IMPACT OF NIGHTTIME TEMPERATURES ON SLEEP BEHAVIOUR AMONG LOW-INCOME POPULATIONS.

A Khayelitsha-based research study

ALICE GWYNNE-EVANS

UNIVERSITY OF CAPE TOWN, SOUTH AFRICA
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Importance

- Predicted 2.4°C or 36°F increase in global temperature by 2100
- Rising temperatures affect human health and sleep
- Sleep plays an integral role in human biological functions

Sleep variables

Objective Sleep Measurements:

- measured using wrist actigraphy over 7 days
- collected in 1-minute epochs
- scored using the criteria of Patel et al. (2015)

Sleep Duration (time in bed)

Total sleep time

Onset latency

Wake after sleep onset (WASO)

Average length of wake bouts

Number of wake bouts

Efficiency (How well?)

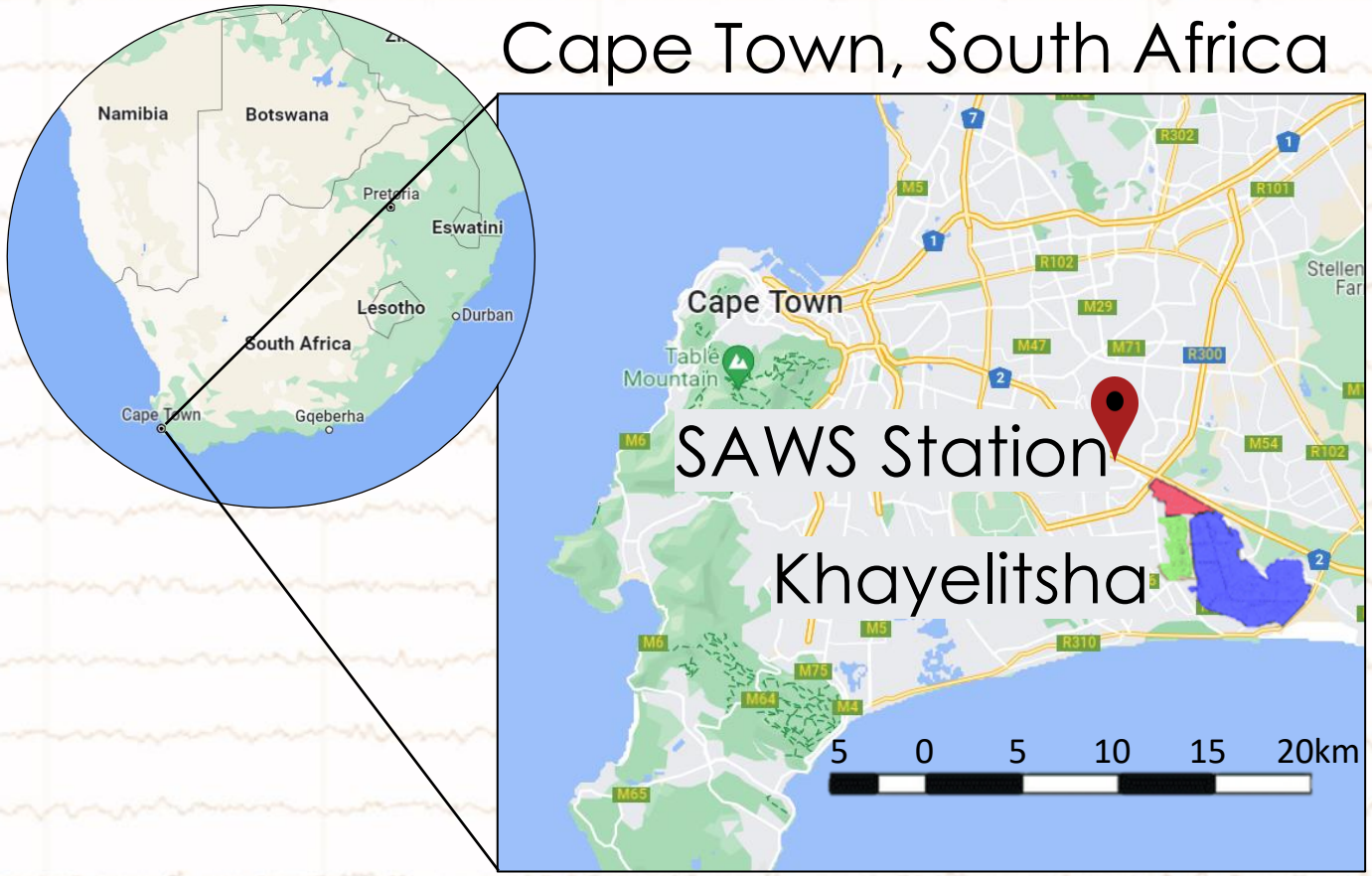
Percent wake

Objectives:

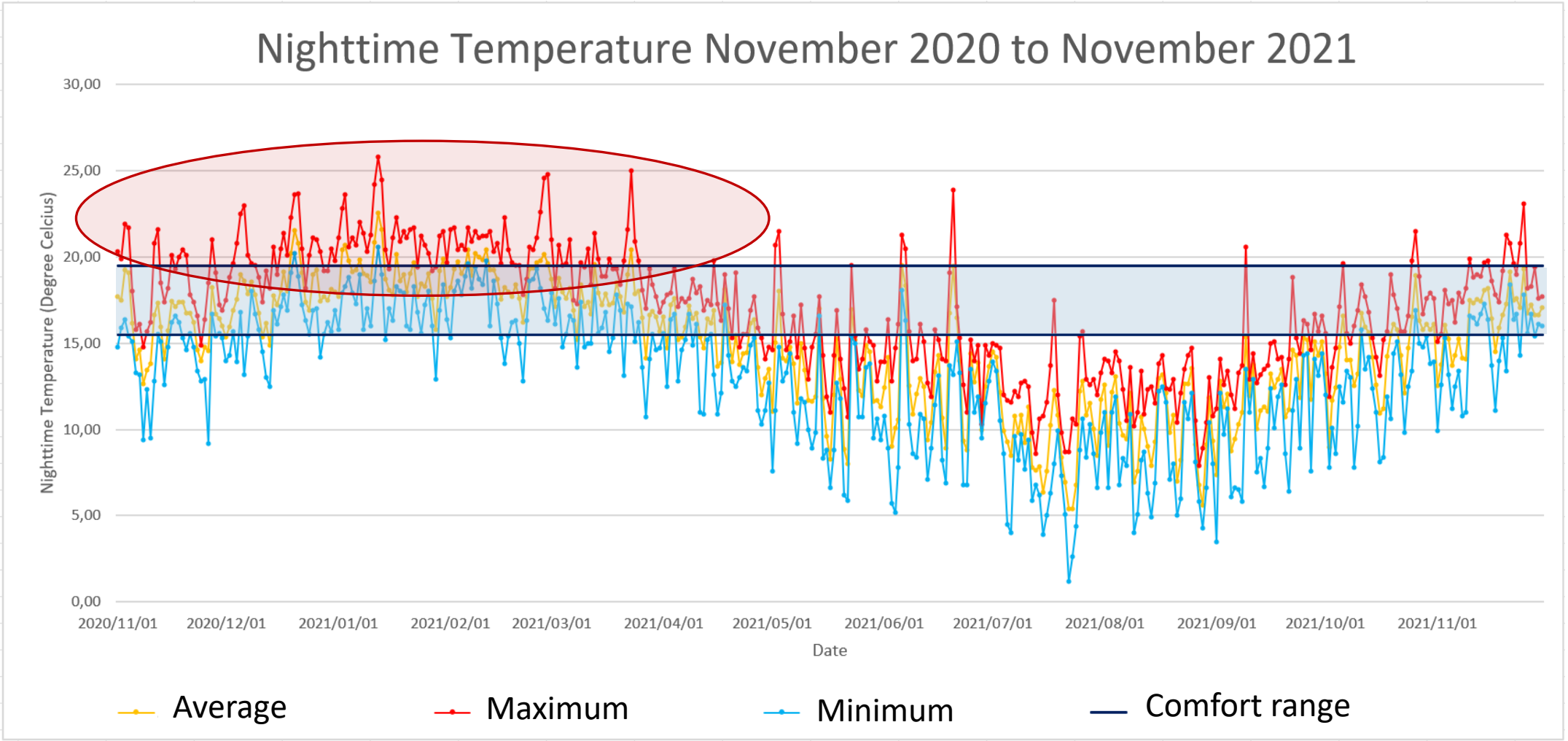
- To explore and quantify the effects of the thermal environment on sleep patterns in a low-income cohort.
- High temperatures will result in disrupted sleep patterns and reduced sleep quality.

Khayelitsha

Cape Town, South Africa



Nighttime temperature



(SAWS, 2023 and Wang et al., 2022)

Participant characteristics

	Frequency (%)
Age	$\bar{x}$ = 39
Male/Female	49/51
Employed	28
Smoker	15
Alcohol	47
Diabetes	4
Hypertension	52
High blood pressure	17

Housing characteristics

	Frequency (%)
Electricity	96
Fan (% yes)	20
House density (occupants)	4
Roof:	
Iron/Aluminium sheets	35
Roofing tiles	12
Asbestos	29
Combination	20
Wall:	
Burnt brick	19
Iron/aluminium sheet	17
Cement	31
Combination	26

Sleep characteristics

	Average $\bar{x}$	Median
Sleep Duration	543.0	550.2
Total sleep time	443.1	446.8
Onset Latency	13.0	5.5
WASO	98.9	86.3
Number of wake bouts	61.3	58
Average length of wake bouts	1.6	1
Efficiency	80.0	81.76
Percent Wake	17.9	16.36

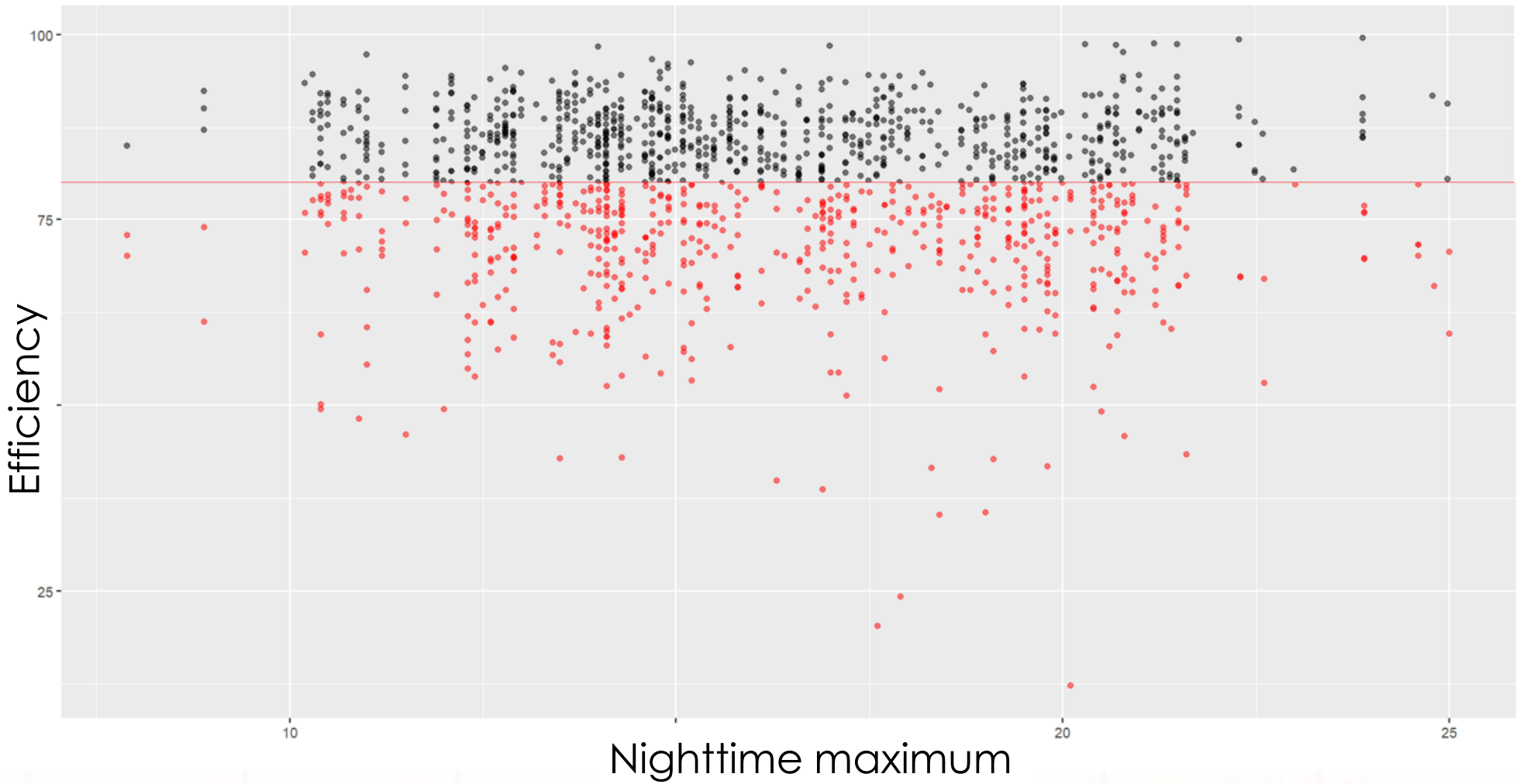
Results

Multivariate analysis of sleep variables vs nighttime maximum and minimum temperature adjusting for covariates

	Night max				Night min			
	Constant	coefficient	p-value	SE	Constant	coefficient	p-value	SE
Duration	788.62	-5.32	0.00	1.40	745.24	-3.38	0.01	1.27
Sleep time	681.94	-5.21	0.00	1.20	644.74	-3.73	0.00	0.00
Average wake bouts	1.24	0.02	0.02	0.01	1.31	0.02	0.01	0.01
Efficiency	84.93	-0.22	0.01	0.09	84.28	-0.23	0.00	0.08
Percent wake	12.48	0.19	0.02	0.08	12.96	0.21	0.00	0.07

*WASO, onset latency and number of wake bouts were NS

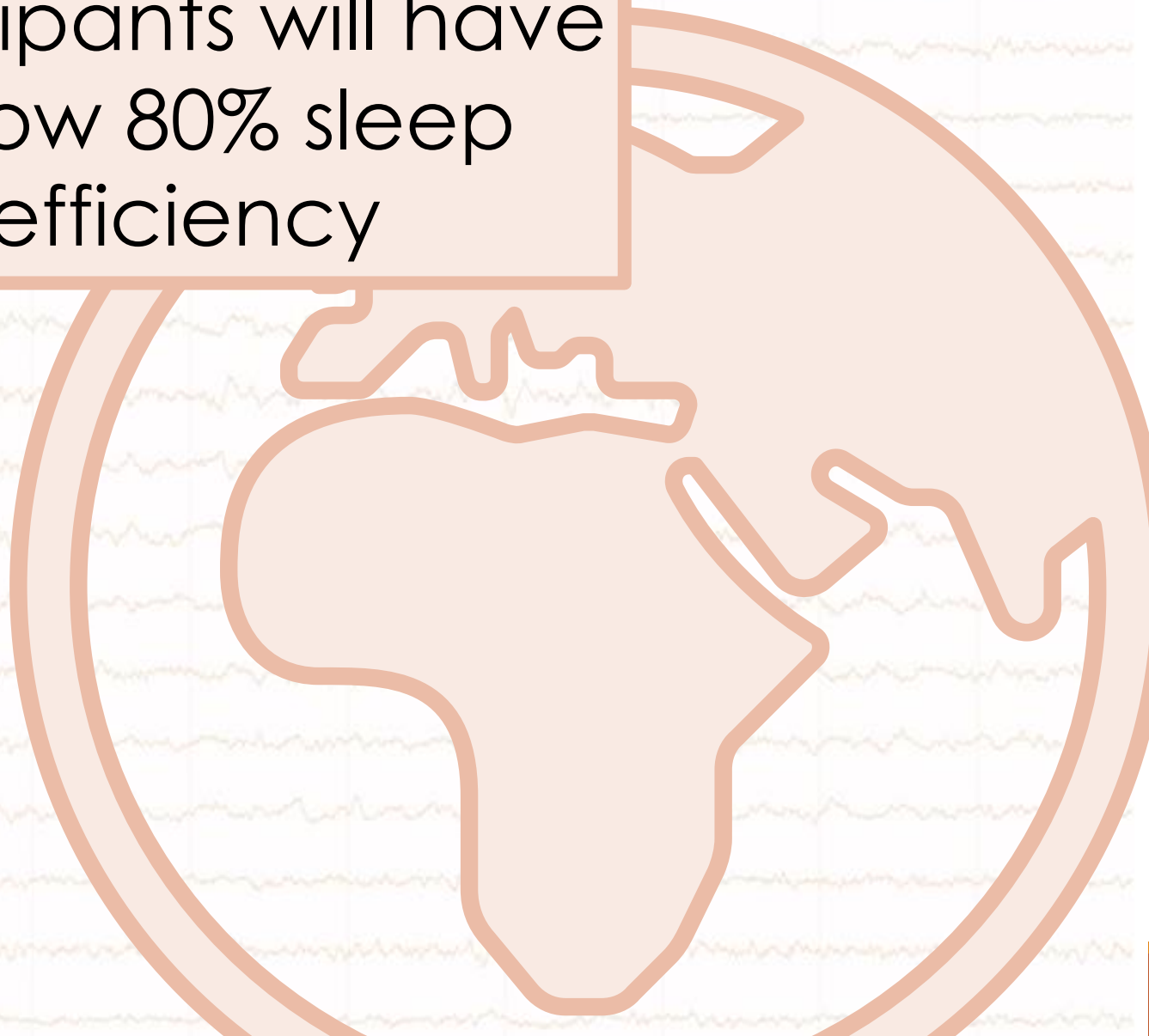
Nighttime maximum temperature vs efficiency, with 80% efficiency threshold



80% efficiency threshold

Take Aways

45% of all participants will have below 80% sleep efficiency



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UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

School of Public Health
Departement Openbare Gesondheid
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