

Human heat stress risk and prescription medications

Ollie Jay

Professor of Heat & Health

Academic Director – Heat & Health Research Centre

Faculty of Medicine & Health

University of Sydney

AUSTRALIA



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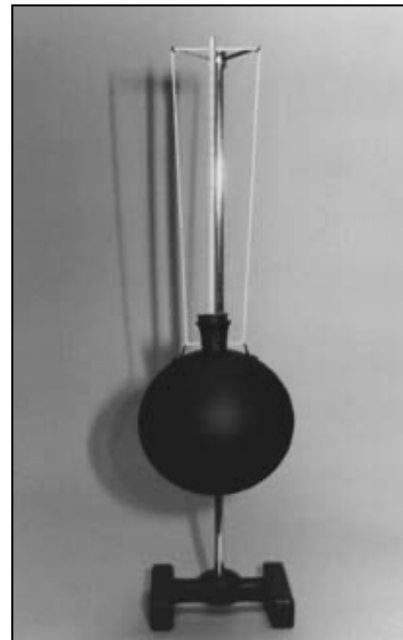
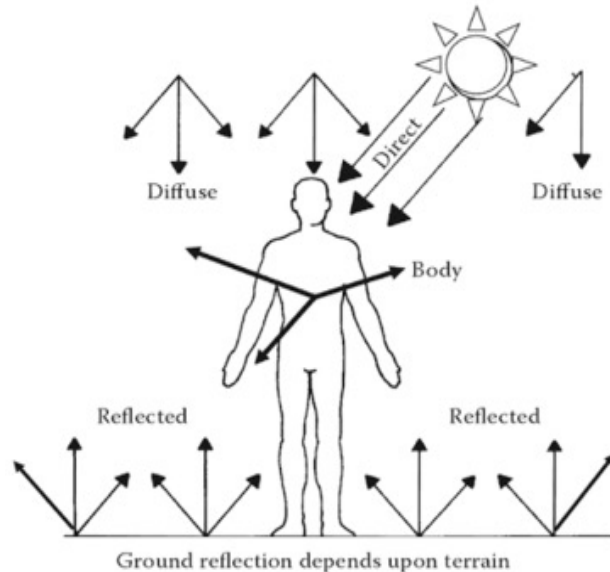
Environmental Factors Determining Heat Stress Risk

Environmental

- Ambient air temperature (shade)
- Mean radiant temperature
- Humidity
- Wind

Personal

- Activity
- Clothing

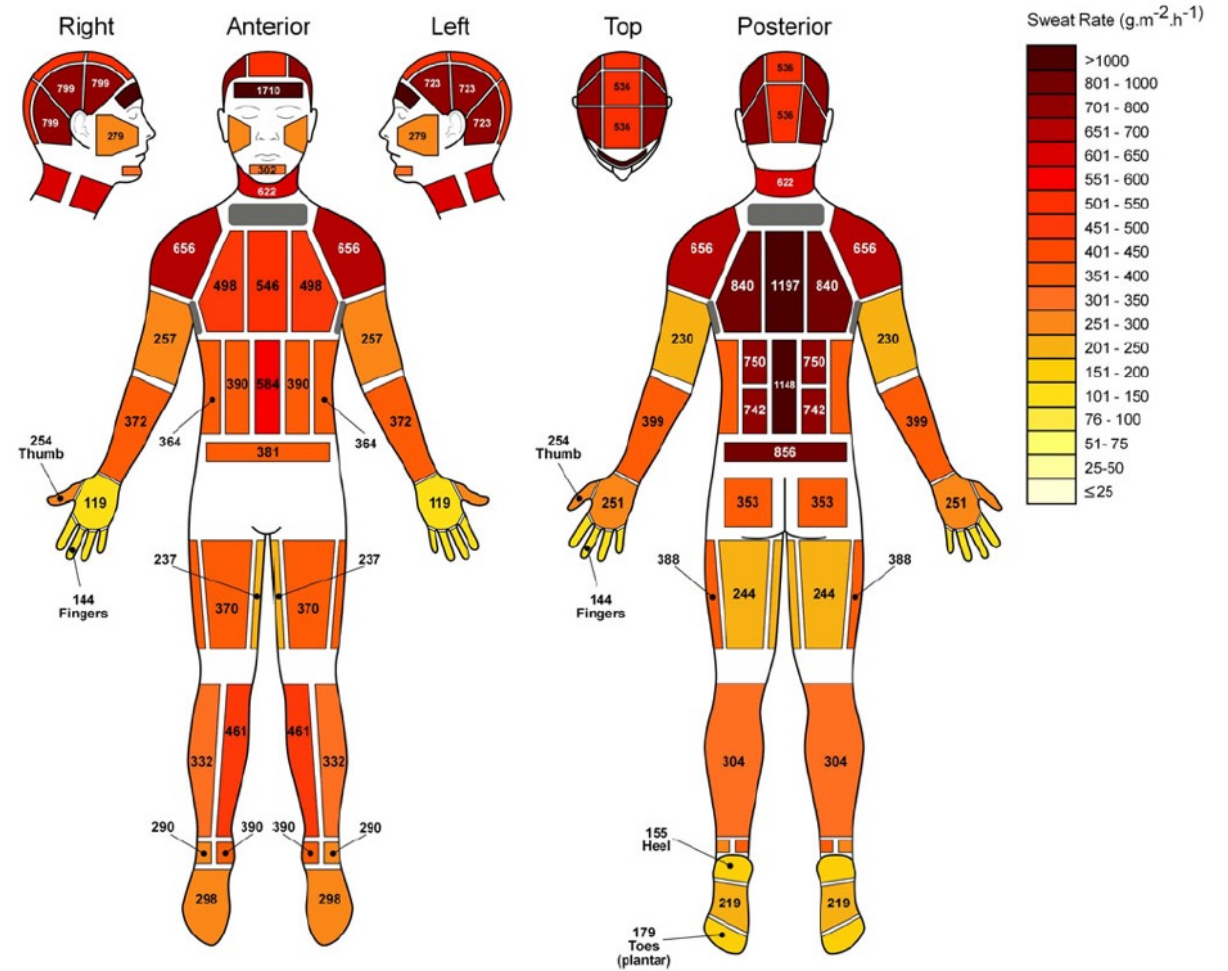
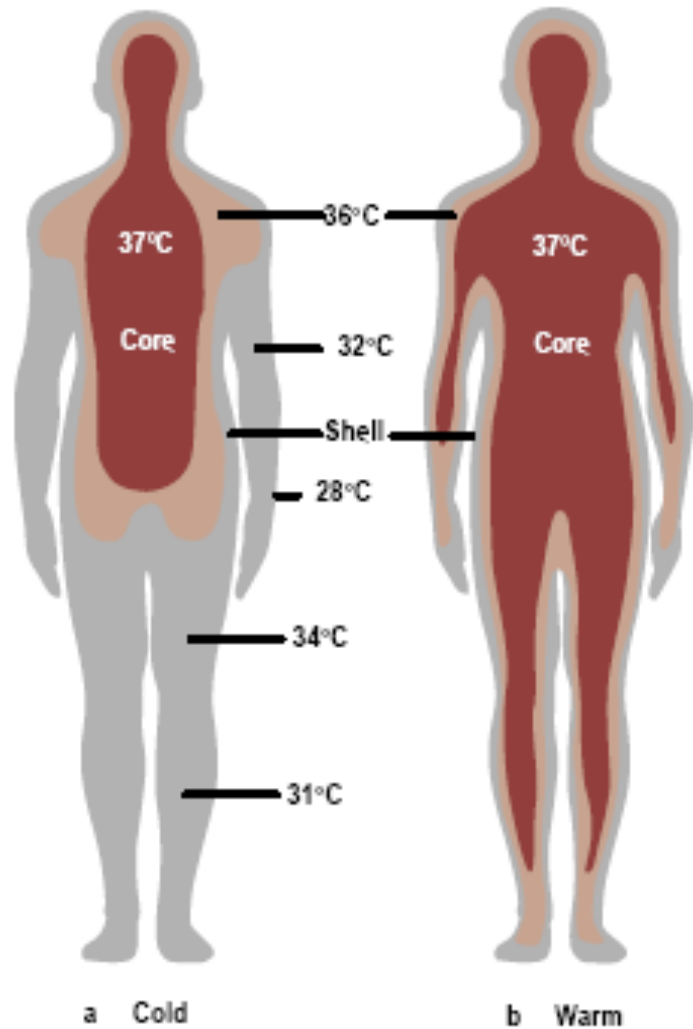


Discussing @ThermalErgLab work & #heatwave w/Head @SydneySPH.
Conditions now @Sydney_Uni:
T_{air}=39.1C;
T_{globe}=52.7C;
V_{air}=3.5m/s
RH=26%



1:29 PM - 11 Jan 2017

Thermoregulation





Environmental Heat Stress



Young Adult



Older Adult



Older Adult +
CV disease



Older Adult +
CV disease +
Access to AC



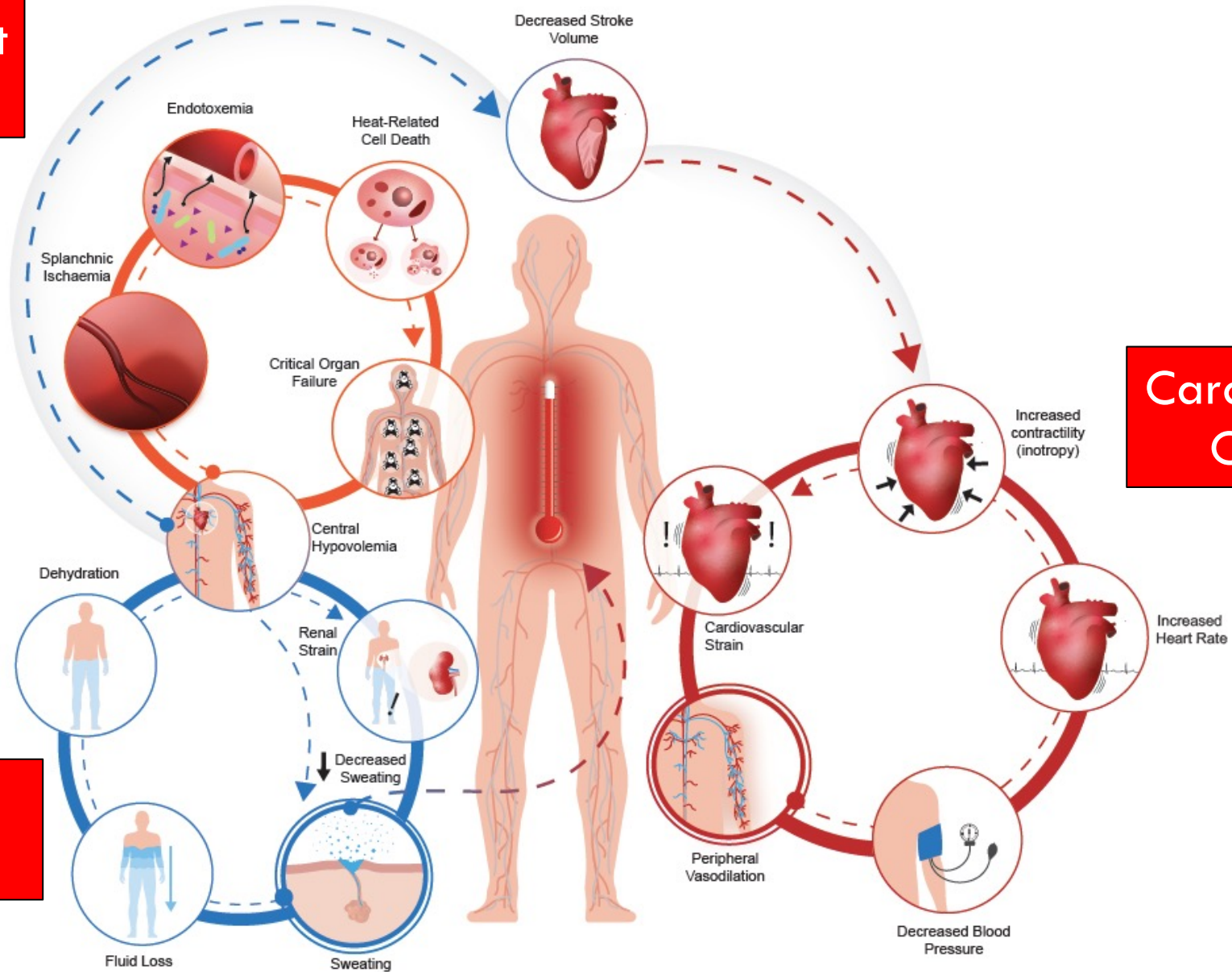
Adaptive Capacity:

Physiological

+

Behavioural

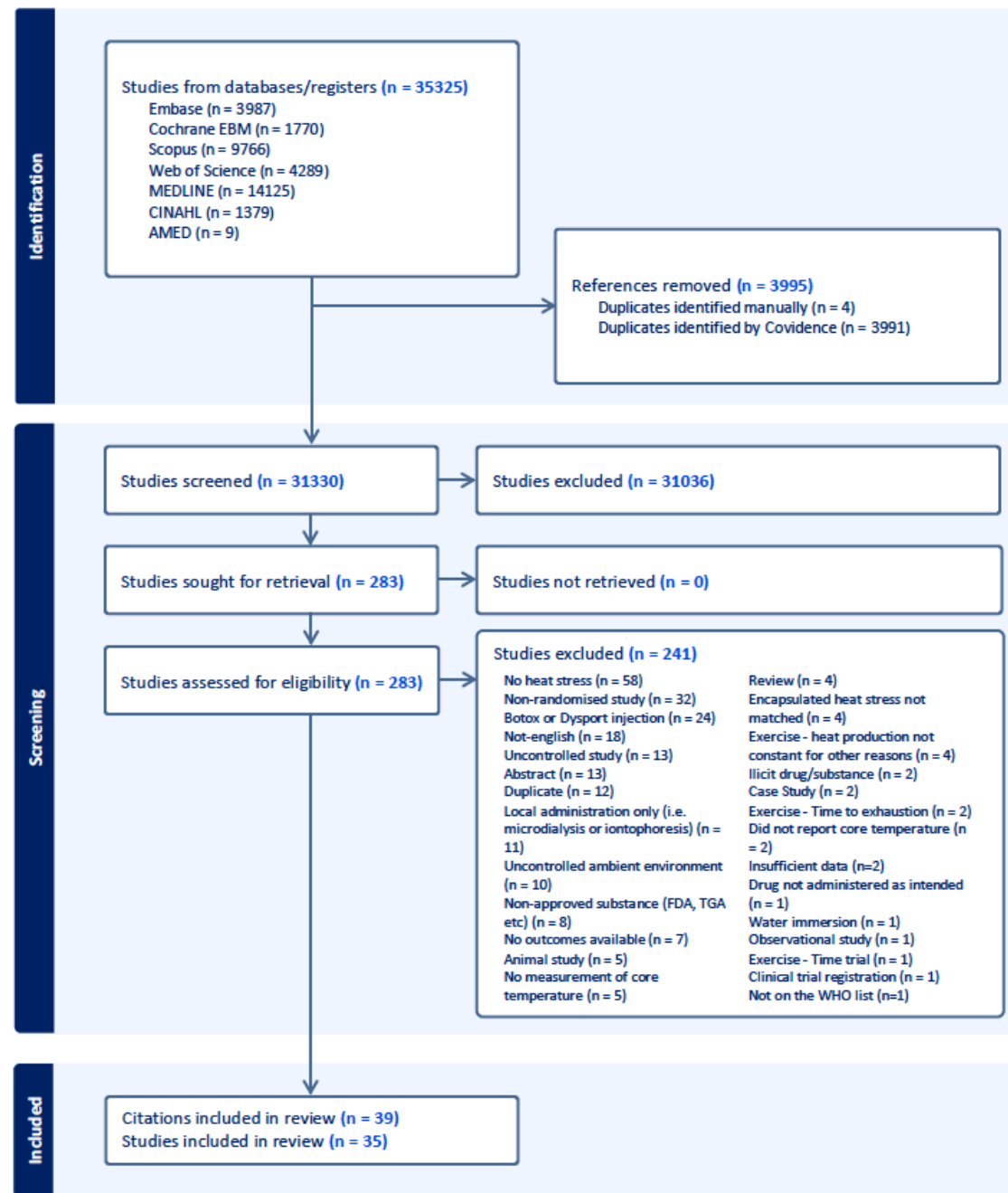
Classic Heat Stroke



Cardiovascular Collapse

Renal Collapse

Medication	Mechanism
Anti-cholinergics	Can affect central thermoregulation, reduce cognitive alertness, and prevent or reduce sweating (many drugs below have anti-cholinergic effects)
Antipsychotics	Can inhibit the sweating mechanism, and reduce systolic blood pressure, central thermoregulation, cognitive alertness and vasodilation
Antihistamines	Can inhibit the sweating mechanism, and reduce systolic blood pressure
Anti-Parkinson agents	Can inhibit the sweating mechanism, reduce systolic blood pressure, and cause dizziness and confusion
Antidepressants	Reduce sweating, some can decrease centrally induced thermoregulation and cognitive alertness
Anxiolytics and muscle relaxants	Reduce sweating and increase dizziness, decrease cardiac output and therefore reduce cooling by vasodilation, and worsen respiratory symptoms
Antiadrenergics and beta-blockers	Can prevent dilation of the blood vessels in the skin, reducing the capacity to dissipate heat by convection
Sympathomimetics	Vasodilators, including nitrates and calcium channel blockers, can worsen hypotension in vulnerable patients
Antihypertensives and diuretics	Can lead to dehydration and reduce blood pressure; hyponatraemia is a common side effect and can be worsened by excess fluid intake



Summary of Evidence

- Anticholinergics (ACB=3 only)
- Anti-Parkinson's agents
- Epinephrine
- Beta-Blockers (non-selective only)

No evidence supports claims of impact on thermoregulation for other WHO-listed medications

Sustainable and accessible ways to keep cool

Mitigating climate change is vital, but inevitable rising temperatures means that identifying sustainable cooling strategies is also important. Strategies at the individual scale that focus on cooling the person instead of the surrounding air can be effectively adopted, even in low-resource settings.



- + Can provide effective cooling for young healthy adults up to 42°C in 50% humidity
- Effectiveness is reduced with low humidity, and in older adults (>65 years), unless accompanied by self-dousing
- Increases dehydration, but can be offset by drinking an extra glass of water per h



- + Can reduce heat strain and dehydration up to 47°C if dousing is sufficient to keep the skin wet
- + Can be used during power outages
- Low compatibility with high clothing coverage



- + Can reduce dehydration and thermal discomfort in hot and humid conditions
- + Can be used during power outages
- Risk of slips and falls

* Feet immersed above the ankles in 20°C water



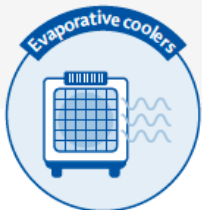
- + Provides high evaporative heat loss without needing to sweat
- + Can be used during power outages
- Clothing must be re-soaked roughly every 60 min

Electric fans can be used below these temperatures irrespective of humidity:

39°C Healthy young adults (aged 18 to 40 years)

38°C Healthy adults (aged over 65)

37°C Over 65s taking anti-cholinergic medication



- + Can cool air temperatures in dry conditions
- Minimal effect in high humidity
- Risks creating mosquito breeding sites without proper maintenance



- + Lowers air temperatures in hot and dry conditions
- Must be used in well ventilated or outdoor areas otherwise humidity increases offset any benefit
- Risk of slips and falls



- + Can reduce core temperature and cardiovascular strain in conditions up to 45°C
- Requires access to ice
- Labour-intensive to prepare

* Crushed ice wrapped in a damp towel applied to the neck and chest



- + Can provide internal cooling
- + Water should be ingested at a temperature that is most palatable (~10°C) to ensure optimal hydration
- If person has already started sweating, not effective at lowering core temperature

Read the full paper: Jay O, Capon A, Berry P, et al. Reducing the health effects of hot weather and heat extremes: from personal cooling strategies to green cities. *The Lancet* 2021. Published online August 19

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“Given the inevitable rises in global and local temperatures over the coming decades, identifying effective prevention and response measures that can be implemented, particularly in low-resource settings, has never been more important.”

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“HeatWatch” App Project



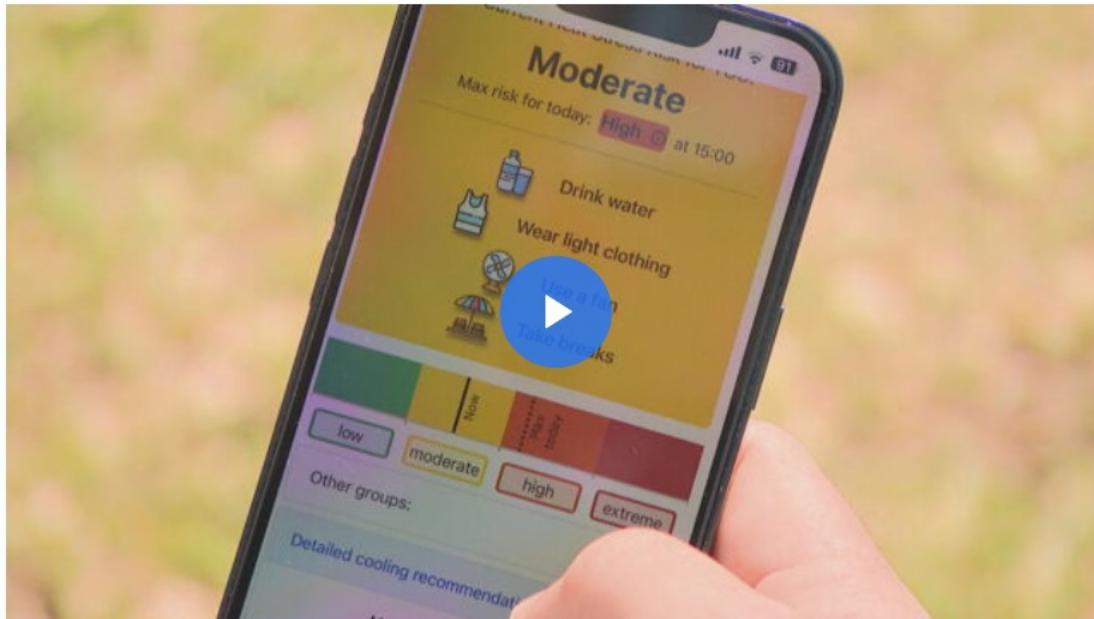
9NEWS

News / National

New tech to protect Aussies during forecast extreme summer conditions



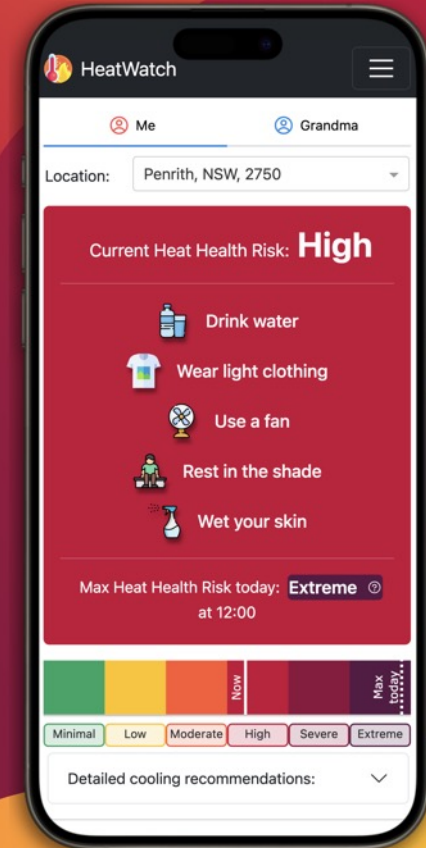
By Savannah Meacham • Digital Chief of Staff | 7:31pm Sep 18, 2023



New technology to help protect Aussies this summer

HEATWATCH

STAY SAFE IN THE HEAT





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Thank You for Listening



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