurred around the following key issues: general interest in a national spatial data platform of cleaned data, desired functionality, licensing, security, hurdles to use of a platform, and other issues/ comments. Overall, there was interest in a national spatial platform from all types of stakeholders. Indeed, even the least interested stakeholder was open to such a platform if it added value to their survey data at no cost to them and followed their existing security protocols. General concerns around the feasibility of developing, maintaining and funding such a resource were expressed by stakeholders with geospatial expertise.

Additional feedback around these issues is presented below and grouped by type of stakeholder.

Population survey custodians/ researchers

We spoke to potential users of a national spatial platform, that is, researchers who are custodians of population survey data, yet do not have in-house geospatial expertise and do not currently link their data to measures of the built environment. In general, there was substantial interest in the opportunities that a national spatial platform of cleaned data would provide them.

Security was more of a concern to some researchers than others. Some surveys maintain their own secure environment where researchers undertake analysis of the survey data at an individual level. For these surveys, a national spatial platform would need to work within their existing security protocols. Another research group was extremely concerned with security and not willing to use a national spatial platform. However, they were very interested in the potential value of linking spatial data to their survey data and were willing to pay for this to be done as a consultancy. However, most groups were confident that any security issues could be overcome and seemed comfortable with the national spatial platform vision of a web-browser where users upload addresses and download results.

These groups were interested in the liveability indicators developed by our study and had suggestions for other measures of the built and natural environments that they would be interested in exploring with their health outcomes. Notable measures that were of interest to these stakeholders that were not part of The Australian National Liveability Study were: housing affordability, access to schools, and traffic related air pollution.

Most groups acknowledged that it may be necessary to pay a data linking fee, although there was one group where this would be a barrier to use of a national spatial platform.

The idea of a proof of concept for linking spatial data – i.e., demonstrating how their survey data can be linked built environment measures, analyzing the data, and producing a manuscript - appealed to the researchers and may be a way to engage those groups with any concerns about security and cost.

Data providers

We also spoke with groups likely to contribute to the development of a national spatial platform: data providers.

First, we spoke with the two private data providers that our team has developed ongoing relationships with and who also have an interest in built environment and health research. These companies reiterated their willingness to work with us regarding improving their data products for our use, were open to continuing to provide data at reduced costs under educational licenses, and were interested in working towards selling and licensing their data for use in a platform. Their main concern was that it is essential that any platform that uses their data does not compete with their business model, such as providing spatial data, indices and tools to local governments. Since the proposed national spatial platform is aimed at researchers this is not currently an issue, but should be kept in mind, especially if the intended users for the platform expands to include government users. The importance of involving lawyers early on in the process was noted.

Next we spoke with the Australian Bureau of Statistics (ABS), who expressed a strong interest in The Australian National Liveability Study, the proposed national spatial platform, and the general idea of linking geospatial measures to other datasets. The ABS geospatial team has been exploring the linking of built environment measures to the National Health Survey, and have completed a demonstration of value projects linking access to public open space to the National Health Survey dataset. In undertaking this project, and in consulting with our team, they encountered similar issues to those encountered by The Australian National Liveability Study, namely concerns around data quality and methodological choices. They are keen to learn from The Australian National Liveability Study, and also support potential linking of datasets. Their main philosophies are: 1) providing open data; and 2) using existing resources wherever possible. ABS asked whether National Map or AURIN might serve as a foundation for developing the national spatial platform.

AURIN is a web-based portal which provides access to diverse spatial data from multiple sources. AURIN is similarly supportive of the national spatial platform idea as it could build off their existing data catalogue.

Other data providers consulted (Community Indicators Victoria (CIV) and MetroAria) were similarly supportive of the national spatial platform idea and willing to share lessons they have learnt in disseminating indicator data. Note that neither CIV nor MetroAria provides tools to calculate built environment measures as proposed in the national spatial platform. Until now, CIV is Victoria-based only. Funded since 2006 by VicHealth, CIV until

now has been a free resource and is currently exploring cost-recovery options to ensure its continuation into the future.

MetroAria provides six indices of metropolitan accessibility within Australian Capital Cities: Adelaide, Brisbane, Canberra, Darwin, Hobart, Melbourne, Perth, Sydney. It was developed by the researchers at The Australian Population and Migration Research Centre (APMRC), the University of Adelaide with funding from AURIN [38]. MetroAria is currently freely available on AURIN Map.

Both CIV and MetroAria expressed the tension with Open free data, and funding the development of indicators. It was noted that it is important to decide upfront whether or not to charge for data/a service, since it is difficult to shift from a free model to a user pays model.

The MetroAria team are prepared to share cleaned spatial data, but in most cases, are hampered by license agreements. They suggested pre-calculating measures at the parcel level – that is, for each individual address. This is a potential mechanism to address security issues as this approach would mean measures could be pre-calculated and a table with a row for each address sent to users for linking at (as opposed to the users uploading potentially sensitive address data for calculation of measures).

Health geographers

The Health Geography Study Group is a special interest group of the Institute of Australian Geographers. This group was consulted because many of its members have expertise in linking spatial measures of the environment with health survey data and/or the development of spatial portals. The group identified the importance of ensuring that any platform survives beyond the initial funding period. This group also highlighted the problem of the lack of historical spatial data on the location of features of the environment, noting that this could limit potential linking of historical population survey data to link spatial data to survey data collected in the past. Another point raised by this group was the difference between technical and conceptual expertise, and the fact that usually both are required in any project exploring the geography of health. A technical tool such a national spatial platform can replace technical expertise, but may not be able to replace conceptual expertise. Finally this group also felt that this could be "just another portal" and questioned whether we were potentially reinventing the wheel. In response to these questions it will be important to highlight the differences between the proposed platform and existing tools, and also be able to state the value of a national spatial platform.

Feedback from The Australian National Liveability Study workshop

The national spatial platform session of The Australian National Liveability Study workshop (previously described) consisted of small table discussions around the following questions:

1. Who do you see as the users of a national geospatial portal?
2. We have proposed some functionality. Are there additional useful functions? Are any of the proposed functions less useful?
3. What are the strengths and weaknesses of a national geospatial portal?
4. Who else should we be consulting with?
5. Are there any other issues with the idea of a national geospatial portal?

Given the types of stakeholders who attended the national workshop, the participants did not engage as well with the idea of a national spatial platform (a more complicated tool requiring additional user time, effort and skills to produce results) as they did to the dissemination of liveability indicators (i.e., results available immediately). This may be because the stakeholders were from government and NGOs and saw the platform that was being proposed as primarily a research tool. Therefore responses to this workshop session were relatively sparse. Specific results from each question of the workshop session are presented below.

Who do you see as the users of a national geospatial portal?

Some participants thought that users would be the same as those users of the liveability indicators. Other participants thought that users would vary based on level of access and ease of use. In other words, if the platform is labour intensive and complicated to use, then it will be used only by researchers. Responses to other questions and general discussion at the tables suggest that many stakeholders saw this as a researcher tool.

Are there additional useful functions? Is any of the proposed functionality not useful?

- Mapping at different levels
- Ability to monitor the built environment over time
- Use it for complex systems modelling (e.g. scenario modelling of policy changes to improve the liveability of an area)

What are the strengths and weaknesses of a national spatial platform?

Strengths

- Available to use
- Potential to look at land values

Weaknesses

- Not truly national (what about rural locations?)
- Needs to be functional and easy to use

Who else should we be consulting with?

No responses to this question.

Are there any other issues with the idea of a national spatial portal?

Participants identified a number of potential issues. They raised the issue of democratization of information and ensuring that there are no financial barriers to access of this information. They also questioned whether/how this would change the pathways that journalists and policymakers use to access information. A national spatial platform may still mean that journalists and policymakers go directly to researchers for information.

The issue of audience and marketing was also raised. It was noted that marketing needs to be appropriate to the audience and there are potentially different approaches (e.g., AURIN walkability measure versus Walkscore©).

Participants suggested the use of a "narrative" to guide use of a national spatial platform – that is, there is a need to be clear about caveats and construction, how the platform should and shouldn't be used, and suggested scales that might be meaningful. Narratives may also be useful in guiding intended use of the liveability indicators.

Finally, participants identified a tension between caution – for instance, maintaining control of the data and removing details – and ensuring that knowledge is available for better outcomes – for instance freely sharing all information.

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Response to feedback on the idea of a national spatial platform – and next steps

The potential users of a national spatial platform - health researchers with survey data and lacking geospatial expertise - were excited about the potential of a platform to enable them to add measures of the built environment to their survey data with relatively little cost and effort. While many stakeholders saw the proposed platform as "just another portal" and highlighted the importance of using existing infrastructure such as National Map and AURIN, these existing tools do not allow researchers to do what we are proposing with a national spatial platform: securely upload participant addresses, calculate built environment measures, and download results.

It is certainly possible that the platform could be built around National Map and AURIN (i.e. custom build tools that link with National Map and AURIN). Indeed the value in these existing portals is that they are opening up spatial data, negotiating license agreements, and making spatial data more readily available. These data could form the basis of a national spatial platform. However, it should be noted that the spatial data made available via National Map and AURIN have two important limitations when it comes to using these to calculate built environment measures for health research.

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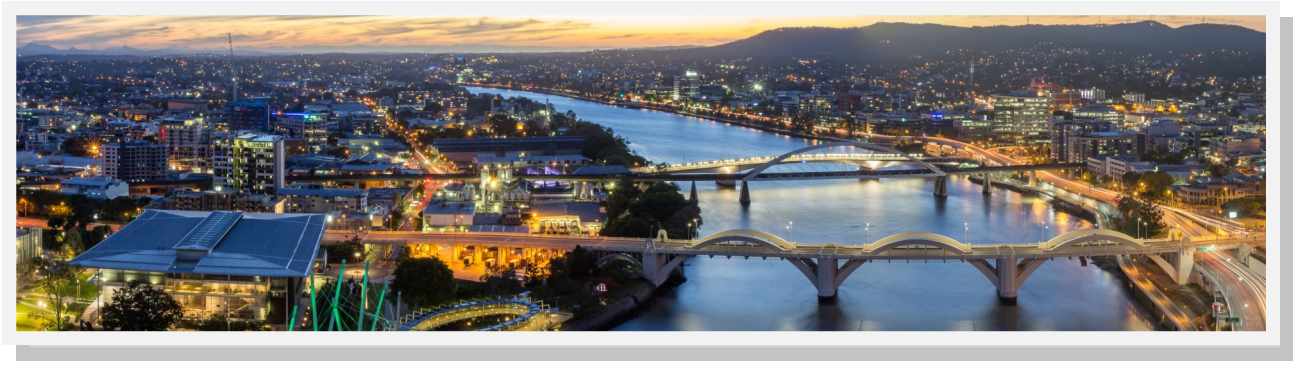
An important issue raised by stakeholders is that of maintenance of a national spatial platform beyond any initial funding period. This was seen by some stakeholders as a rationale for using existing portals such as AURIN or National Map. We agree that maintenance is an important issue, however it is also important to acknowledge that there is no guarantee that existing portals will be maintained, and feel that it is more important for the long term success of a national platform to meet the needs of the users than it is to use an existing portal just because it is existing. Given our previous experiences with AURIN – namely developing a walkability index tool [39], yet not having our improvements to the tool available for users due to a change in AURIN priorities – we believe it is important to maintain some control over the platform. It is also worth noting that even if a national spatial platform was not maintained beyond its funding period, it would still be of value as it would have allowed for the linking of a number of health surveys – and resulting publications would substantially increase our understanding of the relationship between the environment and health. Other important outcomes would be the continued data advocacy and development of a constituency of users who recognize the value of such linkage.

Based on the stakeholder feedback and our experience, we propose to take advantage of the value provided by AURIN and National Map by developing a proposal for a national spatial platform that can use their data and is compatible with them, yet is also able to standalone if need be (E.g., by switching the underlying data providers). Table 6 illustrates how our current vision for a national spatial platform may work. Note that there are several unknown groups. The Australian National Liveability Study will provide the clean spatial data in the first instance, however responsibility and a mechanism for cleaning future spatial data needs to be ascertained.

Similarly, the role of archiving data, and developing the webtools also need to be ascertained. These roles and responsibilities will be discussed during The Australian National Liveability Study II, which will also produce a more detailed proposal. The Australian National Liveability Study II will also explore potential funding mechanisms and submit funding applications.

Table 6. National spatial platform tasks and roles.

National spatial platform tasks	Groups/organisations undertaking these roles
Source raw spatial data (purchase, negotiate license agreements, source)	AURIN National Map
Clean the spatial data	The Australian National Liveability Study II (in first instance) Unknown who would do this on an ongoing basis.
Archive the cleaned historical spatial data (ie different time points	Unknown
Develop web tools to allow users to securely upload, analyse, and download data	Unknown
Test data at different scales	Unknown
Create and supply metadata	Unknown
Host and maintain website	Unknown



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Appendix 1: GIS Method Detail

Population weighted centroid method

DATASET CREATION

Point dataset of population weighted centroids for 2011 SA1s.

Technique Summary

Use the meshblock data and the 'Mean Center' function to create population weighted centroids for SA1s

Datasets required:

Meshblock boundaries with population and SA1 ID attributes/fields (Source: ABS).

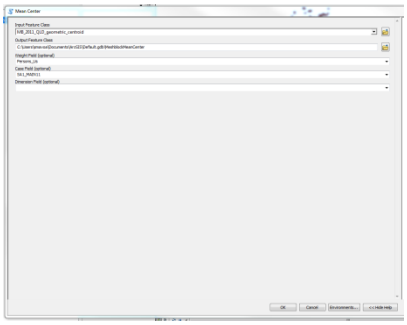
2011 SA1 boundaries (Source: ABS).

Process:

Convert meshblocks to geometric centroids (Feature to Point, with the 'Inside' check box ticked).

Check that the meshblock dataset has an SA1 ID and a population field (Usual resident population from the 2011 census).

Use the 'Mean Center' Function (In Spatial Statistics/Measuring Geographic Distributions) to calculate the population weighted centroid for SA1s (filename = PWC in the dialog box below). Note that the Weight Field is the field containing the population and the Case Field is the field with the SA1 ID.



The result of the Mean Center function is the population weighted centroids file.

Final Output File

PWC

Appendix 2: Publications

1. Journal articles

Published

- Giles-Corti, B., Badland, H., Mavoa, S., Turrell, G., Bull, F., Boruff, B., Pettit, C., Bauman, A., Hooper, P., Villanueva, K., Astell-Burt, T., Feng, X., Learnihan, V., Davey, R., Grenfell, R. & Thackway, S. (2014). Reconnecting urban planning with health: a protocol for the development and validation of national liveability indicators associated with noncommunicable disease risk behaviours and health outcomes. Public Health Research and Practice, 25 (1), 1-5.

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- Rachele J., Learihan V, Badland H, Mavoa S, Turrell G, Giles-Corti B (under review) Applying a policy perspective to investigating neighbourhood socioeconomic and transport disadvantage in Brisbane, Australia, *Transport Policy*

- Rachele, J., et al., Are measures derived from land use and transport policies associated with walking for transport?. Journal of Physical Activity and Health, 2017: 15(1): 13-21.

- Hooper, P., et al., Testing spatial measures of public open space planning standards with walking and physical activity health outcomes: findings from the Australian National Liveability Study. Landscape and Urban Planning, 2018. 171: 57-67.

- Mavoa S, Eagleson S, Badland H, Gunn L, Boulange C, Stewart J, Giles-Corti B. Identifying appropriate land use mix measures for use in the creation of a national walkability index, *Journal of Transport and Land Use.*

- Feng, X., et al., Modest ratios of fast food outlets to supermarkets and green grocers are associated with higher body mass index: Longitudinal analysis of a sample of 15,229 Australians aged 45 years and older in the Australian National Liveability Study. Health & Place, 2018. 49: 101-110.

2. Presentations

- Giles-Corti B et al. Healthy Liveable Communities: Strengthening the evidence base. *Be Active 2014 Sports Medicine Australia Conference,* Canberra, Australia, 15-18 October 2014.
- Learnihan V et al. The development and validation of national liveability indicators: linking geography, urban policy, chronic disease risk factors and health outcomes in Australia. Institute of Australian Geographers Conference, 1-3 July 2015.
- Boruff B et al. The development and validation of national liveability indicators: linking geography, urban policy, chronic disease risk factors and health outcomes in Australia. *Association of American Geographers Annual Meeting,* Chicago, USA, 21-25 April 2015.
- Hooper P et al. Are we creating POSitive places for active living through urban planning policy? Developing and validating national liveability indicators of public open space in Australia. *14th International Society of Behavioral Nutrition and Physical Activity,* Edinburgh, Scotland, 3-6 June 2015.
- Giles-Corti B et al. Are 'liveable' communities associated with physical activity and dietary behaviours? Developing and validating a set of national liveability indicators. *14th International Society of Behavioral Nutrition and Physical Activity,* Edinburgh, Scotland, 3-6 June 2015.

- Rachele JN et al. Benchmarking policy performance for active living: Developing and validating national transport liveability indicators. *14th International Society of Behavioral Nutrition and Physical Activity,* Edinburgh, Scotland, 3-6 June 2015.
- Feng X et al. Beyond 'food deserts'? Measuring local food environments in Australian cities. *14th International Society of Behavioral Nutrition and Physical Activity,* Edinburgh, Scotland, 3-6 June 2015.
- Badland H et al. Identifying and validating policy-relevant, national spatial measures of walkability. *14th International Society of Behavioral Nutrition and Physical Activity,* Edinburgh, Scotland, 3-6 June 2015.
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- Astell-Burt T et al. Is 'liveability' associated with physical activity and dietary behaviours? Developing and validating a set of national liveability indicators. *8th Making Cities Liveable Conference,* Melbourne, 6-7 July 2015.
- Badland H et al. Creating policy-relevant spatial measures of transport which map to health behaviours and outcomes. *International Conference on Transport & Health,* London, 6-8 July 2015.
- Badland H. (Invited Keynote Presentation) Healthy built environments for all: What do we need to consider? *Australian Population Health Congress*, Hobart, 6-9 September 2015.
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3. Media coverage

Badland H. interviewed by T. Elliott. Limiting carparking in shopping centres. *3AW.* 12 June 2015.

Giles-Corti B. interviewed by L. Jones. Apartment buyers seek 'walkable' neighbourhoods that are a step up from the rest. *Domain.* 19 July 2015.

Badland H. interviewed by P. Reynolds. More cash and fewer cars. *Moreland Leader,* p.5. 7 September 2015.

Badland H. interviewed by P. Karvelas. Australia's drinking culture. *Radio National: the Drawing Room.* 16 November 2015.

Badland H. interviewed by M. Overs. Proximity plays a part in alcohol impact. *Go8news,* Edition 7, p.7. 26 November 2015.

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Giles-Corti B. interviewed by C. Frost. The best address to fight the flab. *Daily Telegraph.* 11 December 2015.

Appendix 3: Workshop participants

In Attendance			
1	Alison Camroux	National Heart Foundation	Yes
2	Andrea Hay	Department of Health and Human Services (VIC)	Yes
3	Billie Giles-Corti	University of Melbourne	Yes
4	Bryan Boruff	University of Western Australia	Yes
5	Chris Galano	The Sax Institute	Yes
6	Chris Pettit	University of New South Wales	Yes
7	Denise Laughlin	Department of Health and Human Services (VIC)	Yes
8	Emma Michelle	University of Melbourne	Yes
9	Gavin Turrell	Australian Catholic University	Yes
10	Hannah Badland	University of Melbourne	Yes
11	Iain Butterworth	Department of Health and Human Services (VIC)	Yes
12	Jane Monk	Metropolitan Planning Authority	Yes
13	Jerome Rachele	Australian Catholic University	Yes
14	Priscila Goncalves	University of Sao Paulo, Brazil	Yes
15	Rachel Davey	The University of Canberra	Yes
16	Rod Duncan	Planning Institute of Australia (VIC)	Yes
17	Sonia Wutzke	The Sax Institute	Yes
18	Suzanne Mavoa	University of Melbourne	Yes
19	Thomas Astell-Burt	University of Wollongong	Yes
20	Vincent Learnihan	The University of Canberra	Yes
21	Xiaoqi Feng	University of Wollongong	Yes

Appendix 4.

The Australian National Liveability Study 2016 Whole-of-group Meeting Summary Notes

Introduction

Prof Billie Giles-Corti welcomed attendees and introduced the work of the National Liveability Study team, giving a brief overview of research undertaken to date and thanking the team for their work.

There was a question regarding the development of Liveability Indicators (LIs), and whether this initiative has traction and interest external to Victoria. It was agreed that there is wide interest in LIs, and that this is often motivated by how they can be used to highlight and address inequities.

Presentation of Findings

Walkability

- Dr Hannah Badland presented on the findings of the Walkability domain, and there was some discussion on the implications of creating a Walkability Indicator.
- Dr Badland reported that walking-related urban planning policies should be associated with transport walking, that thresholds could provide the metrics to refine dwelling density and land use mix policies, that customised and meshblock data appear suitable for measuring Land Use Mix (LUM) nationally, and that daily and local living LUM measures have promise but need to be created and tested nationally.

Alcohol

- Dr Hannah Badland presented on the findings of the Alcohol domain. Dr Badland raised three implications for creating a national alcohol indicator: that alcohol outlet data are readily available nationally, that spatial measures need to be tested with other outcomes (e.g. drinking behaviours, injury, crime) and that there is potential for spatial measures to support public health law for liquor outlet planning submissions.
- A question was raised regarding the results and their implications, and there was discussion about the usage of POS data and also the physical placement and presentation of alcohol on the shelf. It was raised that this may be a difficulty in developing National Indicators.

Transport

- Dr Jerome Rachele presented the findings of the Transport domain. The conclusions were that good policies can result in improvements in health behaviours, that we need to obtain higher quality spatial data, and that in developing clear policies we must evaluate their effectiveness for promoting positive health behaviours.
- There was a question regarding the impact of traffic volume on walking for transport, and from discussion it was suggested that highly connected areas might anticipate heavier traffic, and that traffic volume is perhaps much more important for children walking for transport than for adults.
- There was a further question regarding traffic speed versus traffic volume, and whether this was addressed in the research. Although it wasn't (as the dataset does not capture), Dr Rachele confirmed it is something that future research could hopefully address.
- An issue regarding transport policies was raised, in particular an absence of policy on direction of transport (where there may otherwise be policy for distance and frequency). An example was given of a bus travelling between two interchanges but weaving through suburbs to get there.

Food

- A/Prof Astell-Burt presented on the findings of the Food domain. A/Prof Astell-Burt showed how food environment was mapped across meshblocks, as well as access to green grocers, supermarkets and takeaways within 1600m, 800m and 400m.
- Conclusions were that findings can identify different categories of local food environment, that addressing 'food deserts' should be a priority, that the ratio of fast food outlets to green grocers and supermarkets should be restricted, and that spatial proximity to healthier food options is a necessary, but not a sufficient cause of better health.
- A question was raised about the dataset used, which was confirmed to be from Sensis.

Public Open Space

- Dr Bryan Boruff presented on the findings of the Public Open Space domain. Dr Boruff highlighted nuances in policy terminology, nuances in POS definitions, and lack of evidence in current policy. Dr Boruff raised three implications for creating a national indicator: that meshblocks are more than just parks, that planning policy provides more specificity than can be measured by meshblocks, that (as others have found) any exposure to Greenspace may be beneficial. He also asked whether the objective should be to rewrite existing policy, or develop national data standards.
- There was a question about the association between park usage for organised sports or running versus walking, and whether this was encompassed in the findings. Not clear from the findings, but mainly seems to be organised sports or running rather than for walking.
- Victorian findings suggest that while most dwellings have access to parks within 400m, 75% of parks are less than 1hectare in size so the health outcomes aren't being realised. It was agreed it was important to consider this in developing National Indicators.

Technical Successes & Challenges

Dr Suzanne Mavoa reported the successes and challenges facing the National Liveability Study, in particular highlighting issues surrounding sourcing and cleaning spatial data as well as determining appropriate scale.

Regarding the next stages of research, two potential objectives were identified: to create, visualise and disseminate the National Liveability Indicators, and to create a national geospatial database.

- A question was raised regarding the role of AURIN, and it was suggested they could be a future partner in creating the national geospatial database (although they do not offer data cleaning)
- The issue of cleaning and updating data pertaining to food and transport domains was raised, as these are expected to be constantly changing and often linked to survey data. Dr Mavoa suggested such data can be made as "temporarily accurate" as possible, by linking to current studies. It was also suggested from discussion that it could be monitored every few years to track outcomes from policy. This suggestion was picked up in the Discussion session prior to lunch as a valid way of measuring policy and the impact of non-delivery.

Workshop: Calculation, visualisation and dissemination of national liveability indicators

Dr Suzanne Mavoa led a workshop to consider how best to map and disseminate indicators, with four groups (Blue, *Black*, Red and Yellow) discussing the following questions, with their findings represented below:

Q. What are the strengths and weaknesses of indicators being used to benchmark and monitor policy?

Strengths

- Creates shared discussion platform that connects to the vision
- Capable of being measured - need to know if we're doing well
- Agreement on what the expectations are across the system
- Solid cultural boundaries to build a platform from as to what we believe is important
- Reminds civilised society of what our values are, and to articulate it
- We value health as a society, and indicators are linked to health
- If you get indicators right, you save money down the track
- Help at the VCAT level for development
- Can help inform local governance and decision making
- An evidence base from which to work with
- Brings together cause and effect
- Can use to give feedback to local government to evaluate policy
- A joining mechanism between the various planning schemes
- Targets several levels of government
- Measure the performance of the transport integration act
- *Able to assess where you are at, any change from benchmark (good or bad) helps measure progress towards goal*
- *Can hold organisations accountable for actions or inaction*
- *Evidence based*
- Data linkage potential: bespoke analysis/policy perspective would create standards to support & monitor health over time

Weaknesses

- Ongoing evaluation is complicated
- What if data isn't very good quality?
- This works highlights the differences between datasets
- Political cycles? They can be ignored by governments
- Might be politically sensitive, or reveal governments are doing a bad job
- *If there is weak/conflicting evidence supporting indicators there can be tendency for no action/no policy development*
- *Potential for disconnect between metrics and policy: intention of policy vs what the legislation demands (legal implications)*
- *Unintended consequences eg. food menu labelling policy could actually reduce information provided to consumers.*
- *No spatial metrics in alcohol and food policies. This is perhaps one of the greatest findings! For a policy to be able to be effectively monitored it must be linked explicitly to metrics (spatial and non-spatial). Our work pushes for the spatial and inclusion/consideration of place in policymaking to enhance decision making and resource allocation*
- Indicators are more important in terms of communicating principles for good planning, not necessarily as a benchmarking tool
- What does the ACT results mean in relation to other urban areas, and can you nationally benchmark an urban area vs. another urban area?

Q. Who are the types of people and organisations likely to use the liveability indicators?

- Governments (Federal, State, Local) use specific parts tailored for use (eg. transport and other planning oriented ones) but also heeding the total data as there are implications outside smaller parts
- ABS (Health Sector)
- AIHW
- NGOs (eg. Heart Foundation)
- Universities (Departments within)
- Private users and companies (Real estate industry)
- Local government (especially those without resources). Important as it provides info for how to develop and implement development
- Planning and policy-makers (infrastructure, transport, precinct level)
- Real estate and other businesses
- Really several user groups each using the info in different ways
- Councils, Local governments across the country, State governments, Federal governments
- NGOs
- Citizens groups
- Universities
- Media
- International organisations
- UN - align with UN goals?
- For economic analysis – add economic lens to deals?
- To do city deals? Transport, walkability and access to employment are the three most important to get out first because they can be used for "city deals"
- *Policy-makers*
- *Non gov. stakeholders/advocates*
- *Researchers*

Q. What is the best way of disseminating the indicators?

- Don't reinvent the wheel, use existing (eg. web-based)
- Via AURIN partnership?
- National Map: Bryan is pushing but discussion happening concering whether this is most appropriate for users
- Need good metadata, but also a worry whether people are using data correctly (regardless the mechanism needs to be advertised)
- *Use existing infrastructure rather than creating new portal*
- *AURIN?*
- *National Map?*
- *Look at pros and cons of Metro ARIA dissemination.*
- *National Health Survey? / Special release from ABS? Eg. datasets provided at ABS geography levels for a specific point in time (Count of food establishments by type for every meshblock/SA1 in Aus, For every major urban area at SA1 level the average weekday bus service frequency, For every major urban area at SA1 level the number of on/off license alcohol outlets, The standardised walkability score for every SA1 in each major urban area etc.)*
- Need to make clear how this is different from existing resources in the market (eg. whether national data exists and this is a cleaner, useable version, or if it's being created to be more fit-for-purpose)
- Marketing direction needs to be clear and must respond to consumer needs à adopt a targeted planning and marketing approach
- Use maps and visualisations to promote the usage of the data (using the product as the message to the market)
- End user knowledge of the datasets (eg. a trend analysis vs. others) is important so people can use and interpret in meaningful ways, and apply to relevant contexts. Is a data dictionary the answer to this? Or making clear the caveats, definitions, nuances etc?
- Where will funding for dissemination come from?
- Depends on who is going to host the data? A stand-alone organisation (independent) like CIV? Maybe AURIN is an option to host the data? It must be independent.

Q. What would help and hinder people using the indicators?

- Perceived risk in the exposure of LIs if results are negative/stigmatizing, or exposing underlying datasets
- Free data vs. a cost and recovery model (has implications for who will use. It was suggested to adopt whatever model is currently used by CIV)
- Keep relevant to end users
- Licensing issues
- Will users actually be using the data for further analysis?
- Maybe have different levels of users
- Upload own areas-of-interest
- *Good metadata and methods around the creation of indicators*
- *Being able to graph, tabulate and map indicators graphically*
- *Little or no restriction to download and access eg. NEXIS: "NEXIS information is not intended for operational purposes at the building or individual feature level. Its strength is to provide nationally consistent aggregated exposure information irrespective of existing administrative or geographic boundaries."*
- If you don't know what to do with it?
- So if your city isn't walkable, what do we do now?
- Have stories from a lived experience perspective
- There must be a policy linkage

Workshop: National Geospatial Platform

Dr Suzanne Mavoa led a second brainstorming style workshop to consider the potential to leverage off the preliminary work of the National Liveability Study and develop a national geospatial platform.

The same groups discussed the following four questions, with their findings represented below:

Q. Who do you see as the users of a national geospatial portal?

- Likely the same as the Liveability Indicators
- Different levels of access: Open access vs sure style access. If labour intensive, only researchers will use, but if easy to use we could anticipate Local Government, the public, private sector or journalist use

Q. We have proposed some functionality. Are there additional useful functions? Are any of the proposed functions less useful?

- This is probably more of a researcher question
- We could use it for complex systems modelling as an additional scenario if we changes policies to try and improve the liveability of an area
- Mapping (for levels)
- Ability to monitor over time is useful

Q. What are the strengths and weaknesses of a national geospatial portal?

- Strengths: It's available to use, We could use it to look at land values
- Weakness : It's not truly national, What about the rural cities, You don't want to get caught up in creating something that ultimately is not very functional, It needs to be intuitive

Q. Who else should we be consulting with?

No response

Q. Are there any other issues with the idea of a national geospatial portal

- Issue of pathways – journalists and policymakers may still call researchers rather than do the work themselves
- Democratisation of information – no $ barriers to access
- Question of audience and marketing (AURIN vs. walkscore approaches)
- Suggestion of using 'Narrative' to govern its usage, eg. be clear about caveats and construction, how it should and shouldn't be used, and what suggested scales might be meaningful
- Need to manage the risk of "stigma" or negative representation in comparative use of data (eg. low income areas) when used by media to "brand" places.
- Make sure informing knowledge for better outcomes, vs. losing control of the data (and the negative impact on the data providers). But also, over caution and stripping back details or criteria can make data less useful.

Appendix 5. Stakeholders consulted about a national spatial platform

Data providers

ABS

AURIN

Callpoint Spatial Ltd (private company)

Community Indicators Victoria

Metro Aria

Pitney Bowes (private company)

Population health survey custodians/researchers

45 & Up

AusDIab

HILDA

Ten to Men

Other

The Institute of Australian Geographers Health Geography Study Group

McCaughey VicHealth Centre for Community Wellbeing

Level 5, 207 Bouverie Street
The University of Melbourne
Vic. 3010 AUSTRALIA