



The effect of nighttime temperature on sleep behaviour in African-origin adults from the Modeling the Epidemiologic Transition Study (METS).

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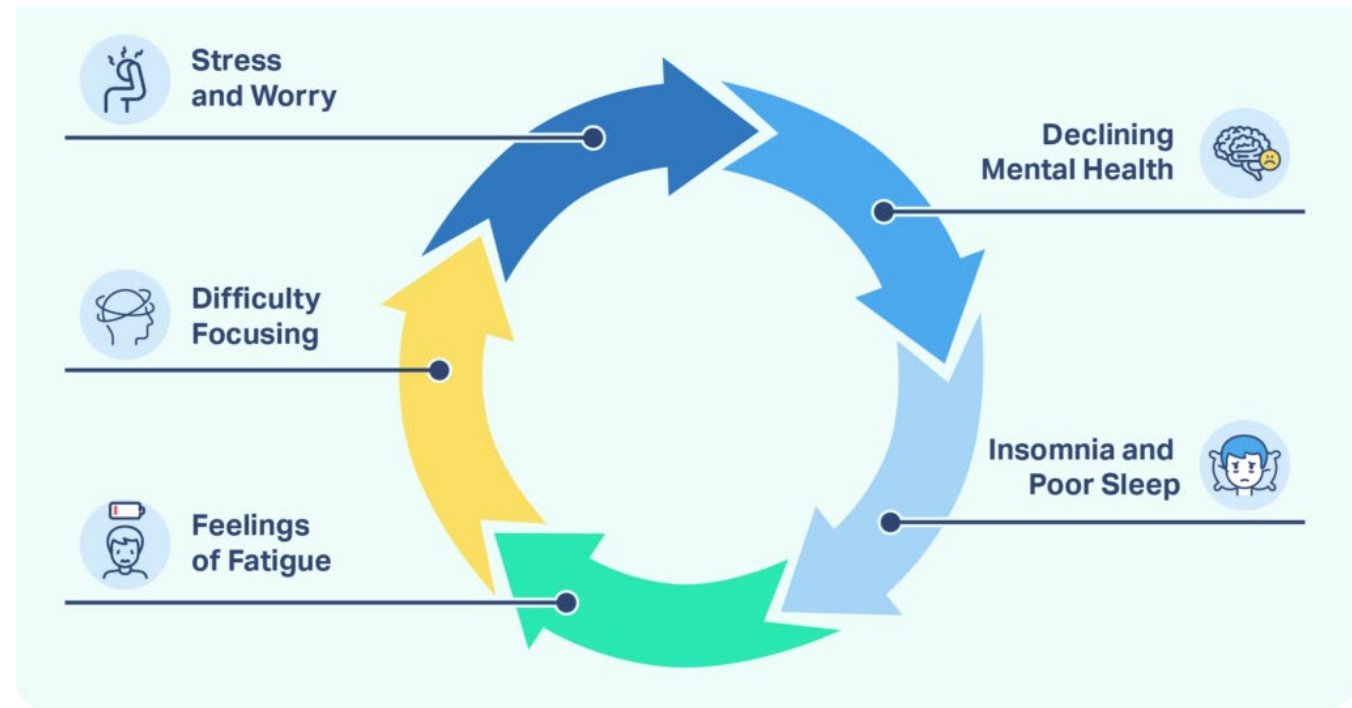
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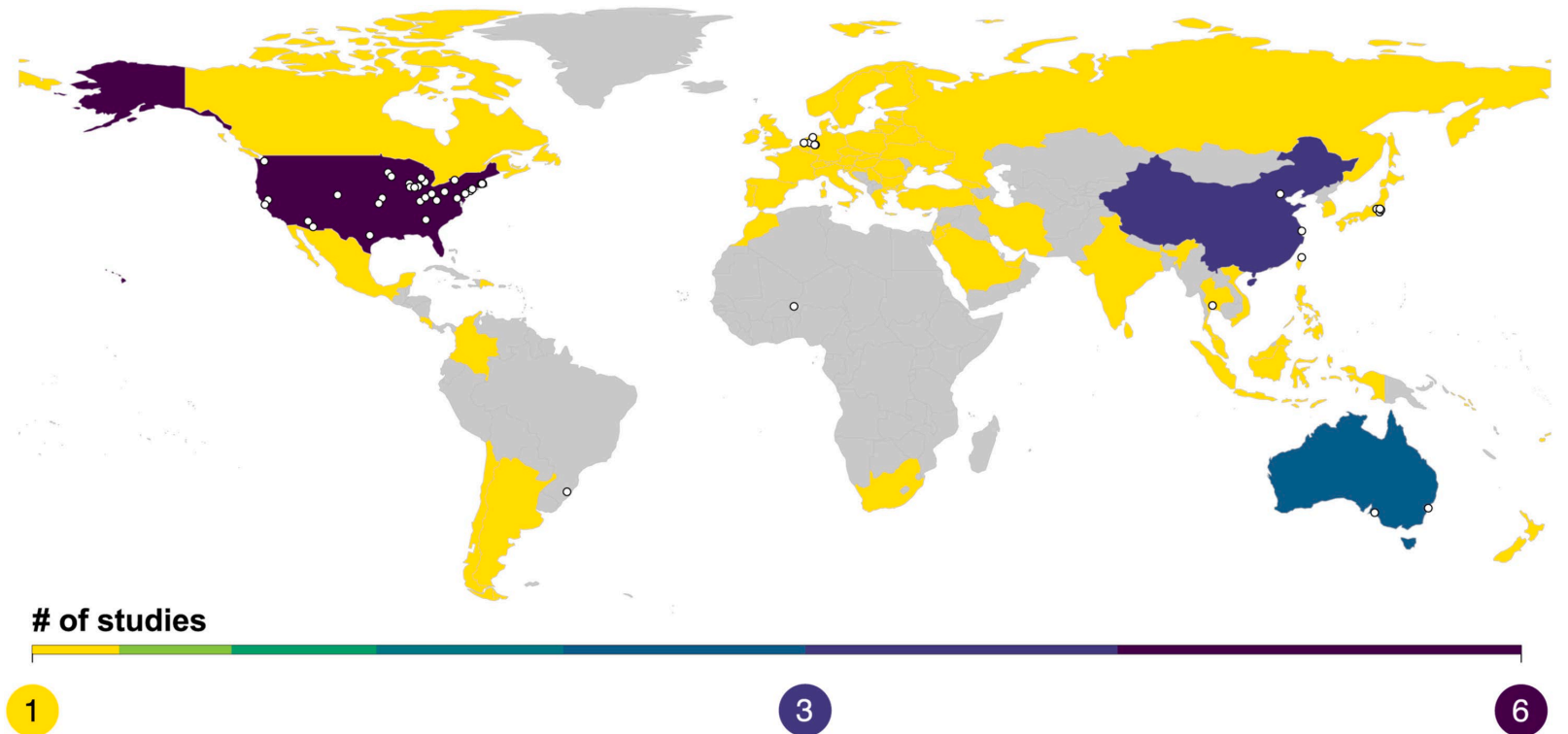
Sleep and Mental Health

- Shorter sleep duration, and poor sleep quality are associated:
 - cardiovascular disease [17]
 - metabolic diseases [18]
 - cancer risks [19]
 - **mental health disorders** [20]



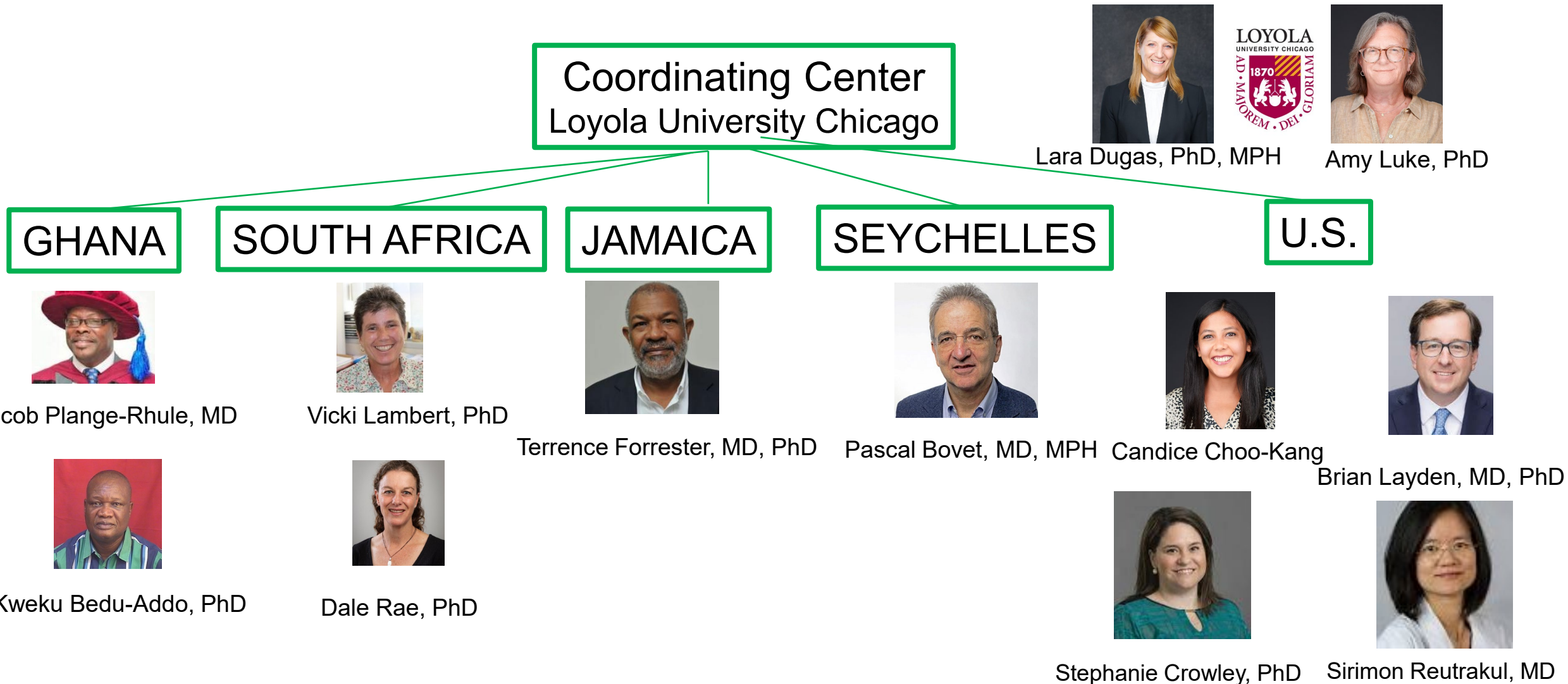
Nighttime temperature and sleep

- Increasing nighttime temperature has been identified as a risk factor, but few studies use measured sleep behaviour and temperature.

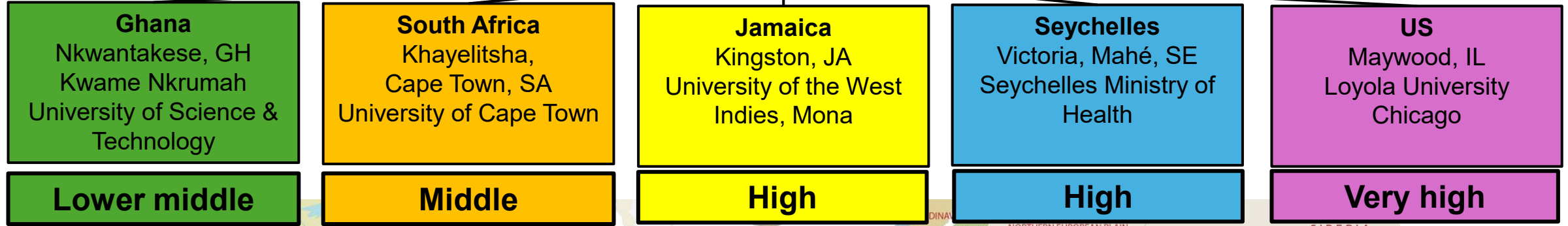


Modeling the Epidemiologic Transition Study (METS)

Overall aim: understand factors contributing to cardiometabolic risk and diabetes in 5 population-based samples of adults of African-ancestry at different stages of economic growth.



**METS Coordinating
Center**
Loyola University Chicago

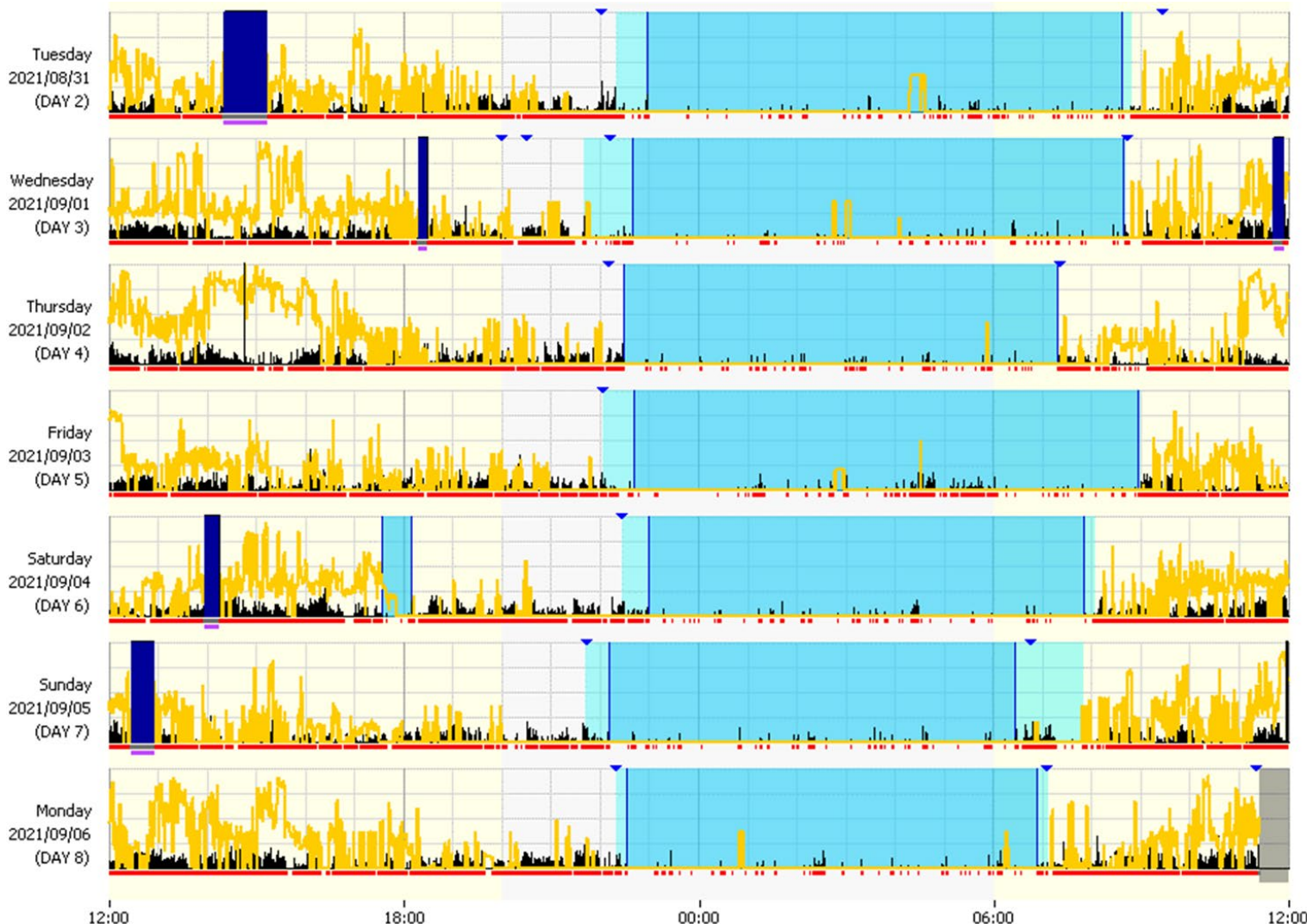


Human Development Index (HDI)
composite measure of nation's longevity, education, & income¹



¹U.N. Human Development Reports: <https://hdr.undp.org/data-center/human-development-index#/indicies/HDI>

Objectively measured sleep behavior



Sleep variables

Onset latency

Sleep efficiency

Wake after sleep onset (WASO)

Percent wake

Average wake bouts

Participant Characteristics (N=809)

	Ghana N=125	RSA N=190	Jamaica N=176	Seychelles N=186	USA N=132
Sex					
Men	42 (34%)	91 (48%)	56 (32%)	92 (49%)	31 (23%)
Women	83 (66%)	99 (52%)	120 (68%)	94 (51%)	101 (77%)
Age (years)	46 [39-53]	39 [33-46]	49 [42-54]	47 [42-50]	49 [44-53]
Weight (kg)	69 [63 - 78]	70 [60 - 88]	84 [69 - 96]	81 [71 - 94]	96 [81 - 110]
BMI kg/m²	26 [23-31]	26 [21-34]	30 [25-35]	29 [25-33]	34 [29-40]
SES					
House density	5 [4-6]	4 [3-6]	4 [2-5]	4 [3-5]	3 [2-4]
Alcohol (yes)	24 (19%)	109 (57%)	57 (32%)	106 (57%)	52 (39%)
Employed (yes)	113 (90%)	69 (36%)	143 (81%)	182 (98%)	81 (61%)
Type of work					
Regular work	95 (90%)	61 (34%)	137 (79%)	166 (97%)	68 (62%)
Shift worker	7 (7%)	14 (9%)	13 (8%)	32 (18%)	35 (41%)



Objective Sleep Characteristics

	Ghana	RSA	Jamaica	Seychelles	USA
Duration (mins)	455 [416 - 485]	558 [496 - 603]	445 [399 - 489]	434 [393 - 476]	436 [389 - 490]
Sleep time (mins)	383 [346 - 409]	449 [403 - 500]	376 [344 - 419]	383 [347 - 419]	384 [348 - 426]
Percent sleep (%)	85 [82 - 88]	83 [78 - 87]	87 [83 - 89]	89 [86 - 91]	89 [85 - 91]
Percent Wake (%)	15 [12 - 18]	17 [13 - 22]	13 [11 - 17]	11 [9 - 14]	11 [9 - 15]
Efficiency (%)	83 [80 - 86]	81 [76 - 85]	85 [82 - 88]	87 [84 - 90]	87 [83 - 89]
Onset Latency (mins)	9 [5-15]	11 [7-17]	7 [5-11]	6 [4-10]	8 [5-12]
Wake after sleep onset	66 [51 - 82]	96 [71 - 126]	59 [48 - 73]	48 [37 - 63]	49 [38 - 70]
Wake bouts (mins)	46 [37 - 57]	61 [50 - 73]	41 [33 - 51]	39 [29 - 48]	38 [27 - 47]
Wake bouts (bouts)	1 [1 - 2]	2 [1 - 2]	1 [1 - 2]	1 [1 - 2]	1 [1 - 2]
Sleep bouts (mins)	46 [38 - 56]	60 [49 - 73]	41 [33 - 51]	38 [29 - 48]	37 [27 - 47]
Sleep bouts (bouts)	9 [7 - 11]	8 [7 - 11]	10 [8 - 13]	11 [9 - 13]	12 [9 - 15]

420 mins=7 hrs

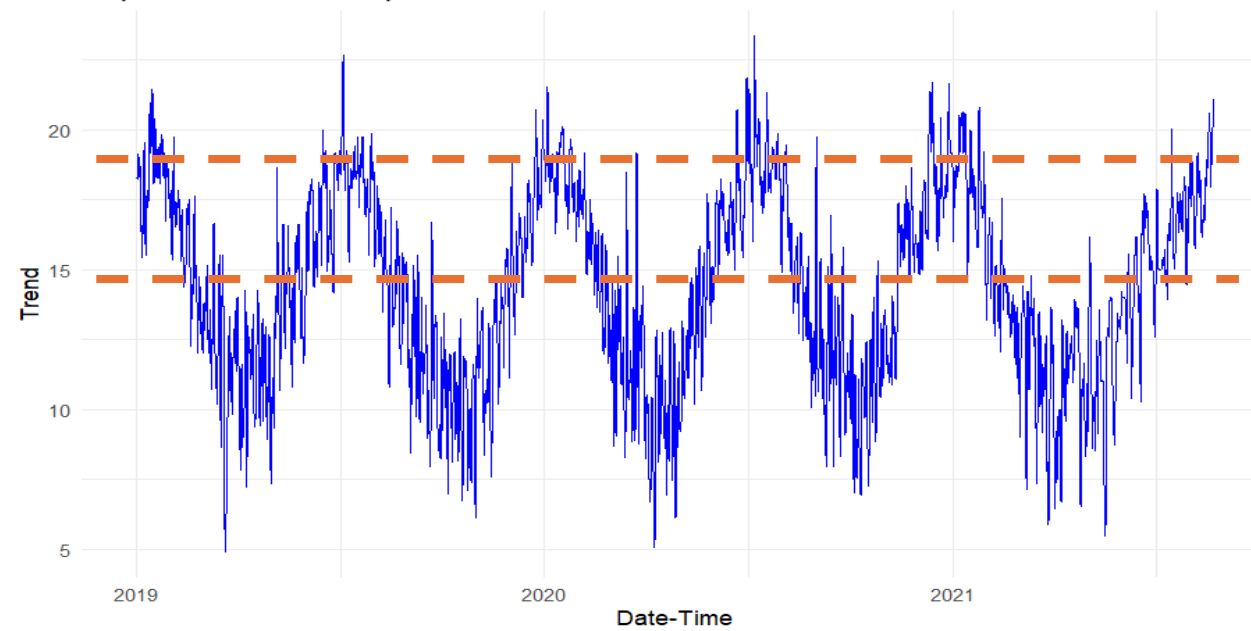
450 mins= 7.5 hrs

480 mins= 8 hrs

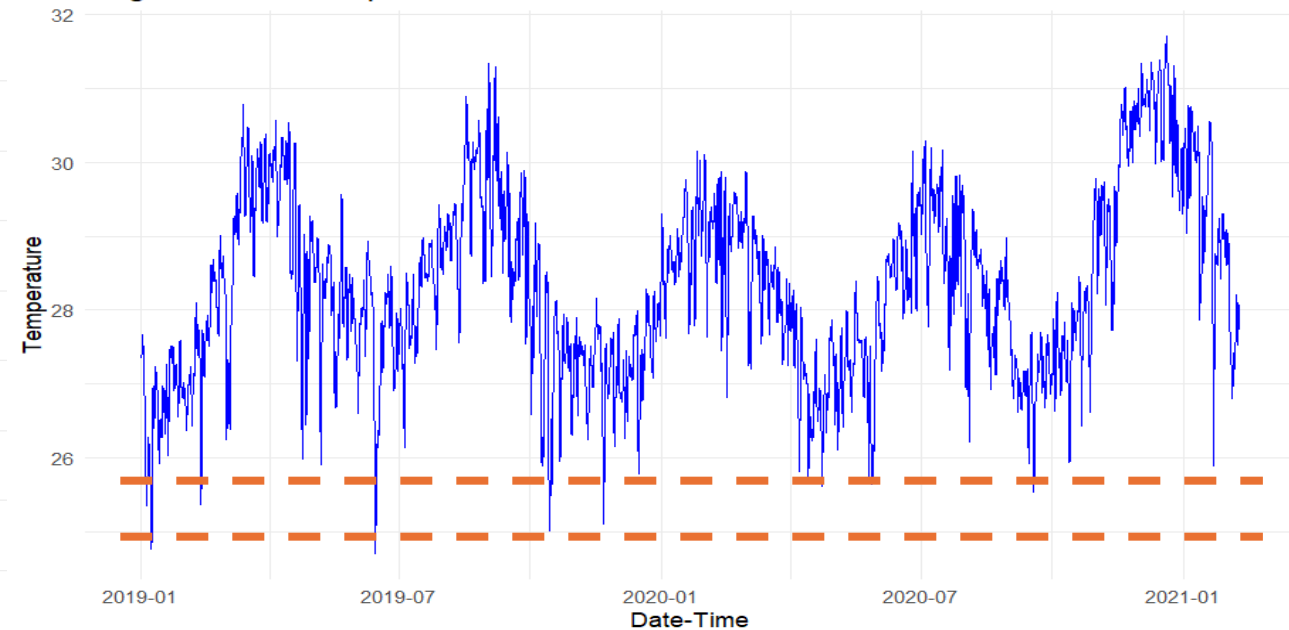
540 mins=9 hrs

Current sleep recommendations for adults: 7-9hrs (420-540 mins)

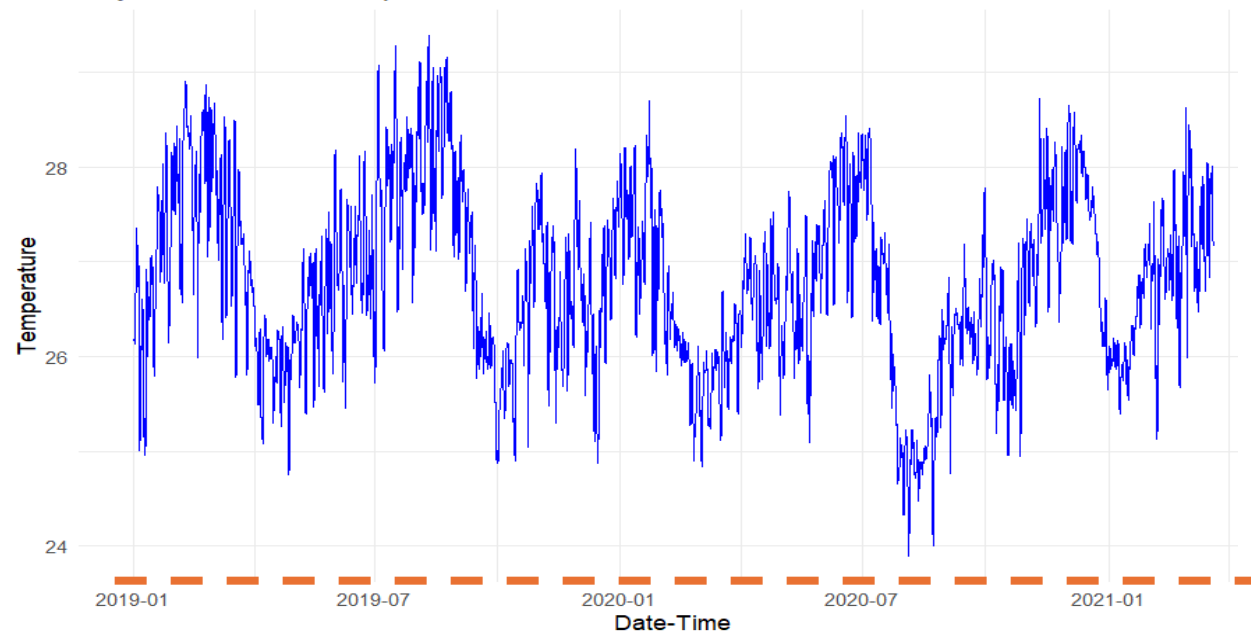
Cape town Trend Component



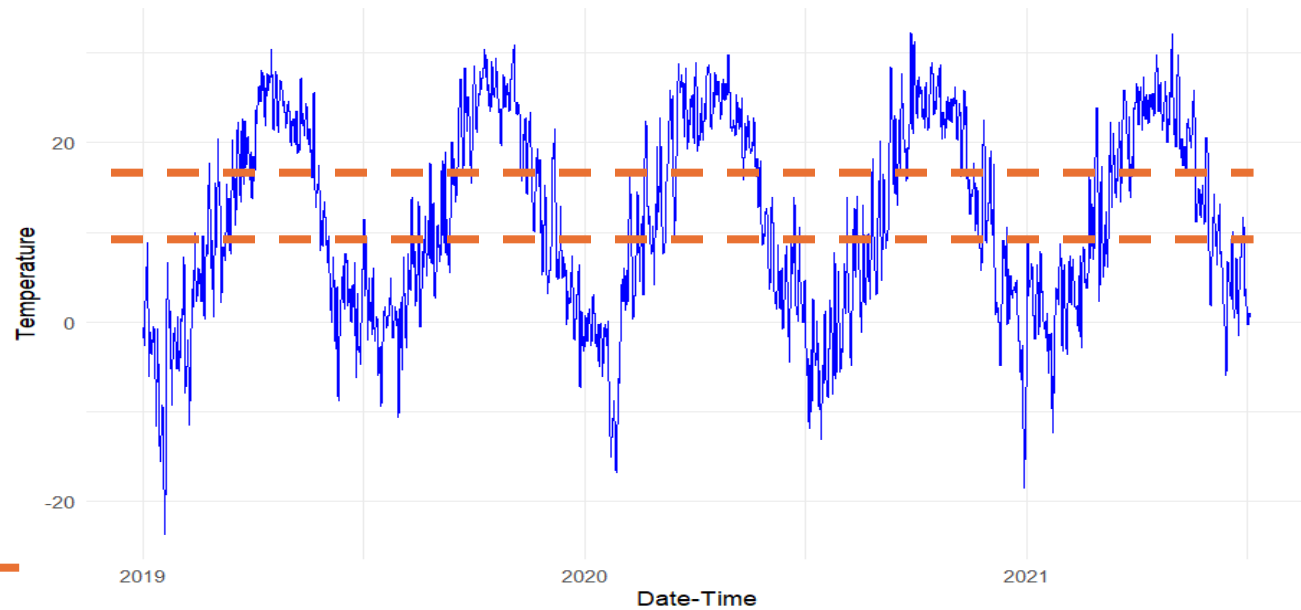
Kingston Trend Component



Seychelles Trend Component

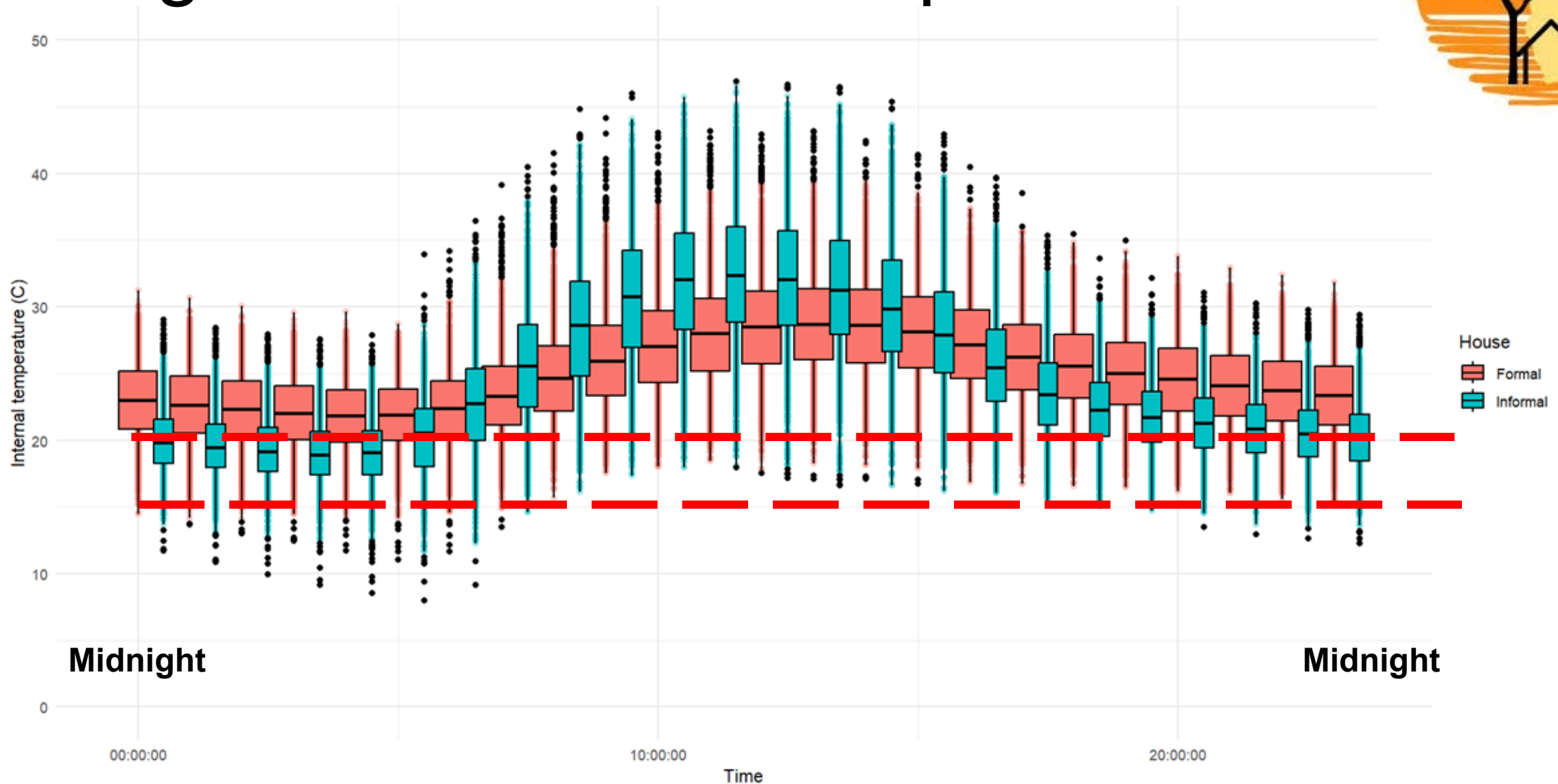


Chicago Trend Component





Nighttime bedroom temperature



Nighttime temperature and sleep

	Sleep Efficiency	WASO	Percent Wake	Average Wake Bout	Duration	Sleep onset Latency
Temperature (°C)	-0.05 (0.001)	-0.005 (0.02)	0.05 (0.001)	0.59 (0.002)	-0.002 (0.001)	0.01 (0.15)
Age (years)	0.01 (0.05)	-0.008 (0.54)	0.01 (0.59)	0.01 (0.64)	0.01 (0.32)	0.01 (0.34)
BMI (kg/m ²)	-0.009 (0.49)	-0.0004 (0.70)	-0.01 (0.56)	-0.01 (0.43)	-0.01 (0.38)	-0.01 (0.46)
Sex (Women)	-1.63 (<0.001)	-1.68 (<0.001)	-1.63 (<0.001)	-1.72 (<0.001)	-1.64 (<0.001)	-1.69 (<0.001)
Hypertension (Yes/No)	1.24 (<0.001)	1.29 (<0.001)	1.24 (<0.001)	1.26 (<0.001)	1.27 (<0.001)	1.25 (<0.001)
Employed (Yes/No)	-0.91 (<0.001)	-0.88 (<0.001)	-0.90 (0.002)	-0.88 (<0.001)	-1.05 (<0.001)	-0.99 (<0.001)
Alcohol (Yes/No)	-0.80 (<0.001)	-0.79 (<0.001)	-0.80 (<0.001)	-0.80 (<0.001)	-0.73 (<0.001)	-0.77 (<0.001)
Roof type	0.03 (0.83)	-0.02 (0.88)	0.03 (0.83)	-0.02 (0.86)	0.04 (0.78)	0.02 (0.89)
Wall type	-0.05 (0.440)	-0.07 (0.32)	-0.06 (0.40)	-0.07 (0.31)	-0.07 (0.32)	-0.05 (0.42)
House density	0.003 (0.93)	-0.0003 (0.99)	0.003 (0.92)	0.008 (0.81)	0.01	0.004 (0.89)
Site						
South Africa	-12.97 (<0.001)	-1.3 (<0.001)	-12 (0.001)	-12.87 (<0.001)	-12.6 (<0.001)	-12.88 (<0.001)
Jamaica	-8.96 (<0.001)	-8.7 (<0.001)	-1.1 (0.001)	-8.2 (<0.001)	-7.9 (<0.001)	-7.9 (<0.001)
Seychelles	1.62 (<0.001)	1.53 (<0.001)	1.62 (<0.001)	1.56 (<0.001)	1.40 (<0.001)	1.48 (<0.001)
United States	-9.08 (<0.001)	-9.13 (<0.001)	-9.6 (<0.001)	-9.01 (<0.001)	-9.30 (<0.001)	-9.23 (<0.001)

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