HEAT ILLNESS
NEW INSIGHTS & THERAPIES

PROF IAN ROGERS SJOG MURDOCH & UNIVERSITY OF NOTRE DAME

KEY CONCEPTS

- Ditch heat exhaustion as a "diagnosis"
- Heat stroke has very specific characteristics
- Heat wave deaths are rarely due to heatstroke
- Recognition and first aid most alter outcome
- Cold water cooling is the most effective method
- Severe dehydration is rare in exertional heat illness

WHAT IS “HEAT EXHAUSTION”?

SPORTS MEDICINE AUSTRALIA

- "Characterised by a high heart rate…….loss of endurance, loss of skill, confusion and nausea"
- "The rectal temperature may be up to 40°C ……should only be measured by a doctor or nurse"

LET'S JUST SAY PATIENTS ARE "HEAT STRESSED"

“MY SON GOT A TOUCH OF HEAT STROKE DOWN THE BEACH TODAY”

THE DEFINING FEATURES OF HEAT STROKE

- (Any) Neurological dysfunction
- Core temperature above 41.5°C
- (Hot & dry OR sweaty skin)

WHAT IS A "HEAT WAVE" ?

- There is no universal definition
- It depends on both climate and population preparedness
- Generally it will include elements of:
  - Prolonged duration (> 3 full days)
  - Mean (or sometimes maximum) temperatures well above that expected, for that locale, at that time of the year (mean temperatures of 30-32°C are often the threshold)

HEAT WAVES – SYSTEM & DIRECT PATIENT EFFECTS

- Plenty of published contemporary Australian evidence:
  - Melbourne 2009, Adelaide 2009, Sydney 2011, Melbourne 2014
- Measured increases of 20-100+% in a whole range of parameters:
  - Ambulance dispatches incl cardiac arrest and attending deceased
  - Telephone advice line and medical deputising service calls
  - ED attendances with a notable skew to ATS 1 & 2
  - Cardiovascular, cerebrovascular and renal admitting diagnoses
  - All cause mortality & not just by "mortality displacement"
- For all measures the effect is most pronounced in the elderly

HEAT WAVES – WHAT WE GET WRONG

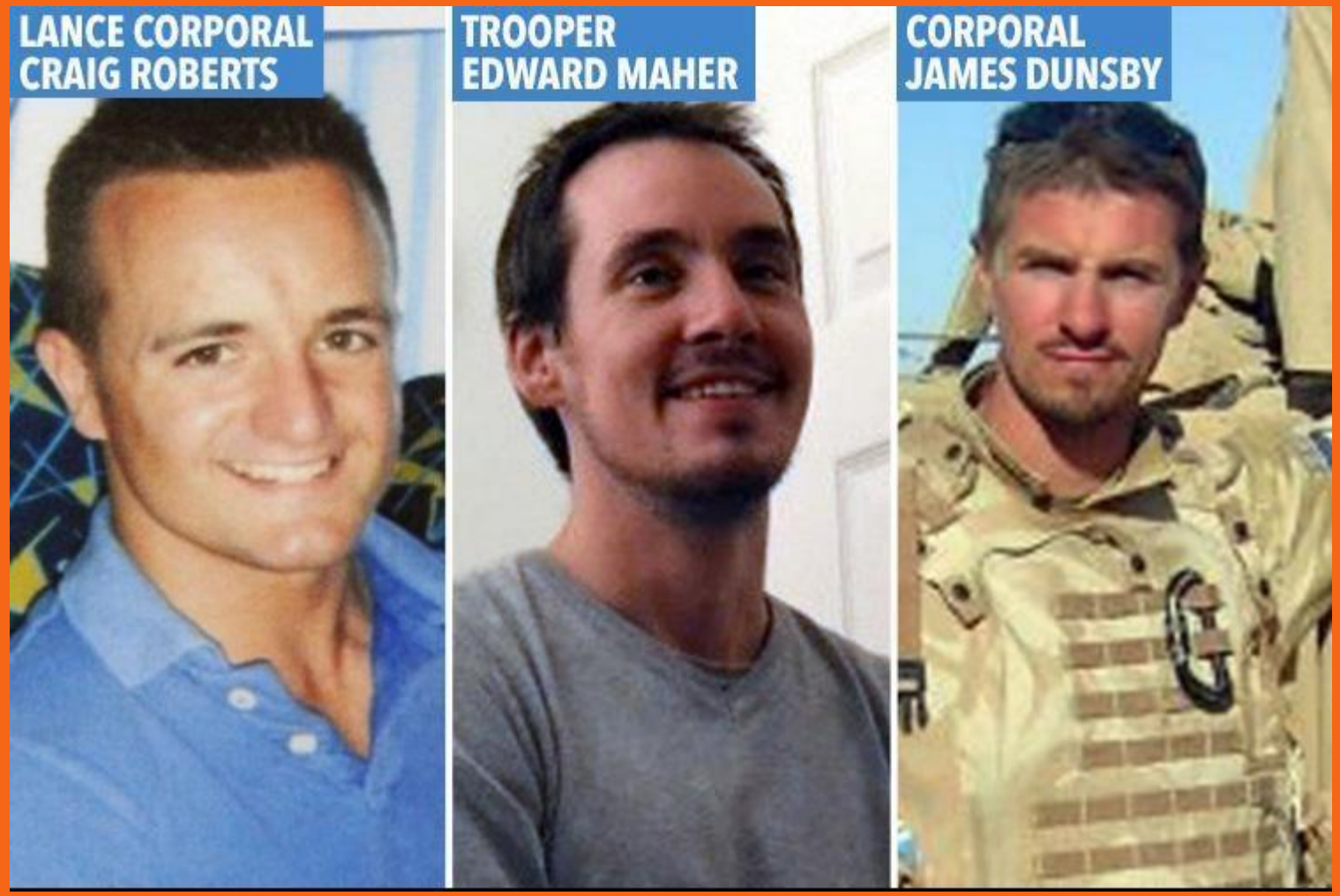
- Diagnosing heat stroke in epidemic proportions
  - eg 140 cases in the one week January 2014 Melbourne heat wave
- Using that "heat exhaustion" label far too often (at all!)
- Labelling an admission as a specific heat syndrome and so potentially underestimating the specific organ system problems
- Assuming the problem is over once the weather changes

EXERTIONAL HEAT STROKE DEATHS – COMMON FEATURES

- "Adverse" environment
- "Burst" activity
- Delayed recognition
- Inadequate first aid

EWAN WILLIAMSON (1998-2012)

BRITISH SAS SELECTION SOLDIERS † 2013



TORRAN THOMAS (1999-2015)

KATO OTTIO RUGBY LEAGUE PROFESSIONAL

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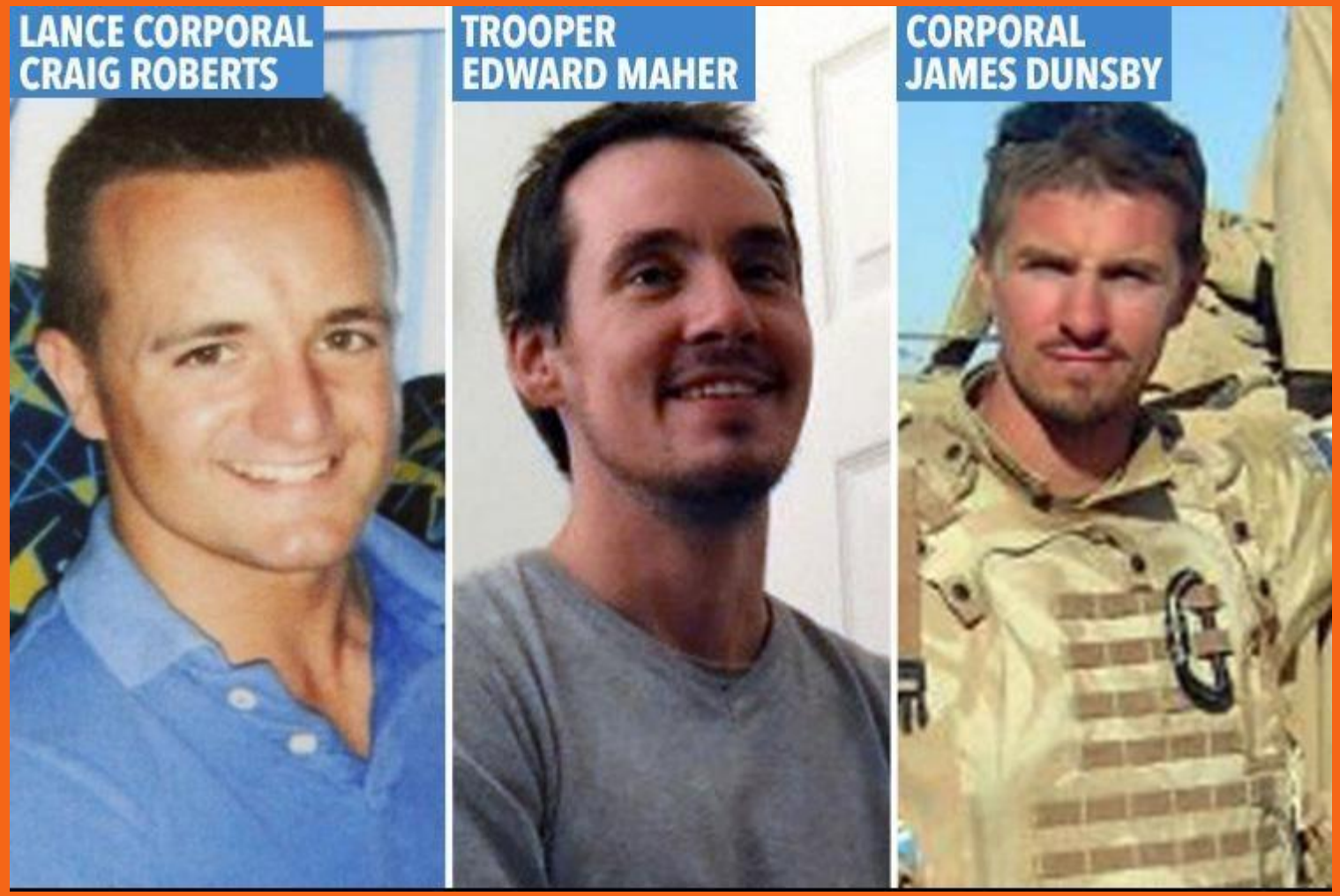

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HOW WOULD YOU COOL A PATIENT WITH HEAT STROKE IN YOUR ED ?

MAGNITUDE & DURATION OF HYPERTHERMIA DETERMINES OUTCOME IN HEAT STROKE

SO COOLING METHODS NEED TO BE:

- READILY AVAILABLE
- PROMPT TO ENACT
- RAPIDLY EFFECTIVE

COLD WATER IMMERSION

- "…..is the optimal field treatment to achieve rapid temperature reduction in heat stroke" -WMS Practice Guidelines *Wilderness & Environmental Medicine 2014*
- Utilises the much, much greater thermal conductivity of water
- Can achieve cooling rates of 0.2°C/min (greater than twice that of evaporative cooling) *Proulx CI et al J Appl Physiol 2003*
- Does not cause the often purported metabolic thermos bottle effect *Casa DJ et al Exerc Sport Sci Rev 2007*

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WHAT SHOULD WE TEACH OTHERS AND USE OURSELVES IN HEAT STROKE?

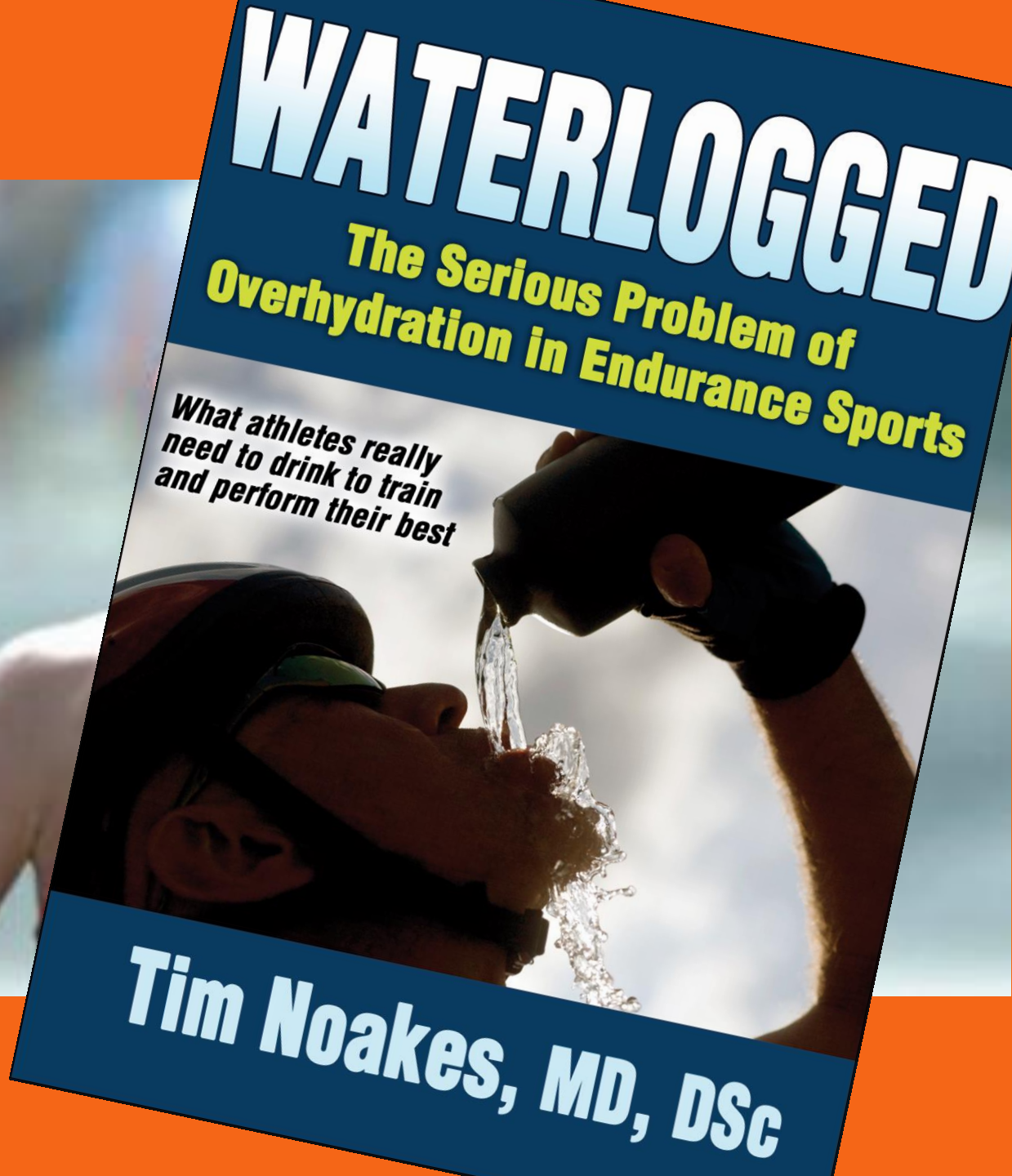
- STRIP off as much clothing as possible
- SOAK with any available water
- FAN vigorously by whatever means available - improvise

And if ice is available

- IMMERSE in a cool or ice water bath (OR)
- COVER with regularly changed iced water soaked towels

THE "DEHYDRATION MYTH" IN EXERTIONAL HEAT ILLNESS

- The "dehydration myth" is a recent cultural phenomenon
- Athletes usually have substantial cardiovascular reserve
- The body will typically titrate exertion to ensure that adequate heat loss by sweating can be maintained
- 3-8% dehydration is tolerated without decline in athletic performance
- Clinical prediction of dehydration in athletes is known to be problematic and most exertional heat stroke victims are near euvolaemic
- In emergency medicine we might be part of the problem, potentiating the myth with our own "routine" use of IV fluids


WATERLOGGED
The Serious Problem of Overhydration in Endurance Sports
What athletes really need to drink to train and perform their best
Tim Noakes, MD, DSc

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