

UV Exposure and Shade:

Integrating UV radiation with health and climate considerations of shade and urban planning

This policy brief presents the outcomes from a RMIT policy review and stakeholder workshop. The brief concerns UV protection measures in policy and practice for urban greening and cooling. The paper is intended to inform policy stakeholders on the level to which UV exposure is considered in current land use planning policy, the potential implications of this, and future directions in policy and research to improve the health outcomes in our cities.

Background

Ultraviolet (UV) radiation poses a significant threat to health and wellbeing in Australia as the leading cause of skin cancers like melanoma. In Victoria alone, there are almost 3,000 new melanoma diagnoses each year¹, placing a significant impact on our public health system². There is a growing recognition of the role the built environment plays in reducing UV exposure in cities, such as by providing shade.

In response to climate change and the urban heat island effect, urban planners are increasingly finding ways to reduce heat in the urban environment^{3,4}. While heat and UV radiation are both associated with sun exposure, they are separate phenomena requiring nuanced responses. Without appropriate consideration, efforts to cool cities may lead to an exacerbation of UV exposure and poor public health outcomes. For example, adding reflective surfaces in the built environment to reduce heat absorption may unintentionally exacerbate local UV exposure by increasing indirect UV radiation⁵. This project investigated how UV radiation is addressed in public health and urban heat policies, undertaking a policy review, supported by a workshop of leading urban planning practitioners.

In 2024, SunSmart conducted an audit of Municipal Public Health and Wellbeing Plans, and related council documents for all 79 local government areas across Victoria. SunSmart found minimal mentions of skin cancer, skin cancer prevention, and UV and sun protection in the reviewed policies. Where sun protection was referenced, this principally related to reducing urban heat rather than UV protection. The audit highlighted that, since 2010, local governments have steadily increased their focus on tree planting and maintenance, public open space and climate change, with tree canopies demonstrating the greatest increase in mentions. This increased focus on tree canopy cover shows a growing consideration of the role of the built environment in providing sun protection.

RMIT researchers expanded on SunSmart's audit to examine land use planning policies relating to the built environment. The review analysed a sample of seven local and state planning policies to determine whether policies with specific requirements for shade and/or changes to surface materials considered the effects of UV radiation and associated health implications.



Key Opportunities Identified

- Planning policy should better include mitigation of UV radiation as an objective in addition to the reduction of heat in the urban environment.
- Further research should investigate the ways the urban built form increases UV exposure, how urban design can best reduce exposure, and what spaces should be prioritised to maximise health benefits. This may include developing a consensus on best practice heat and UV interventions to achieve climate and health co-benefits, for use by planning practitioners.
- Further research should investigate how policies impacting the built form could be better designed to reduced UV radiation exposure in the urban environment.
- There is demand for an evidence-based practitioner guidance document, to guide local planners in making more informed decisions around addressing both UV and heat reduction.
- There is demand for further analytical tools to support land use decision makers in prioritising UV and heat reduction measures.

To expand on this policy review, we conducted a workshop with 14 leading urban planning practitioners from local and state governments, peak industry representative bodies and the private industry. The workshop provided a practitioner's perspective on RMIT's policy review work, and identified key policy and research opportunities.

Key findings

Policy review

No reference to UV exposure or skin cancer

We identified 102 unique policy items across seven policies that mandated or recommended shade or surface material changes to improve health and comfort in urban outdoor environments. Almost all policy items related to shade ($n = 99$), with a smaller number concerning surface materiality ($n = 21$). There were no references to UV radiation, skin cancer or associated terms within the documents. This may have implications for local government

decision making, as those deciding on development applications are unlikely to consider any nuanced requirements of shade and surface materiality relating to UV radiation.

Thermal comfort is a key consideration

Of the 102 policy items identified, most (n = 66) related to ensuring thermal comfort in the urban environment:

“New development should... Reduce the Urban Heat Island effect through extensive canopy tree cover, green roofs, green/vegetated walls and WSUD.”

Prioritising thermal comfort in shading or surface material changes could lead to maladaptive policies, unintentionally increasing UV exposure. This is seen in policies like the lightening of paving materials to reduce heat absorption, which could inadvertently heighten UV exposure through reflecting UV radiation back onto active transport users.

“Development should... shade outdoor areas exposed to summer sun through landscaping or shade structures and use paving and surface materials that lower surface temperatures and reduce heat absorption.”

Shading is prominent in policy, while changes to materiality are only starting to emerge

Shading for health and heat reduction was addressed in all policies studied. Every policy referenced shade, with 99 items specifically focused on it. Landscaping and tree canopies accounted for 80% of these instances.

While surface materiality is less developed in policy, it is emerging. Of the policies reviewed, only five addressed surface material changes, with 21 items focusing on this (21% of policy items). Most references related to changing paving colour to reduce urban heat. The City of Melbourne also considered roof and façade materials. As a leader in policy innovation, Melbourne's approach may indicate a trend towards the inclusion of surface material interventions by other councils. If so, references to surface materiality are likely to increase. It is timely for planning to better consider the impacts of urban cooling policies on UV exposure to maximise the benefits for both health and environmental outcomes.

Policy items often require on-ground actions

Most policy items required developers to undertake specific actions regarding shading and changes to surface materiality (n = 66). This was greater than both the number of general objective statements (n = 13) or non-specific suggestions with limited statutory force (n = 23). The presence of action-specific content indicates that policies concerning shading and surface materials have significant statutory weight, which is promising for urban cooling outcomes. However, since these policies are likely influencing physical changes in the urban environment, immediate action is needed to incorporate UV radiation considerations to prevent development inadvertently increasing UV exposure in cities.

Practitioner workshop

Policy changes need to extend beyond urban planning policy to effect meaningful change

The workshop concluded that influencing planning policy only –

such as in planning schemes – is unlikely to reduce UV exposure risk for city residents. Planning policy mainly regulates use and development of private land, while the greatest opportunity for population protection from UV exposure is on public or semi-private land. (e.g. streetscapes or parks). To meaningfully reduce UV exposure, policy changes must consider a broader range of documents – including engineering standards and public land management policies. Additionally, it was noted that health is not an explicit objective of the Planning Act (Planning and Environment Act 1987), which means it is a lower priority among other considerations, especially in resource-poor settings.

The workshop identified several challenges for implementing changes to standards and public land management policies. Engineering standards require input from various actors, often with competing interests, making changes difficult to implement. Efforts to change local policies may raise equity issues, as some local governments are better resourced to implement UV reduction measures than others, potentially leading to uneven UV exposure for certain populations. There is an opportunity for state government and peak representative bodies – operating across local government areas – to play a leading role in an integrated planning response to UV exposure health risks: distributing resources, sharing knowledge, and fostering buy-in across organisations to shape policy.

The need for nuanced policy responses and further research opportunities

The workshop identified a need for a nuanced policy response when addressing the challenges of UV exposure in the urban environment. Workshop participants identified several key questions where further information would support more informed decision-making, including:

- What populations are most vulnerable to the impacts of excessive UV exposure
- What areas present the greatest UV exposure risk?
- What design responses are most appropriate for reducing cumulative UV exposure?

Further research should be undertaken to study these questions and to translate existing knowledge to aid decision makers. There is also need for an evidence backed practitioner guidance document, to bring together research and practice in providing local planners with the tools and knowledge needed to navigate UV exposure challenges. Additional analytical tools are also needed to support decision making regarding UV exposure in a more informed way.

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¹ Cancer Council Victoria 2023. Cancer in Victoria 2022: Victorian cancer registry. In: Victoria, Cancer Council Victoria. (ed.). Melbourne.

² Gordon, L. G., Leung, W., Johns, R., Mcnoe, B., Lindsay, D., Merollini, K. M. D., Elliott, T. M., Neale, R. E., Olsen, C. M., Pandeya, N. & Whiteman, D. C. 2022. Estimated healthcare costs of melanoma and keratinocyte skin cancers in Australia and Aotearoa New Zealand in 2021. *Int j environ res public health*, 19.

³ Jacobs, S. J., Gallant, A. J. E., Tapper, N. J. & Li, D. 2018. Use of cool roofs and vegetation to mitigate urban heat and improve human thermal stress in Melbourne, Australia. *Journal of applied meteorology and climatology*, 57, 1747-1764.

⁴ Loughner, C. P., Allen, D. J., Zhang, D. L., Pickering, K. E., Dickerson, R. R. & Landry, L. 2012. Roles of urban tree canopy and buildings in urban heat island effects: parameterization and preliminary results. *Journal of applied meteorology and climatology*, 51, 1775-1793.

⁵ Speroni, A., Mainini, A. G., Zani, A., Paolini, R., Pagnacco, T. & Poli, T. 2022. Experimental Assessment of the Reflection of Solar Radiation from Façades of Tall Buildings to the Pedestrian Level. *Sustainability*, 14.