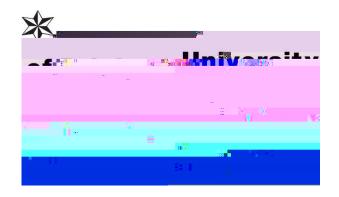
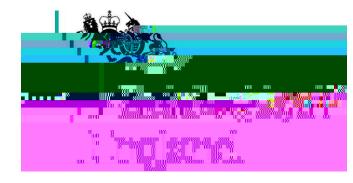
# Current exercise -heat stress research impacting the Public Health England Heatwave Plan - heat alleviation

Dr Neil Maxwell

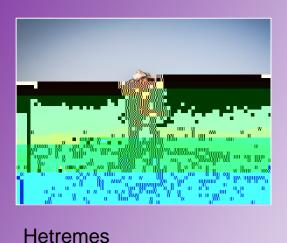




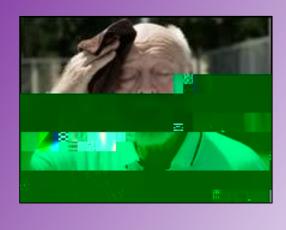


## **Environmental Extremes Lab**

Theme 1
Optimising
Performance in the
Extremes



Theme 2
Impact of
Environmental
Extremes on Health



Theme 3
Occupational
Activities &
Safety in the Extremes



#### Presentation Aim & Structure

is scope for additional/stronger messages relating to exercise-heat stress and heat-alleviation

Heat Sensitive Populations / Individuals

Can an index capture heat illness susceptibility?

Heat Alleviation
Acute methods (e.g. cooling)
Chronic Methods (e.g. acclimation)

Behavioural thermoregulation during exercise in the heat 1st line of defence in maintaining heat balance

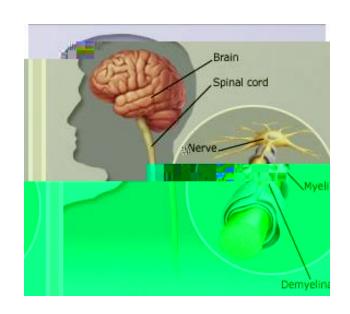
Exercise is still important!







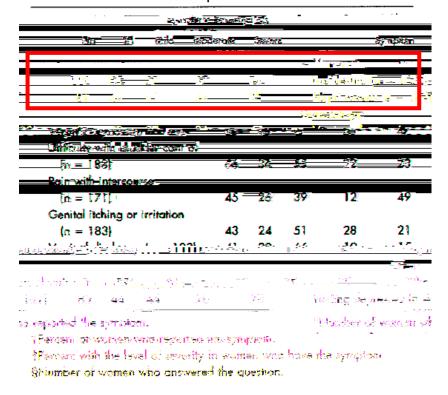
## **Heat-Sensitive Populations**



Neurodegenerative disease 100,000 in UK 70% heat sensitive Symptom exacerbation 30% less active Benefits of exercise high

#### Hot flash / Night Sweat

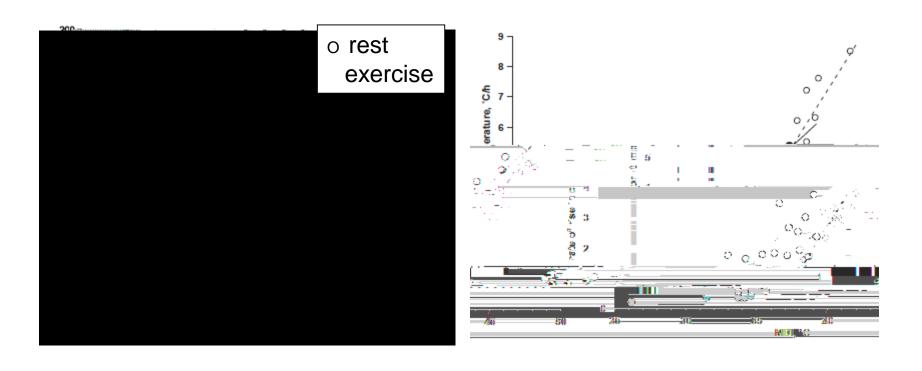
Table 2. Prevalence and Severity of Symptoms Among
Postmenopausal Women



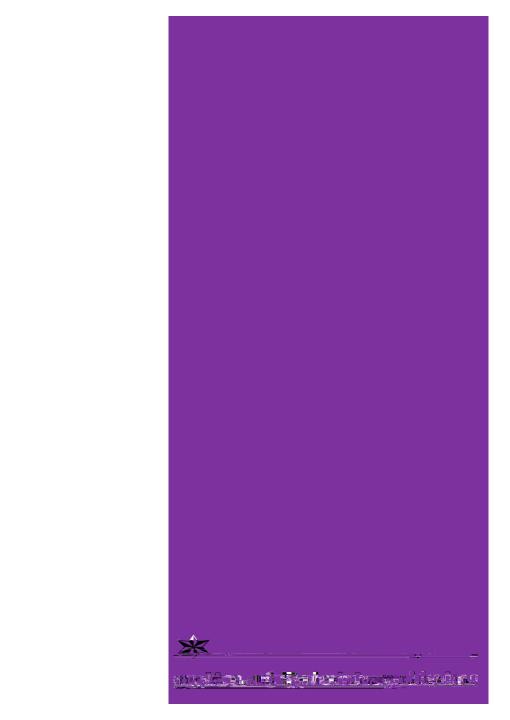
[Couzi et al, 1995]



## **Heat Sensitive Individuals**







## Index of Heat Susceptibility

[PHE, 2016]

Heat Rash Heat Cramps Heat Oedema Heat syncope



Heat Exhaustion



Heat Stroke (classic / exertional)

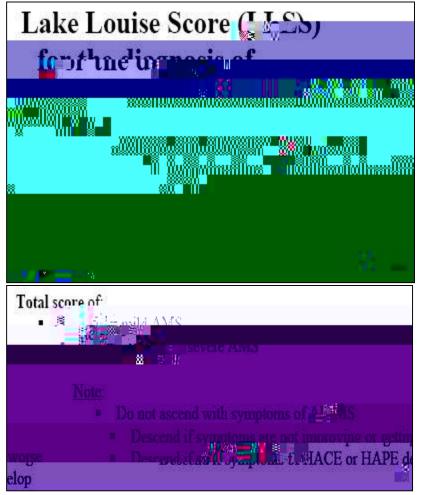


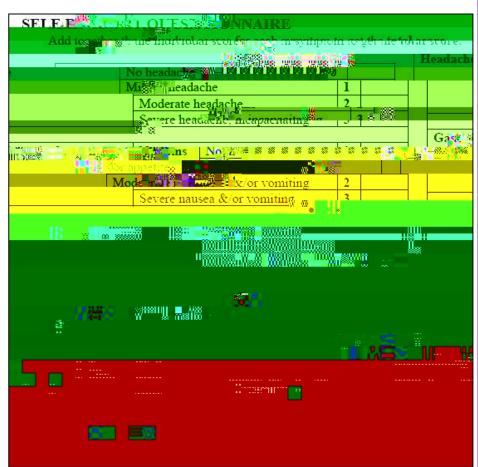


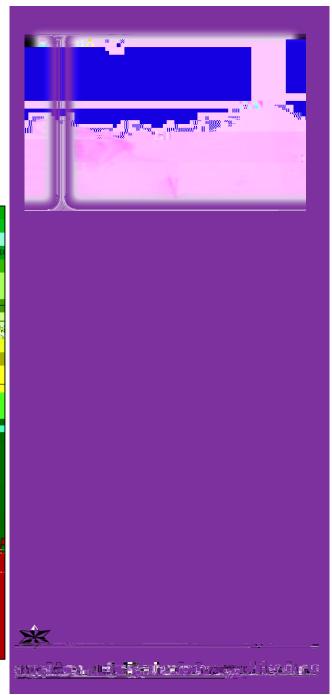
Self-



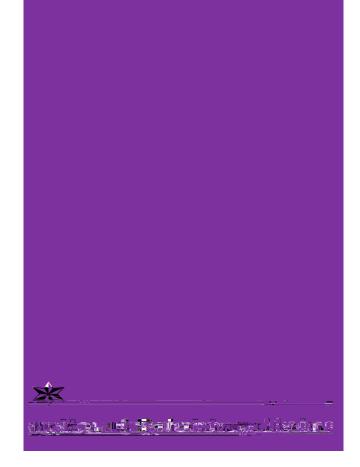
### Index for Acute Mountain Sickness



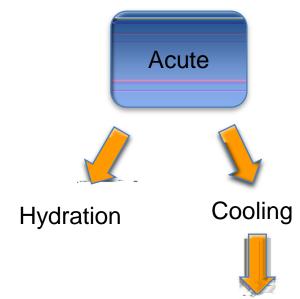




# What Heat Alleviating Methods are Recommended by PHE?

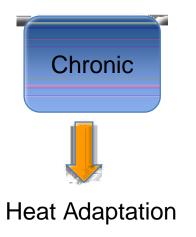


## **Heat Alleviation Methods**



Rationale for Cooling:
to
a greater body heat storage
delays onset of sweating

improved thermal comfort







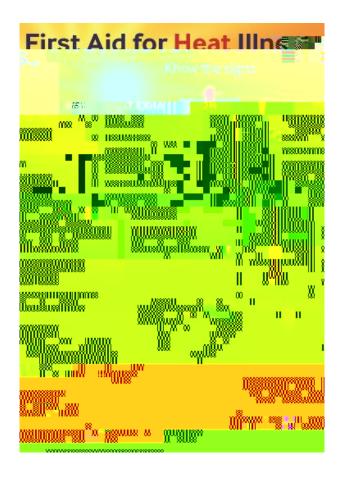


## A Portable Cooling Vest

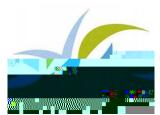
a novel endothermic hypothermic device for core body cooling safety

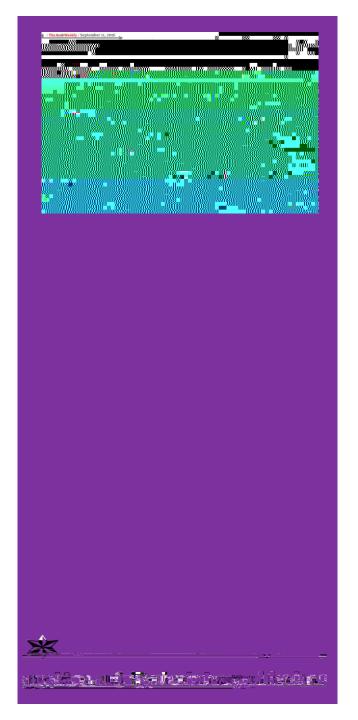












## Should fans be used in a heatwave?

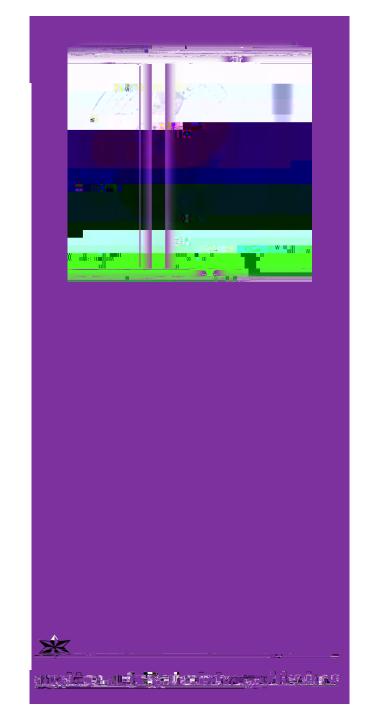
above 35 °C, may not prevent heat-

[WHO, Public health advice on preventing health effects of heat, 2011]

°C, but do not aim

temperature is below 35°C, but fans can cause excess dehydration so they should not be aimed directly on the body and will not be enough to keep cool at temperatures above 35°

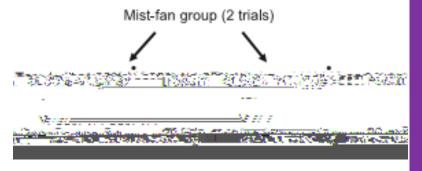
[PHE, Beat the heat: staying safe in hot weather, 2016]

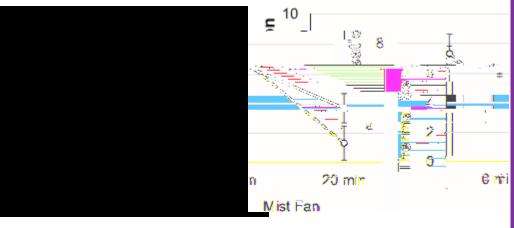


## Should fans be used in a heatwave?

Electric fans prevent heat-related increases in heart rate and core temperature in young people to ~ 80%rh at 36 Cand 50%at 42 C.

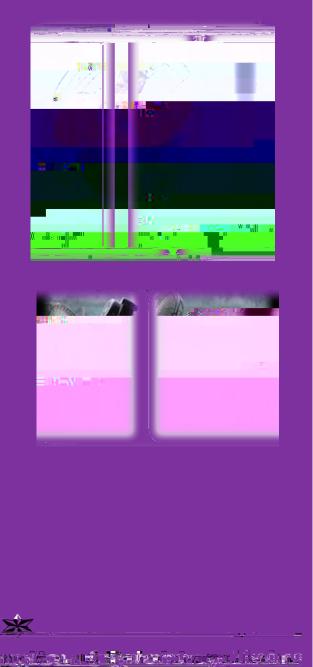
In elderly (60 and 80 yrs) no benefit ( of the electric fan during heat stress.



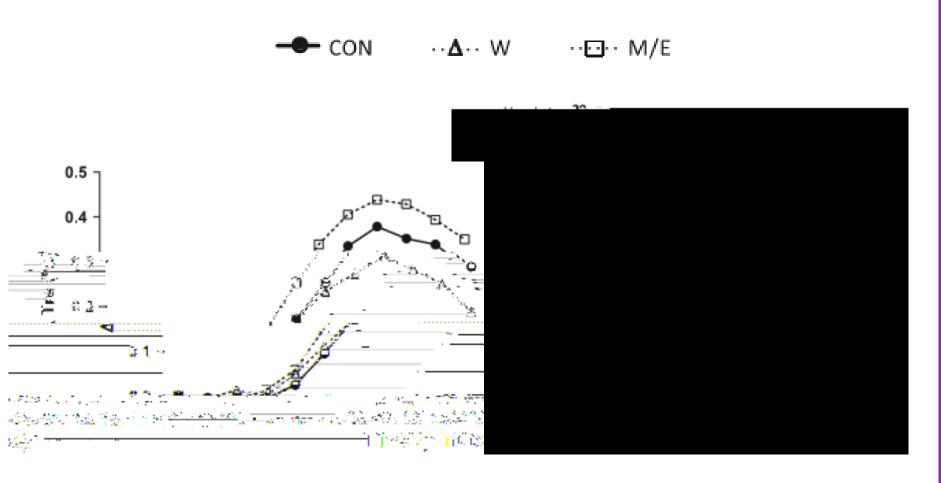


--- Control --- Treatment

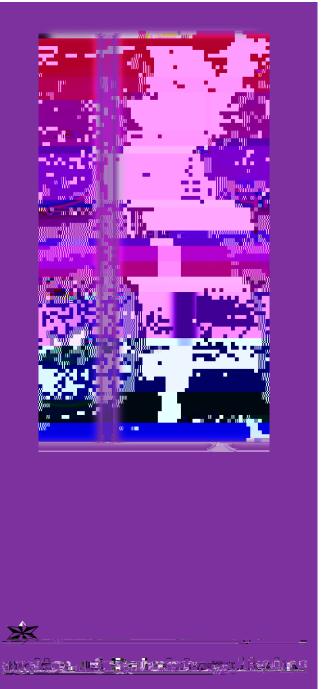
More research required across different populations using different ambient temperatures and fan speeds and misting for more prescriptive advice on the value of electric fans in heat waves



## Is Menthol the answer for keeping cool?



Caution with perceptual manipulations, which may facilitate achievement of dangerously high body temperatures and mask signs and symptoms of heat-illness



## An Ice-cream or a cup of tea?

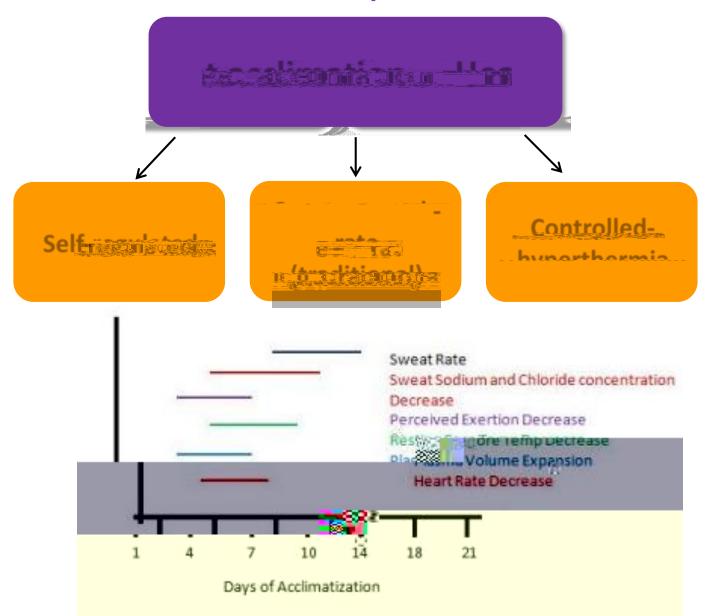




[Bain et al, 2012]



## Prevention is better than cure: Heat Adaptation





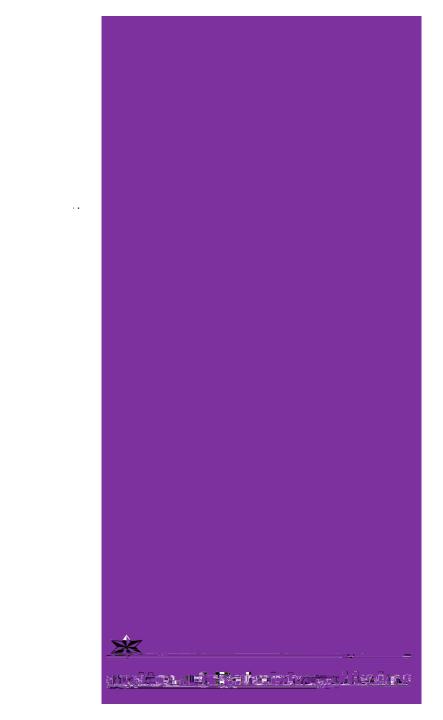
In anticipation of a heatwave, could safe adaptation to the heat offer protection to some vulnerable populations?





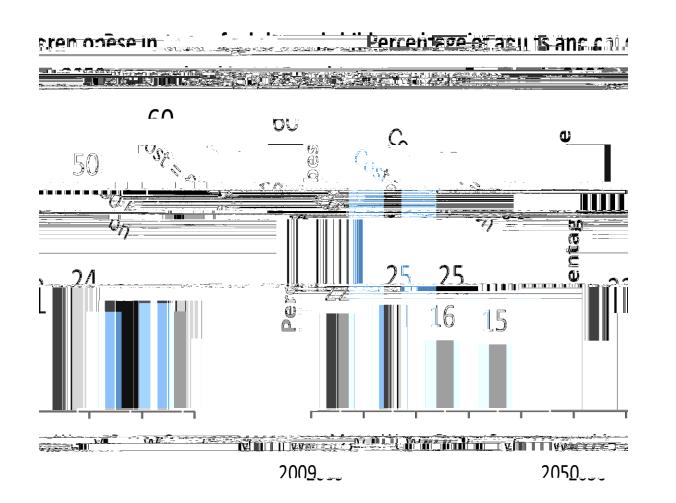
## Could hot baths be the answer?

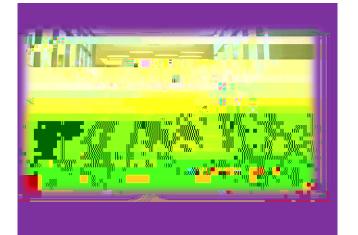




## The Importance of Exercise

[PHE, 2016]





costs the NHS in England more than

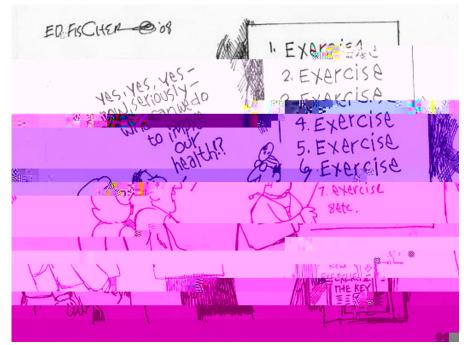
[PHE, 2016]



## The Importance of Exercise

Impairments in heat loss in older and middle-aged untrained males occur in a hot environment. These impairments in untrained middle-aged males can be

[Stapleton et al, 2015]



heat wave plan for a stronger message on the importance of safe exercise



Rationale to acknowledge 1) heat sensitive individuals, 2) use an index of heat illness susceptibility, 3) recommend a wider range of heat-alleviating methods, 4) be aware of behavioural thermoregulation



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