Climate change, air pollution and skin cancer

Trees for Liveable Cities forum

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Doctors for the Environment Australia

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Dr Rosemary Stanton OAM
Dr Norman Swan

www.dea.org.au

Overview

- Health effects of climate change
- Air pollution
- Urban heat island effect
- Skin cancer

What do we know about climate change and health?

Climate change a health emergency

AMA

RACGP

Royal Australian College *of* General Practitioners

RACP

Specialists. Together

EDUCATE ADVOCATE INNOVATE

AUSTRALASIAN COLLEGE
FOR EMERGENCY MEDICINE

Australian College of
Rural & Remote Medicine

WORLD LEADERS IN RURAL PRACTICE

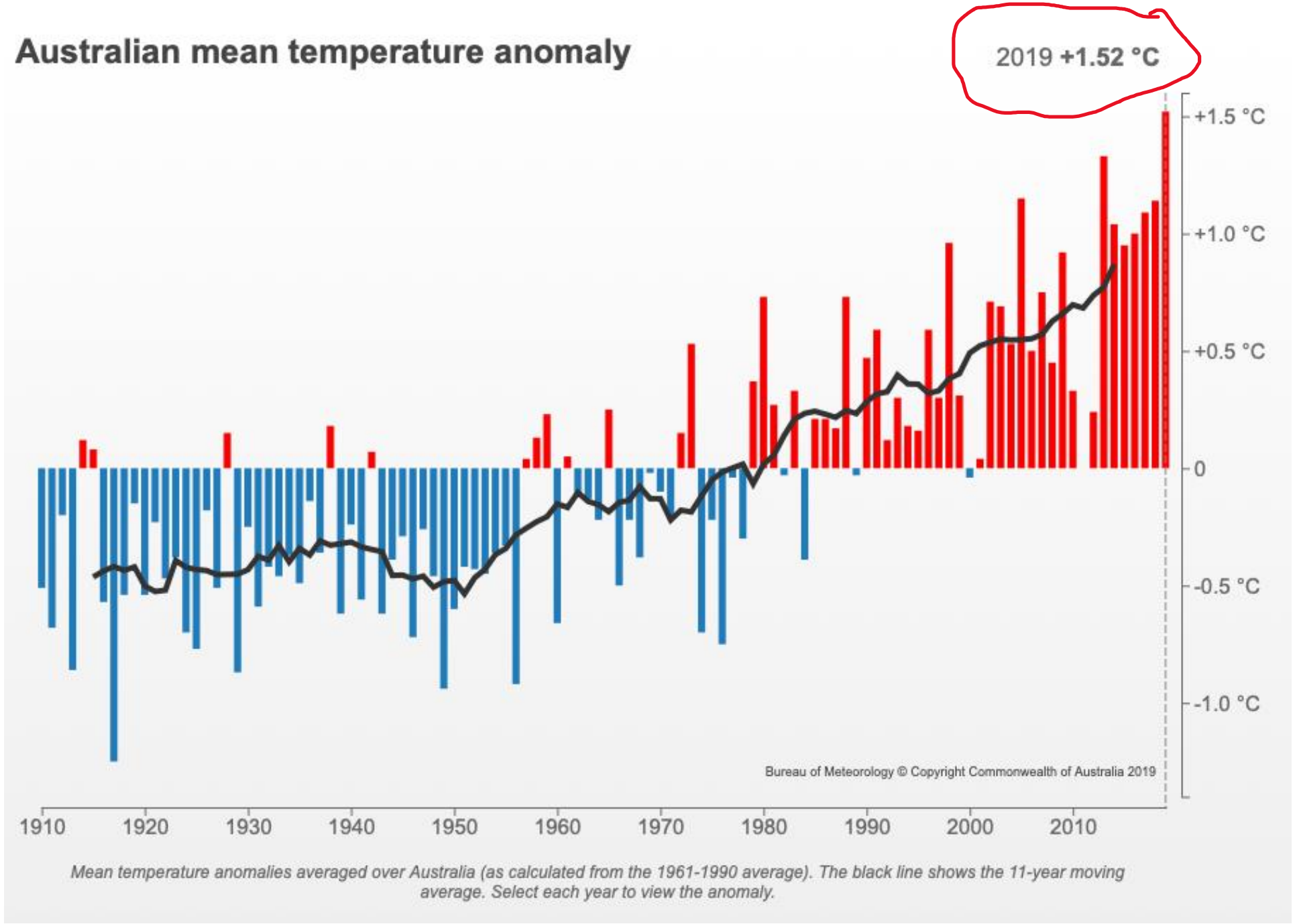
The 2019 report of The *Lancet* Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate

Nick Watts, Markus Amann, Nigel Arnell, Sonja Ayeb-Karlsson, Kristine Belesova, Maxwell Boykoff, Peter Byass, Wenjia Cai, Diarmid Campbell-Lendrum, Stuart Capstick, Jonathan Chambers, Carole Dalin, Meaghan Daly, Niheer Dasandi, Michael Davies, Paul Drummond, Robert Dubrow, Kristie L Ebi, Matthew Eckelman, Paul Ekins, Luis E Escobar, Lucia Fernandez Montoya, Lucien Georgeson, Hilary Graham, Paul Haggar, Ian Hamilton, Stella Hartinger, Jeremy Hess, Ilan Kelman, Gregor Kiesewetter, Tord Kjellstrom, Dominic Kniveton, Bruno Lemke, Yang Liu, Melissa Lott, Rachel Lowe, Maquins Odhiambo Sewe, Jaime Martinez-Urtaza, Mark Maslin, Lucy McAllister, Alice McGushin, Slava Jankin Mikhaylov, James Milner, Maziar Moradi-Lakeh, Karyn Morrissey, Kris Murray, Simon Munzert, Maria Nilsson, Tara Neville, Tadj Oreszczyn, Fereidoon Owfi, Olivia Pearman, David Pencheon, Dung Phung, Steve Pye, Ruth Quinn, Mahnaz Rabbaniha, Elizabeth Robinson, Joacim Rocklöv, Jan C Semenza, Jodi Sherman, Joy Shumake-Guillemot, Meisam Tabatabaei, Jonathon Taylor, Joaquin Trinanes, Paul Wilkinson, Anthony Costello, Peng Gong*, Hugh Montgomery**

Key facts:

- 1 degree C warming is having major effects already
- Primarily driven by fossil fuels

Australian mean temperature anomaly



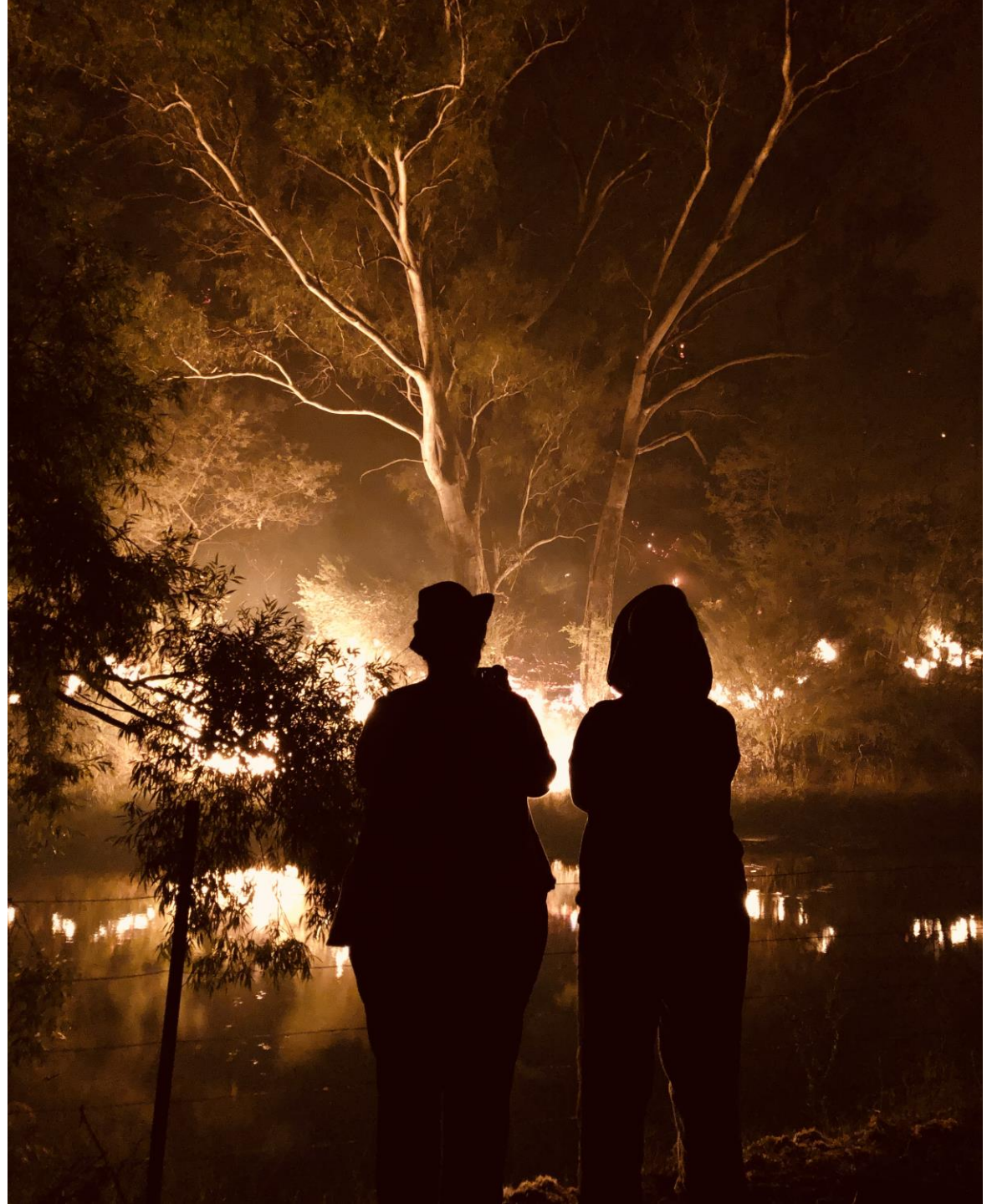
Mean temperature anomalies averaged over Australia (as calculated from the 1961-1990 average). The black line shows the 11-year moving average. Select each year to view the anomaly.

The Sydney Morning Herald

A summer of flame

By **Deborah Snow**

FEBRUARY 8, 2020



Air pollution impacts in Australia

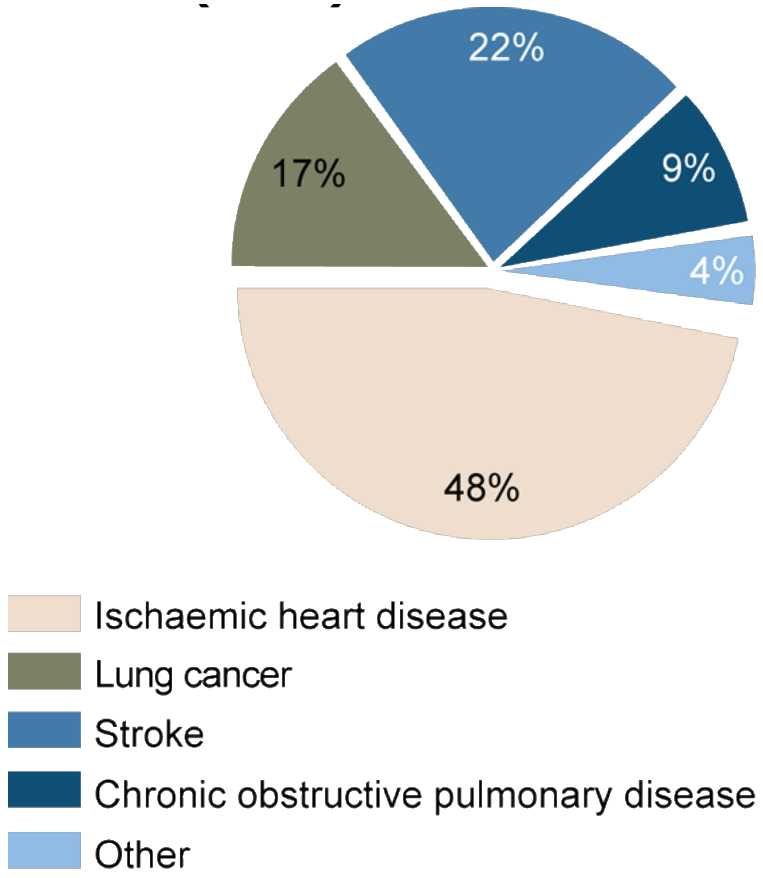
Air pollution contributes to more deaths each year than road accidents (~3000 deaths/year).

No ‘safe limit’ for air pollution

Health costs of outdoor air pollution in Australia – up to $8.4 billion/yr

Sources: 1. Morgan, Broome, Jalaludin, 2013; 2. Department of Infrastructure and Regional Development, May 2014.; 3. AMA, 2013; 4. Commonwealth of Australia, 2014

Deaths from air pollution in Australia



Source: DEA air pollution policy

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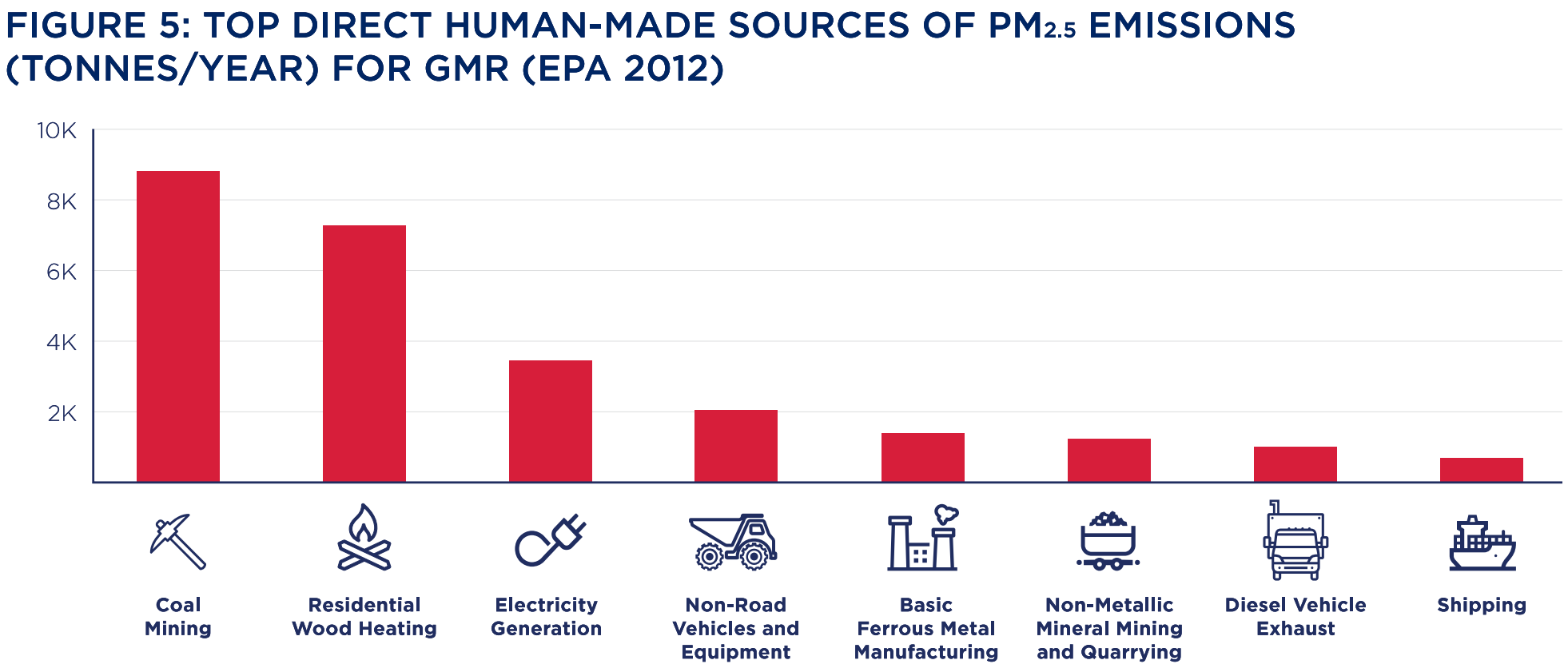
Air pollution impacts can be heart-stopping

28 January 2020

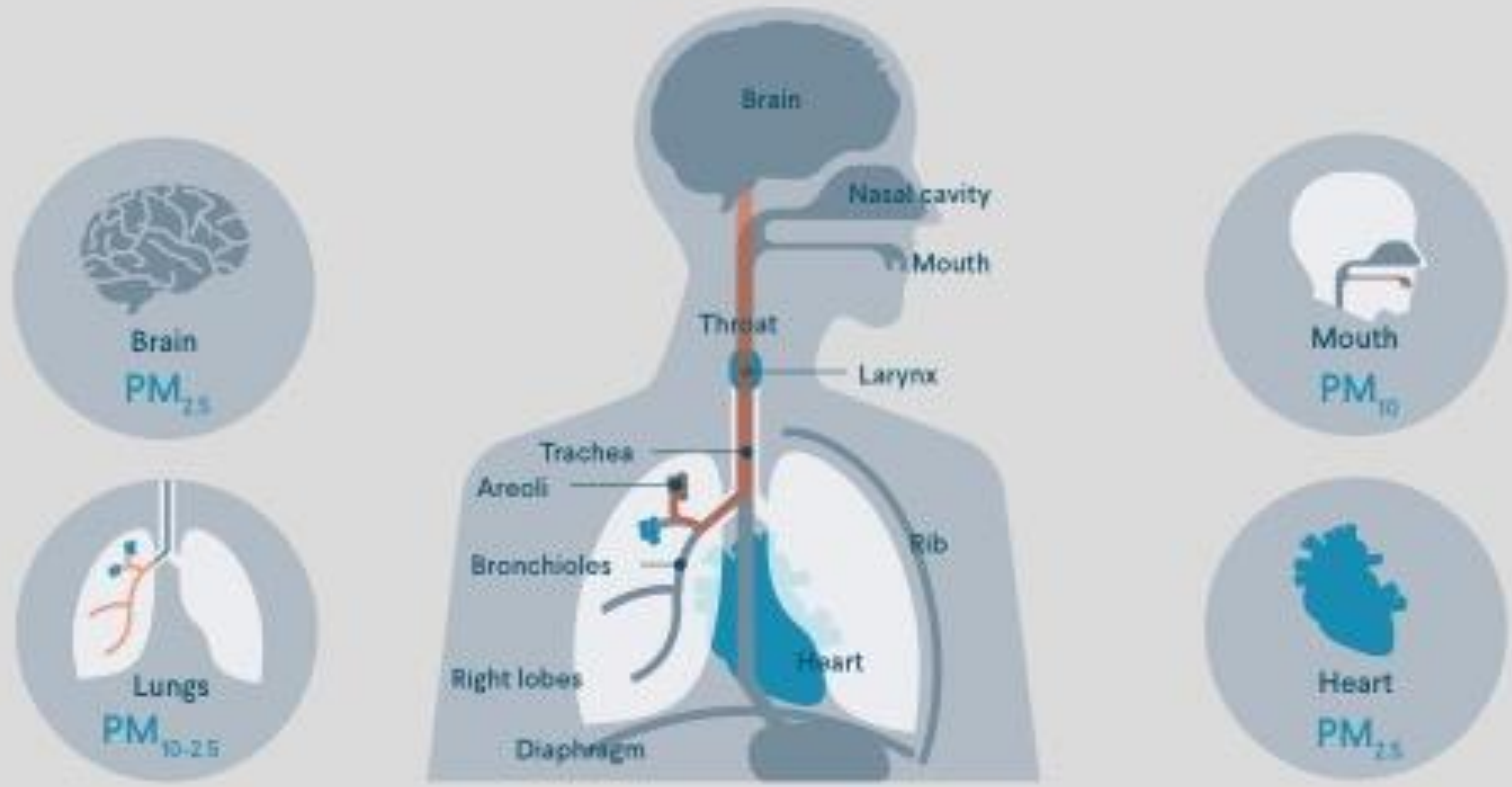
PM2.5 in Greater Metropolitan Region (NSW)



Source: NSW EPA 2016

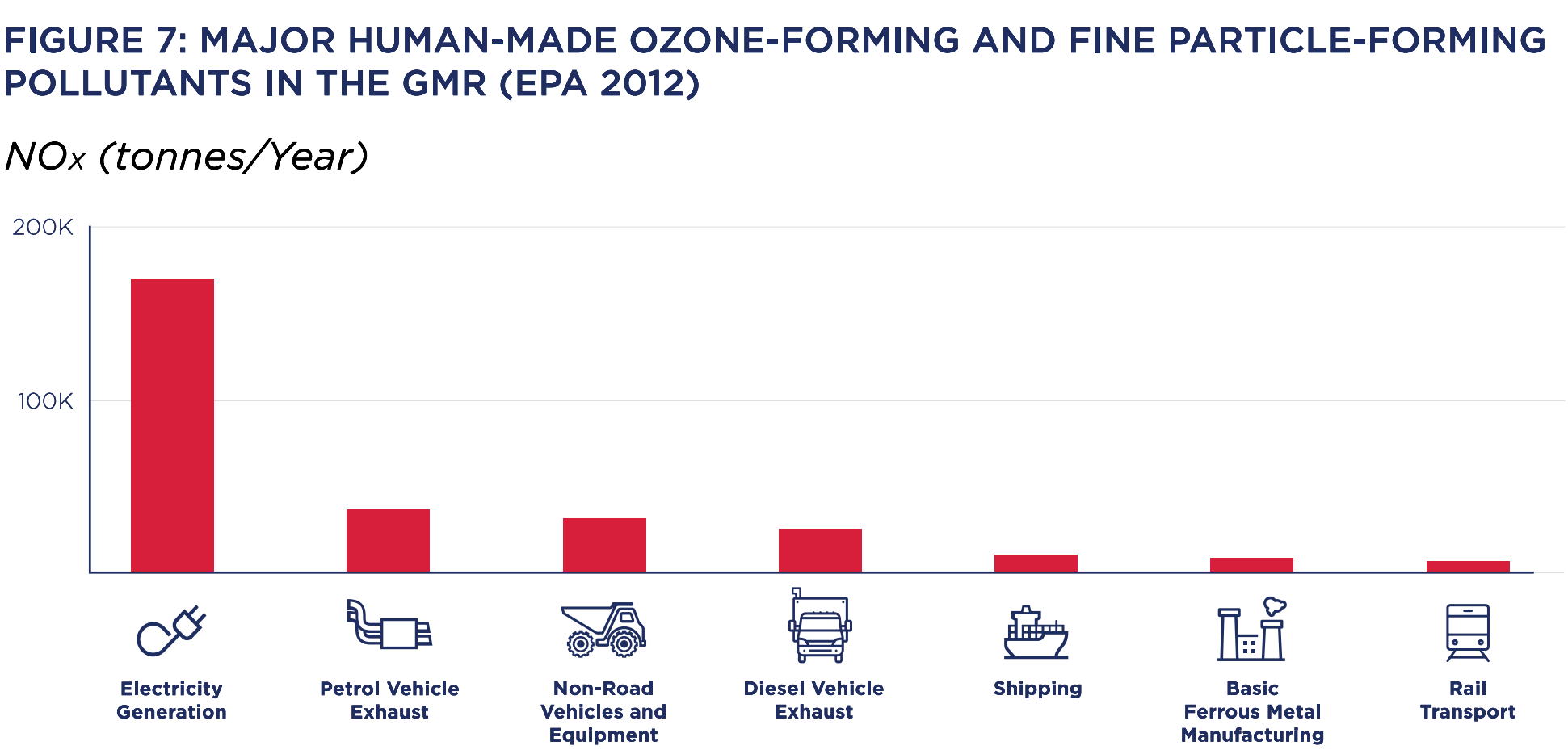
Figure 5

Where in the body does particle pollution go?



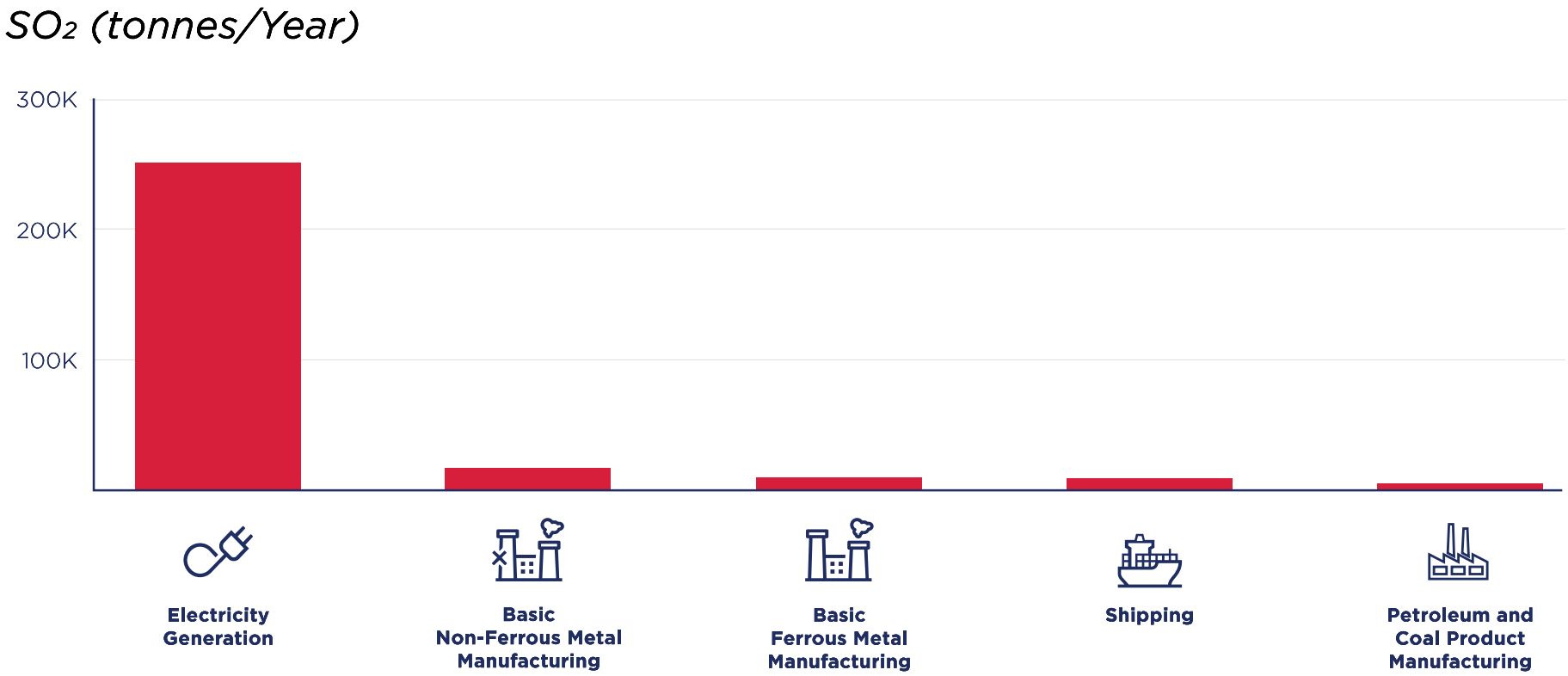
NOx in Greater Metropolitan Region (NSW)

FIGURE 7: MAJOR HUMAN-MADE OZONE-FORMING AND FINE PARTICLE-FORMING POLLUTANTS IN THE GMR (EPA 2012)



Source: NSW EPA 2016

SO2 in Greater Metropolitan Region (NSW)



Source: NSW EPA 2016

Heatwaves

Sydney clocks the hottest place on Earth as hot weather continues

By William McInnes
Updated 8 January 2018 — 5:11pm, first published at 6:40am

High temperatures, combined with high humidity, made it an unpleasant sleep for some in Sydney overnight.

The Bureau of Meteorology confirmed on Monday that Penrith had reached the highest temperature on earth in the past 24 hours when it reached 47.3 degrees on Sunday afternoon.

Case Study

Melbourne, Australia, 2009

Temperatures

27-31 January 2009: max temperatures 12-15°C above summer norm.

28-30 Jan: > 43°C

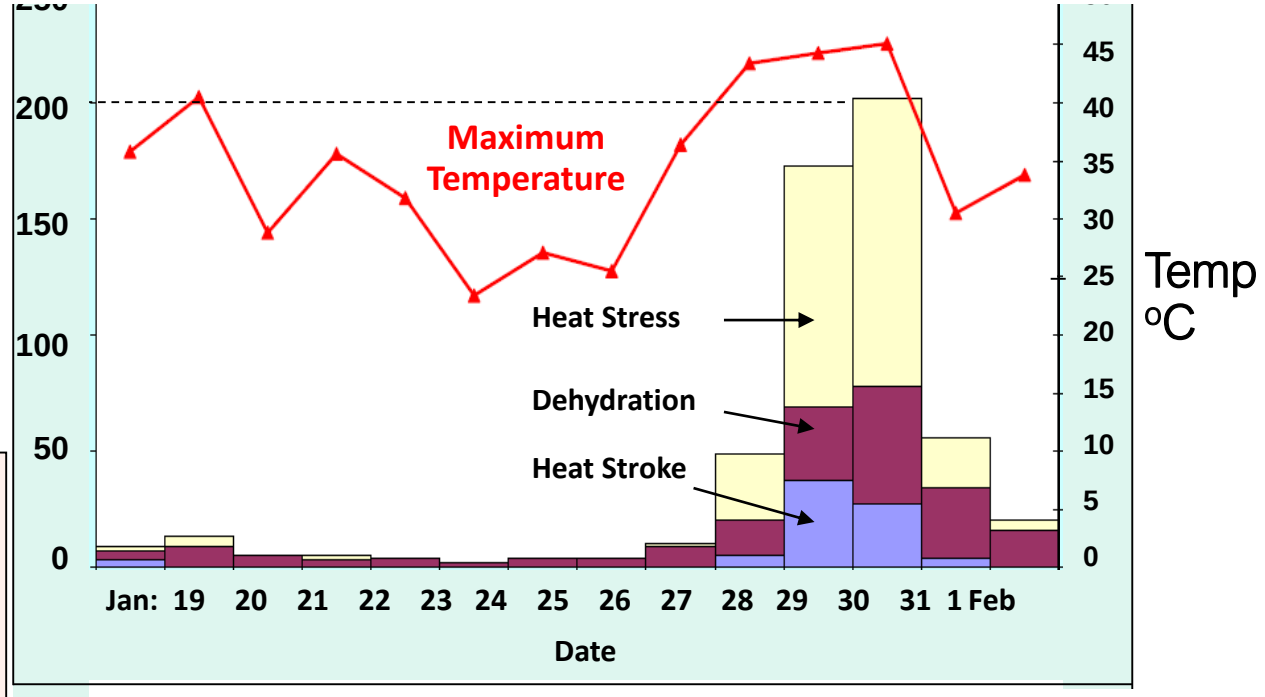
Call-outs, deaths

January 28-30:

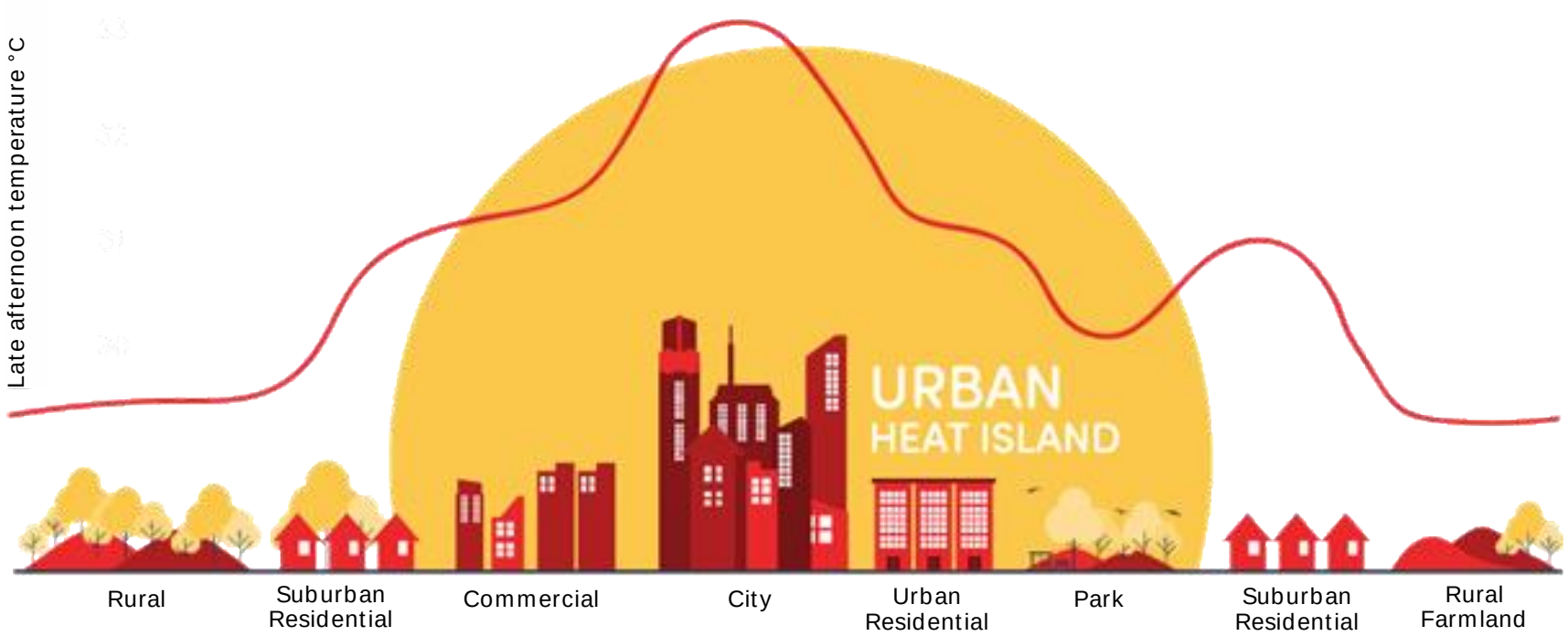
46% increase in **ambulance call-outs**

126 out-of-hospital **deaths** (vs. 44 expected deaths)

Ambulance call-outs for heat-related illnesses in Metropolitan Melbourne, 19 Jan - 1 Feb, 2009



Source: January 2009 Heatwave in Victoria: an Assessment of Health Impacts. *State of Victoria 2009*

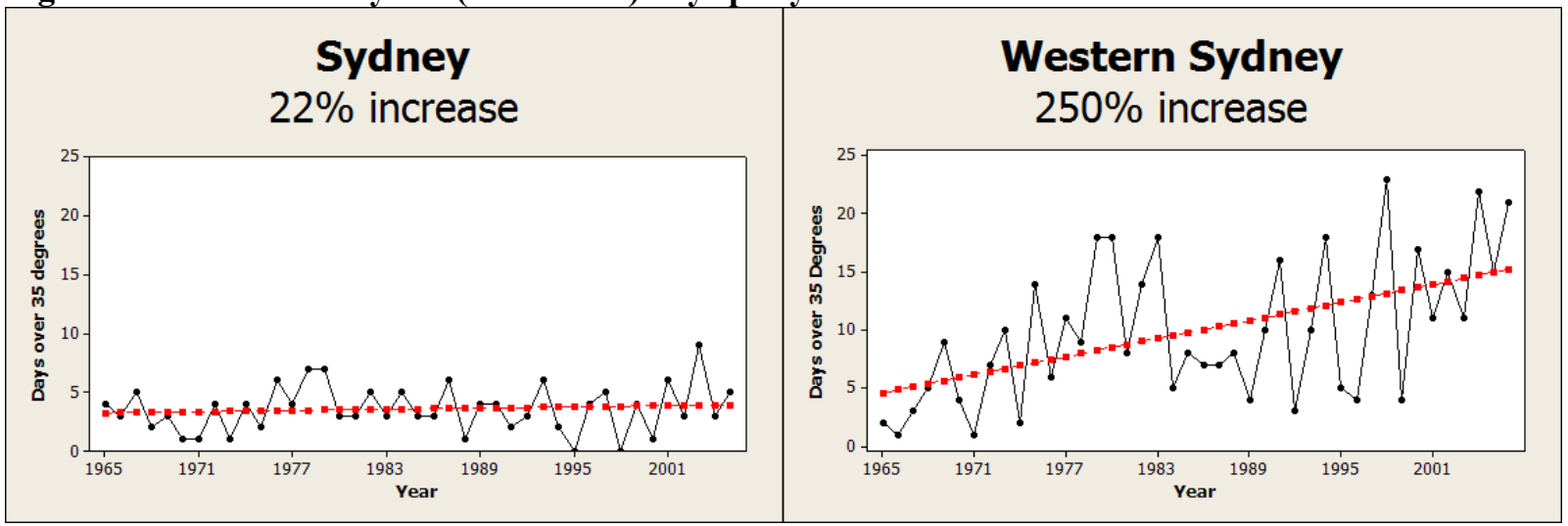


Urban Heat Island Effect (Image credit: City of Parramatta)

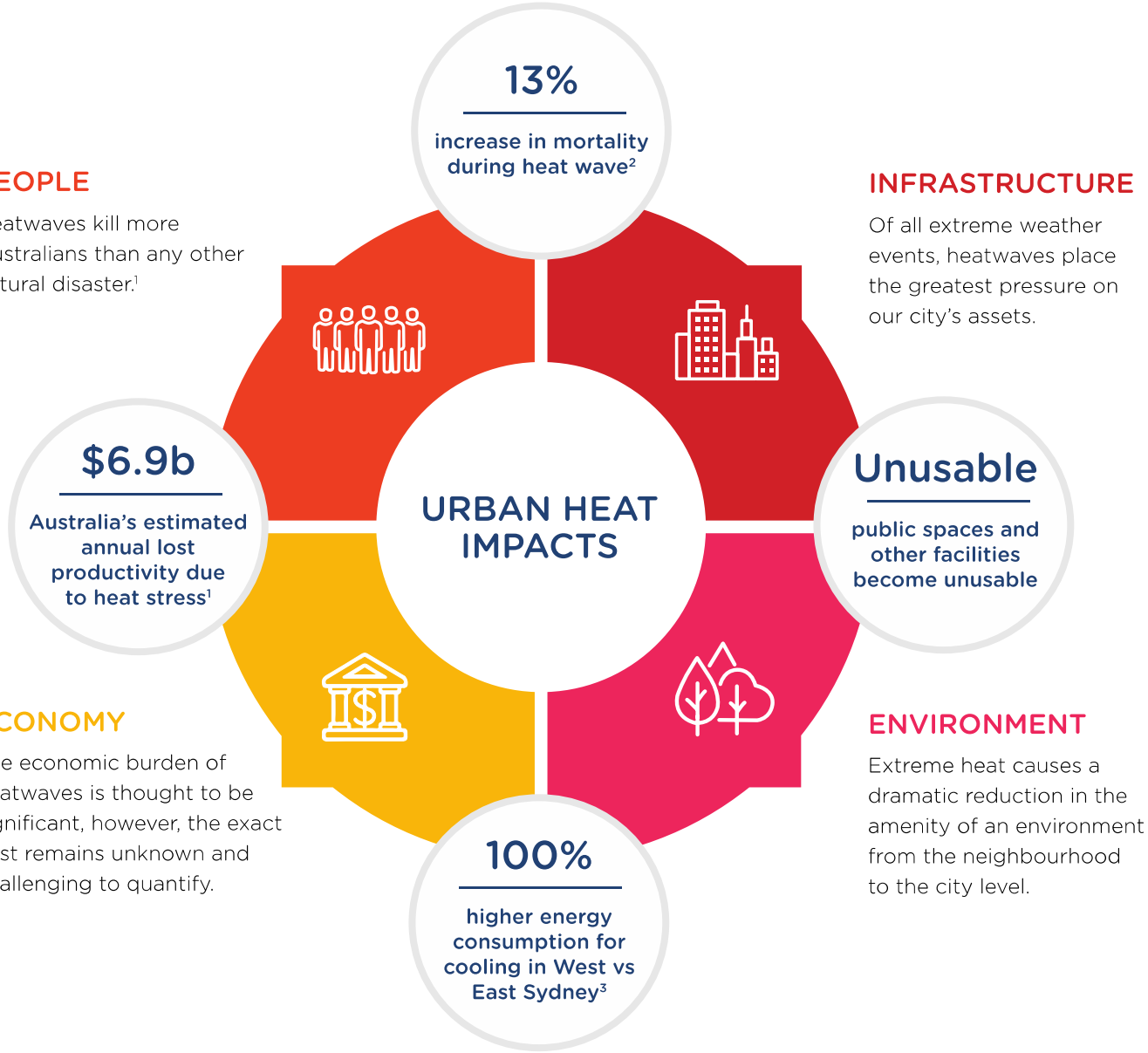
Urban heat island effect in Western Sydney

- Temperatures 6-10 degrees C higher in Western Sydney during heatwaves (compared with Sydney's east)
- 3 x heat-related deaths in Western Sydney

Figure 3 Number of very hot (above 35C) days per year



URBAN HEAT IMPACTS ALL ASPECTS OF OUR CITIES



WESTERN SYDNEY AND THE IMPACTS OF HEAT

HEATWAVE IMPACTS ACROSS SYDNEY

During the 2011 heatwave across Greater Sydney, the Hunter and the Illawarra, impacts included:

340
Emergency department visits for heat effects and dehydration as well as a 2% all-cause increase in emergency department visits

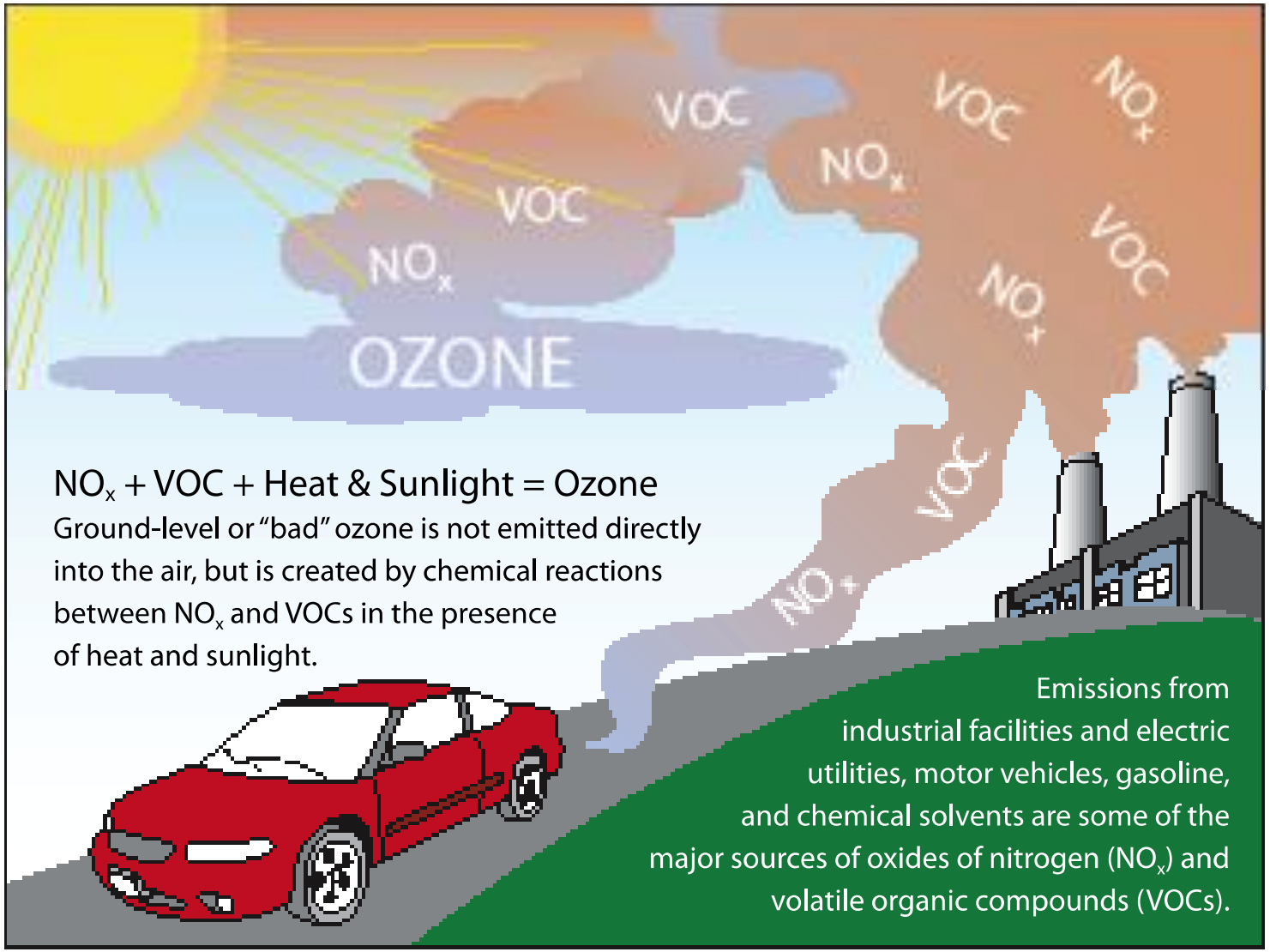
Peak electricity demand increases by almost 100% when temperatures increase from 20 °C to 40 °C

14%
more ambulance calls

Energy consumption for cooling purposes in Western Sydney is up to 100% higher than in the eastern zones of the city

13%
increase in mortality (96 deaths)

Air pollution and ground level ozone



Source: Adapted from EPA 2010.

Ground-level ozone

Causes lung inflammation, reduced lung function, respiratory symptoms – even in healthy lungs

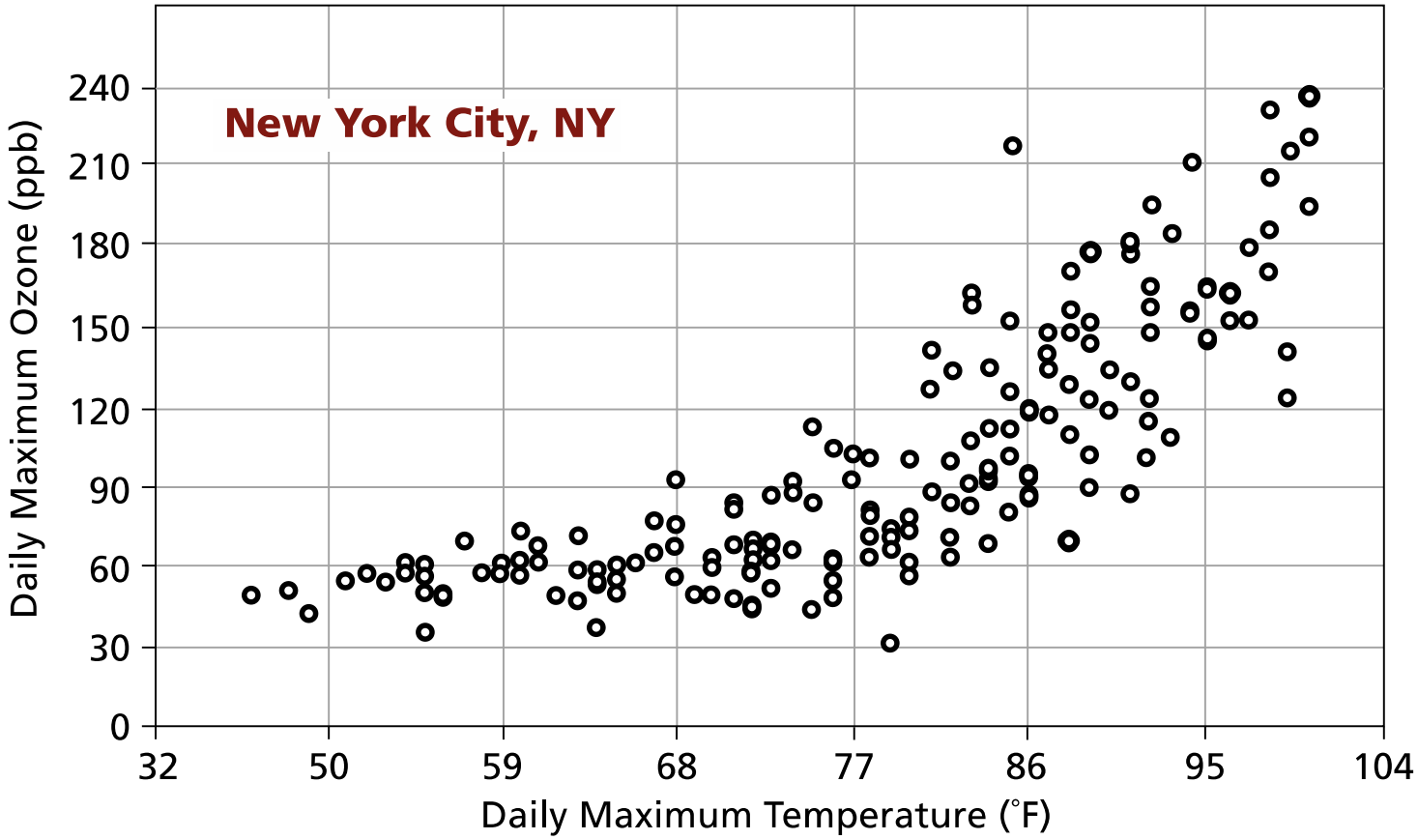
Increases death rates, hospital admissions and emergency department attendances mainly for respiratory causes.

No evidence of a safe threshold.

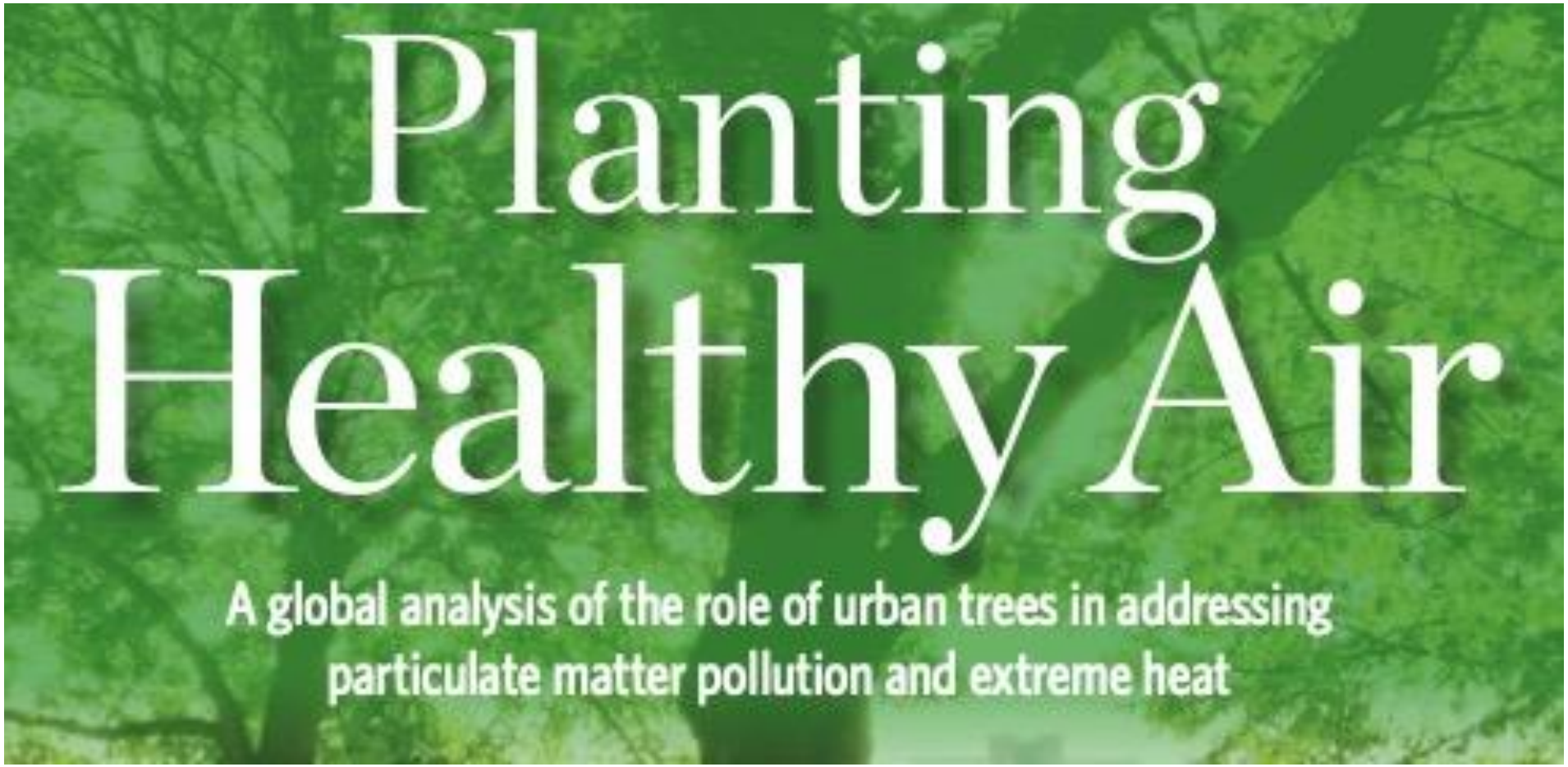
Source: U.S. Environmental Protection Agency, Integrated Science Assessment for Ozone and Related Photochemical Oxidants, 2013.

Ground level ozone and heatwaves

FIGURE 4. Ozone Pollution Worsens as Daily Temperatures Increase



Union of concerned scientists, 2011



The Nature Conservancy

In collaboration with C40 CITIES

Reduced air pollution

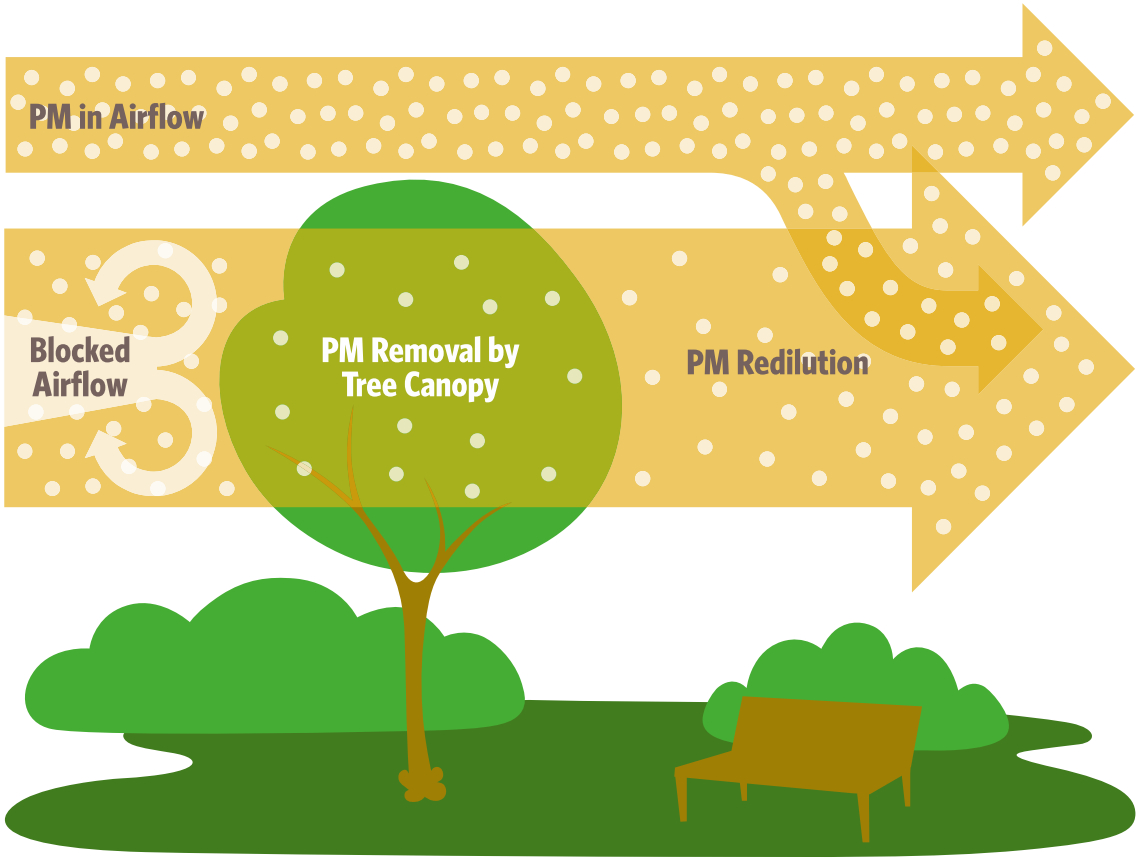


Figure 7. Diagram of PM removal by trees. Illustration: © Mackinzie Jones.

Cooling and shade – reduced heat

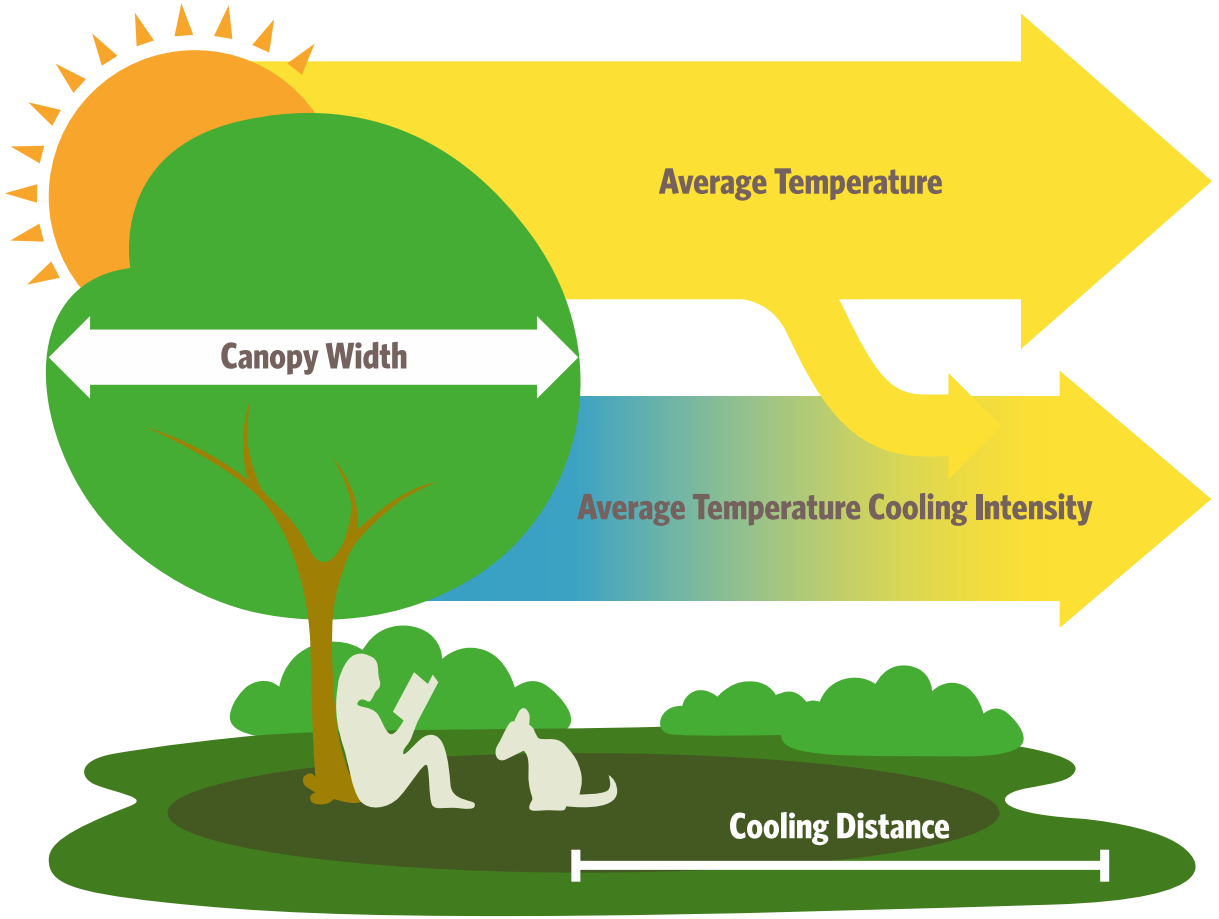


Figure 10. Temperature mitigation by trees. Illustration: © Mackinzie Jones.

Shade. A planning and design priority that helps prevent skin cancer.

Shade protects us from harmful ultraviolet radiation (UV)

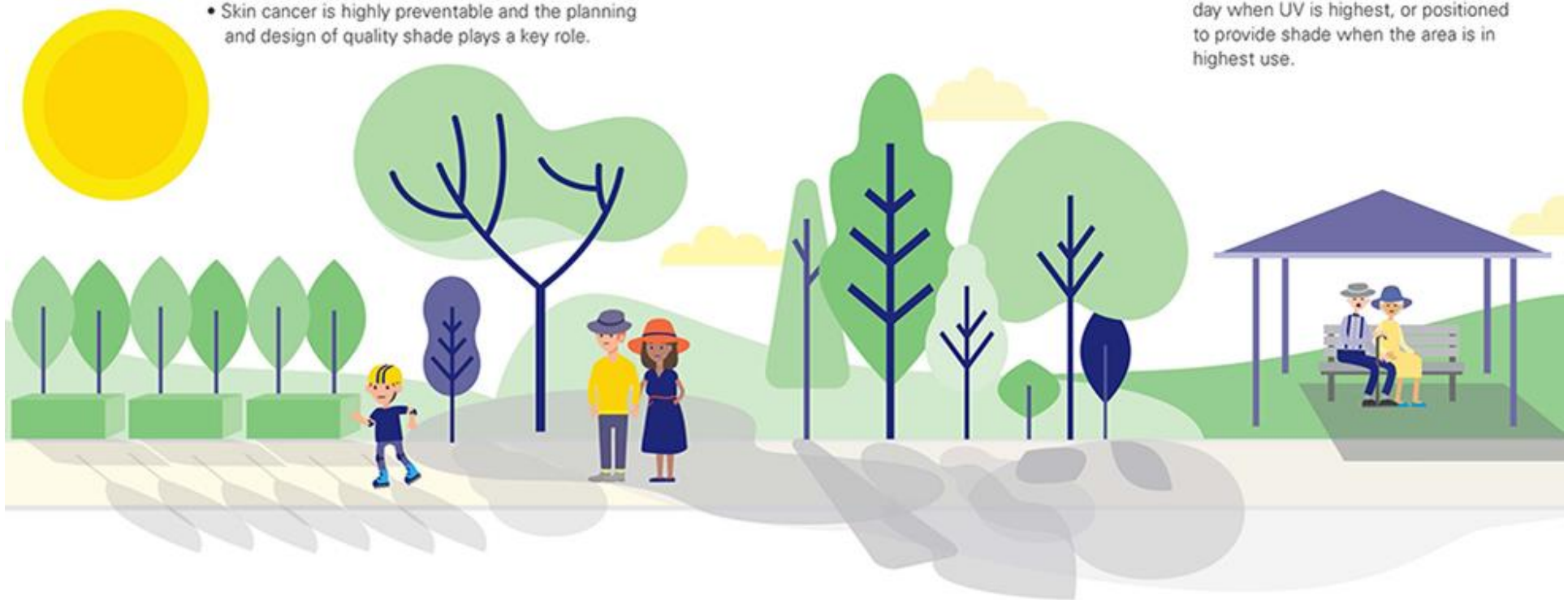
- UV from the sun causes at least 95% of all skin cancers in Australia.
- Skin cancer is the most common cancer in Australia - 2 in 3 people will be diagnosed.
- Skin cancer is highly preventable and the planning and design of quality shade plays a key role.

Quality shade can reduce UV exposure by up to 75%

What is quality shade?

Natural shade: trees with a canopy that is dense and close to the ground.

Built shade: stand-alone, portable or add-on structures positioned to provide shade during the middle of the day when UV is highest, or positioned to provide shade when the area is in highest use.



A combination of natural and built shade provides the best UV protection.

https://www.cancer.nsw.gov.au/shade-and-uv

Cancer Council NSW

Guidelines to Shade

A practical guide for shade development in New South Wales

WSROC

TURN DOWN THE HEAT

TURN DOWN THE HEAT

STRATEGY AND ACTION PLAN

2018

WSROC ABOUT US ISSUES PROJECTS

Turn Down the Heat

Sydney Water Corporation, 2017

Protecting health
through
Protecting the environment

‘Never doubt that a group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.’
Margaret Mead

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