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Title: Urban planning as a means to create low risk environments for non-communicable disease (Abstract ID 192)

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Background

The environments in which we live are strongly influenced by economic, social and political forces. These forces manifest in the built environment and influence the ability of people and communities to access the resources and systems that they need to live healthy and equitable lives and to participate in decisions about the nature of cities. As such, urban planning has considerable potential as a tool to lower non-communicable disease (NCD) risk within populations through use of urban design strategies and practices that are conducive to wellbeing and empowerment. This paper reports findings from research that assessed the extent to which Australian urban planning policies support the creation of healthy, low NCD risk environments through action on the social determinants of health and equity (SDH/E). The paper commences with a brief overview of the links between the features of urban environments and NCD risk, before a description of the research methods and analysis of the policies are presented. Drawing on the existing evidence and the research findings, the discussion then provides an inventory of key considerations that may facilitate urban design and planning in Low and Middle Income Countries (LMIC) to lower NCD risk.

What is the relationship between urban environments and NCD risk?

There is wide recognition and evidence of the profound effect that the built environment can have upon health by by influencing levels of physical activity, supplies of health foods, and exposure to localised pollution (Pikora et al., 2003, Frumkin et al., 2004, Frank and Engelke, 2005, Kelly-Schwartz et al., 2016, De Leeuw and Skovgaard, 2005). The layout of street networks, the connection and aesthetics of places, functions and buildings and the relationship between them can affect the average amount of time people spend walking, cycling, driving, and engaging in public life, as well as perceptions of safety and belonging (Foster et al., 2012,

Alpass and Neville, 2003, Stead et al., 2000, Handy and Clifton, 2001, Freeman, 2001, Saelens and Handy, 2008). The location of dwellings also determines the costs in money and time that residents must spend accessing employment, education, recreation, goods, and services (Frank and Engelke, 2005, Foster et al., 2012, Giles-Corti et al., 2016). In addition, the construction quality, location and orientation of dwellings determines access to health enhancing views, light and fresh air. It also raises or lowers the energy costs required to keep people comfortable and healthy within their homes in hot and cold weather (Howden-Chapman et al., 2012, Bouzarovski and Tirado Herrero, 2017, Huang et al., 2015).

A healthy neighbourhood is, in part, one where residents are supported to walk often, routinely and in significant numbers. Regular incidental walking is recognised as the easiest, cheapest and most applicable means of gaining recommended levels of physical activity for the broadest cross section of social demographics and personal circumstances (Frumkin et al., 2004, Heart-Foundation, 2014, Pikora et al., 2003, Manson et al., 2002, Zapata-Diomedi et al., 2016). The positive effects on health and wellbeing of being able to walk to places and spend time in public are intensified for those who spend a lot of time at home and/or do not have individual access to private motor vehicles (Frumkin et al., 2004, Garden and Jalaludin, 2009).

Neighbourhood pedestrian activity is highly influenced by the physical public realm. Permeability (a planning term meaning being able to walk direct routes) path quality, safety and aesthetics are all determinants of average propensity to walk, as is having a diversity of destinations within close proximity to one's home. Important neighbourhood destinations include shops (particularly those providing affordable and nutritious food), schools, kindergartens and child care facilities, adaptable public open spaces, shared streets, and public gathering places (Frumkin et al., 2004, Heart-Foundation, 2014, Zapata-Diomedi et al., 2016). Adaptable open spaces can provide opportunities for social gathering, community gardens (fresh food production), recreation and exercise. It is important to note that planning of urban spaces should therefore consider the social, economic and emotional needs of the people who will live there, in order to support all aspects of health, and reduce disease risk.

Methods

A census of all Australian urban planning policies and selected legislation (N=108, current 2016) was analysed thematically to determine whether and how the policy goals, objectives and strategies are likely to address the SDH/E. The analysis was undertaken using a social determinants of health framework to identify content in the policies that addressed the

SDH/E either directly or indirectly. NVivo 11 was utilised throughout the analysis. Collaborative coding was also employed to check the interpretations of those coding the analysis and to generate discussion about the theoretical and practical implications of the emerging findings. Following the document analysis we developed an inventory showing the features of urban planning policies that predict low prevalence of NCDs.

Results

We found 1,385 mentions of the SDH/E (natural and built environment, social relations, food, education, culture, safety and transport).

Mentions of SDH in each jurisdiction

	ACT	NSW	NT	Qld	SA	Tas	Comm	WA	Vic	Total
Built environment	10	12	7	23	36	15	3	35	24	**165**
Climate change	11	5	0	10	27	11	0	5	12	**81**
Culture	11	4	0	6	19	6	0	5	8	**59**
Education	8	2	1	5	14	4	4	3	13	**54**
Employment	8	5	9	6	23	7	0	11	18	**87**
Food	2	0	0	8	12	1	0	3	10	**36**
Gender	3	0	0	0	2	0	0	0	1	**6**
Health systems	4	2	1	3	8	1	0	0	5	**24**
Housing	6	6	0	10	29	4	0	16	12	**83**
Income	0	0	0	0	13	0	0	2	2	**17**
Land or country connection	2	1	0	4	12	6	0	2	7	**34**
Natural environment	12	13	4	12	22	9	1	9	18	**100**
Open space	9	7	7	7	18	3	0	9	9	**69**
Safety	9	10	10	9	21	6	9	11	26	**111**
Social exclusion	12	3	2	5	19	4	0	6	13	**64**
Social relationships	11	7	5	4	26	3	5	8	5	**74**
Stigma or discrimination	4	0	1	0	5	0	0	0	0	**10**
Transport	11	19	11	21	31	24	14	33	30	**194**
Welfare system	6	0	0	0	7	0	0	2	4	**19**
Equity	8	3	3	13	24	6	2	14	25	**98**
Total mention of SDH in each jurisdiction	147	99	61	146	368	110	38	174	242	

Liveability

The most prominent consideration of SDH/E arose from visions for an urban development that is compact, mixed use, walkable, and transit oriented - (summed up in the term “liveable”). There were, however, strategies that potentially conflicted with liveability, the most notable being major arterial road projects. Indeed recent Australian research has found that most Australians live in suburbs that fail to meet the most rudimentary design elements, densities and access required for liveability or walkability (Arundel, et al. 2017, Cole et al., 2015, Frank et al., 2004, Garden and Jalaludin, 2009).

The policies were strongest on interventions to soften adverse impacts arising from SDH/E, including promotion of land use changes to facilitate improved access to services for people living in geographically and/or socially disadvantaged areas and climate change adaptation strategies. Fewer examples exist of proactive strategies to achieve healthy urban design by distributing opportunities, power and resources in ways that will lower inequities in NCD risk.

In all jurisdictions, automobile oriented form and the car dependency it spawns is argued to have created a number of problems requiring amelioration. Problems commonly cited include traffic congestion, lengthy and growing commutes, excessive greenhouse gas emissions, infrastructure costs, poor access to social services and employment in outer suburbs, and the loss of valuable agricultural land and natural environments.

One of the greatest challenges for Australian cities if they are to become more liveable and healthier is moving from an evolved car oriented metropolitan form to one that combines pedestrian, cycling and public transport orientation. Such a transformation requires the latter modes to be prioritized in policy intent, funding and implementation over continued private and commercial motor vehicle use (Frumkin et al., 2004, Mees, 2009, Pucher et al., 2010, McIntosh et al., 2014). There is however, no evidence of such a prioritisation. Instead, all jurisdictions are pursuing substantial upgrades to road infrastructure, which ultimately induces greater levels of car and truck use (Cervero, 2002, Ewing and Cervero, 2010, McIntosh et al., 2014, World Health Organization and United Nations Human Settlements Programme, 2010)

Sustainable and smart growth

The overriding intent of all of the documents is to plan for housing and the infrastructure required to accommodate projected population growth and to do it in a ‘sustainable’ manner. The favoured ‘sustainable’ urban development approach is intensive infill within the current urban footprint rather than continued extensive greenfield growth of the urban footprint. In particular, new urban and ‘smart growth’ options of the style advocated by (Calthorpe, 1993) have been highly influential (Newman et al., 2009).

Two major smart growth strategies are advocated. The first is increasing residential densities via new multi-unit construction in central business districts and inner suburbs where hard and soft infrastructure is in place and service sector employment is high and growing. The second strategy is to decant services and service sector employment from the inner city to middle and outer suburbs where most people live but service sector employment levels are comparatively low. The focus of the transfer is large district and regional activity centres usually close to rail infrastructure. The objective is for targeted

activity centres to become more than shopping centres, which many currently are, and incorporate a comprehensive range of social, civic, educational, entertainment and commercial premises as well as high and medium density residences.

A strength of the policies is that the importance of parks and open space for physical activity is widely acknowledged. In addition, protecting significant natural environments, ecosystems, habitats, coast and waterways, as well as agricultural land and water catchments, from urban encroachment is used as an argument for intensive infill.

Equity considerations

These strategies have the potential to improve accessibility and increase the use of public transport (Badland et al., 2014, Handy and Clifton, 2001, Piatkowski et al., 2015). However, the targeting of infill and associated liveability improvements means that no jurisdiction has a goal to improve liveability in all established suburbs. This is particularly problematic for equity, given outer and middle suburbs that lie outside targeted infill areas are usually the least liveable places (Arundel et al., 2017).

Broadly, equity is evident in two objectives in the documents; access to affordable housing and reasonable proximity to services, facilities and employment from that housing. From a health equity perspective this is a very narrow understanding of equity (World Health Organization and United Nations Human Settlements Programme, 2010) and is unlikely to lead to a reduction in health inequities. A broader commitment to equity would be required that encompassed distributional issues within urban areas.

Some jurisdictions have inclusionary regulations to encourage or mandate the development of affordable housing. However, the numbers likely to be produced in these schemes are small compared to the numbers of houses built annually. No jurisdiction has a mandated target for a proportionally rising supply of social housing. In most jurisdictions, housing affordability measures take little account of extra access costs that result from poorly located dwellings.

Most jurisdictions in Australia seem to subscribe to the notion that housing affordability is best achieved by ensuring land supply continually matches private demand. The result is strategies to maintain development on urban fringes. This potentially contradicts the objective that housing be close to services, employment, public transport etc.

In summary, our document analysis shows that all jurisdictions acknowledge the links

between urban environments and the health of individuals and populations. In general, population health is viewed as a co-benefit and co-justification (along with environmental, social and economic concerns) for urban development that is compact, mixed use, walkable, transit oriented, and liveable. However, urban development is a highly contested policy space, most notably between powerful interests vested in well-established highly profitable approaches and those advocating change for social and/or environmental ends (Low and Astle, 2009, Harvey, 1989). The policy documents analysed in our project, however, largely gloss over conflict between these interests.

Discussion

Lessons from the research analysis of Australian policies have been drawn on to create an inventory for LMIC to facilitate urban design and planning that will lower NCD risk. The inventory emphasises the need to create people friendly cities that do not allow cars or vested interests to dominate, and which prioritise active transport and social contact between residents.

Elements of urban environments that can increase and decrease NCD risk

	Decreases NCD risk	**Increases NCD risk**
Transport systems	Frequent Reliable Convenient Networked Accessible Mix of public/private options	Unreliable Infrequent Inconvenient Radial Dominated by private vehicle transport options only
Agricultural land	Close to urban areas to reduce food miles Protected from encroachment Low chemical use	Under pressure from other uses High use of chemicals Distant from city
Housing	A diversity of types and sizes appropriate for climate Appropriately oriented for light and air Located within walking distance of diverse	Homogenous Poorly oriented or located Isolated and distant Expensive & regulated predominately by private markets

	destinations	
Road networks	Appear calm Human scale Safe for pedestrians and cyclists Permeable and connected grids Integrated with built form	Dangerous for pedestrians and cyclists Radial and linear Freeways, which segregate communities and deter active transport
Density	High enough to provide service viability at pedestrian scale Low enough to maintain human scale	Too low for viability Too high for a human scale
Footpaths	On both sides of the road Adequate width Well maintained Connected Free from obstructions Permeable, short routes Tree lined & green verges Lighting Seating	None On one side only Poorly maintained Obstructed Impermeable lengthened routes Disconnected Unmaintained verges
Adjacent land uses	Pedestrian scale and legibility Sensually interesting Human scale buildings: (2-6 stories)	Obtrusive off street car parks Long, high and impervious walls and fences Car scale & legibility Ugly, boring and/or unpleasant

Safety & perceptions of safety	Sense of enclosure Passive surveillance Overlooking porches, balconies & windows Well maintained & useful open space Lighting Small well maintained front yards Pedestrian activity Human activity in public spaces	Poorly maintained yards Long featureless walls, fences and facades Derelict or rundown buildings Unmaintained or useless public spaces Large or isolated open space Poor lighting Absence of pedestrians Poor lines of sight Concealed spaces
Traffic	Slow, obstructed and calm Narrow street On street parking Stop signs speed humps shared streets etc.	High speed, free flowing and busy Major free flowing arterials to cross Wide road lanes Multiple road lanes No on street parking Kerb cuts/slip lanes Roundabouts Marked crosswalks (association with arterials)
Integration	Seamless integration with adjacent suburbs and neighbourhoods Connected to metropolitan areas by public transport and cycling.	Isolated from adjacent suburbs by freeways, and busy aerials, Open space, rail corridors, and expansive commercial and industrial zones. Connection to metropolitan whole via private motor vehicles only Gated or semi gated communities
Destinations	Multiple, diverse, useful and eclectic Short distances	Purely functional Poorly maintained or ugly useless

	Parks/playgrounds (<5 min/400m) Schools (<10min/800m) Public transport stops (<400m)	Long distances None or few within 800m
Decision making systems	Consultative and inclusive Community led Inter-sectoral focus	Dominated by vested interests

Source: Inventory developed by drawing on lessons from the policy analysis as well as following literature: (Adkins et al., 2012, Alexander et al., 1977, Appleyard, 1980, Biddulph, 2012, Brownson et al., 2009, Cattell et al., 2008, Ewing and Handy, 2009, Frumkin et al., 2004, Gehl, 2013, Stevenson et al., 2016, Heart-Foundation, 2014, Hooper et al., 2015, Jacobs, 2016, Oldenburg, 1999, Pikora et al., 2003, Saelens et al., 2003, Timperio et al., 2006, Maas et al., 2009, Wood et al., 2010)

Our key finding is that even when policy proposes strategies that would promote health and health equity these strategies are usually given less attention and funding than those that align with business and developer interests. This suggests that profits are prioritised over wellbeing. Thus, a key task for urban planning in LMIC is to ensure that urban planning policies enshrine democratic processes that allow community and health interests to be well-represented in a manner that can challenge the dominant interest of business. This is imperative since local, regional and national governments in LMICs have an interest in ensuring that the costs of treating the growing NCD epidemic are reduced by using urban planning policies and legislation to reduce the population risk.

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