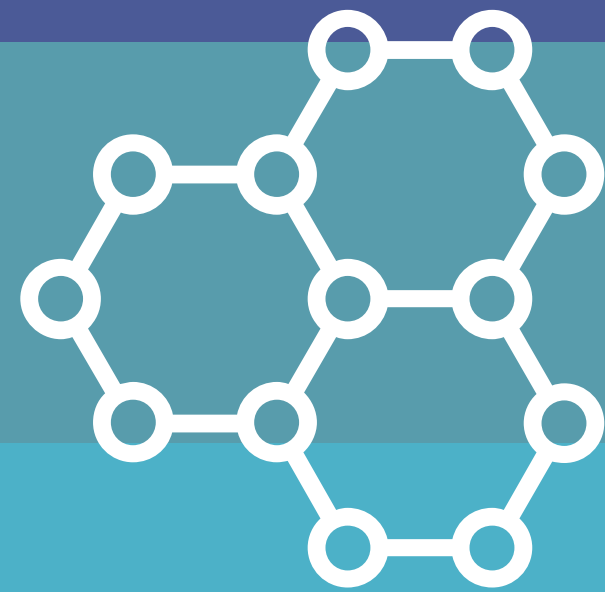




# Optimizing Sleep for Pilots - Resilient Pilot

Stu Beech and James Bennett



## The 24 Hour Sleep System and Jet lag

What can we take away that is important for pilots?

## James's Story

James talks about his experience with Proff Mathew Walker and how he resolved his sleep issues.

## Fitness, Hydration and Nutrition

We think of sleep as an essential component of wellbeing and embracing good physical, vitality and happiness.

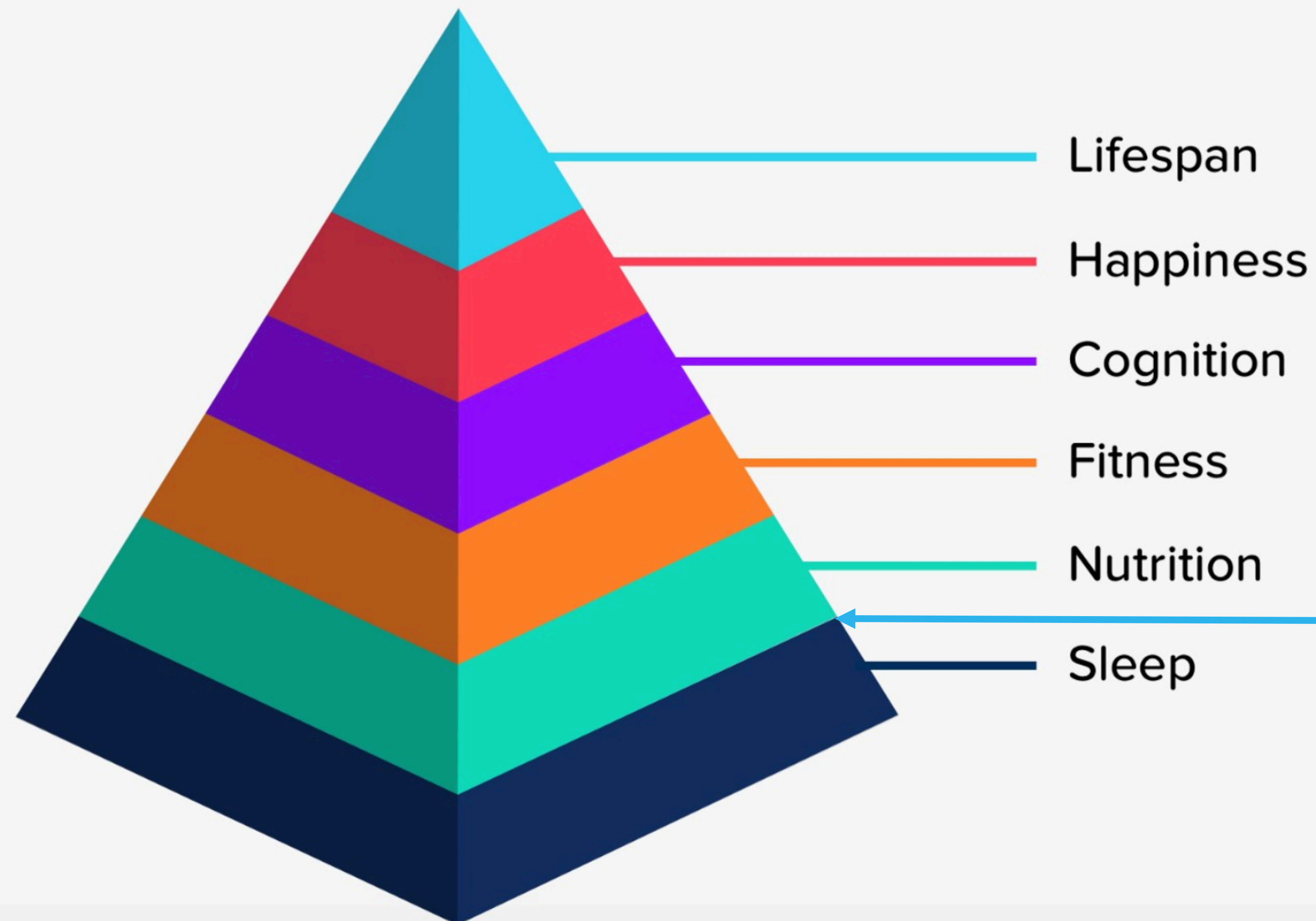
## The LONG and SHORT of it Tool Kit

Long Haul and Short Haul tool Kits to optimize your sleep as Pilots



# Optimising Sleep as Top Priority

To achieve an optimal state of being, one must take a holistic and systematic approach, whereby you look at your body as a set of individual systems that make up the whole, and optimise them in order of priority, from sleep, diet and fitness, to your cognition and longevity.



## Total system approach:

1. Sleep
2. Nutrition
3. Fitness

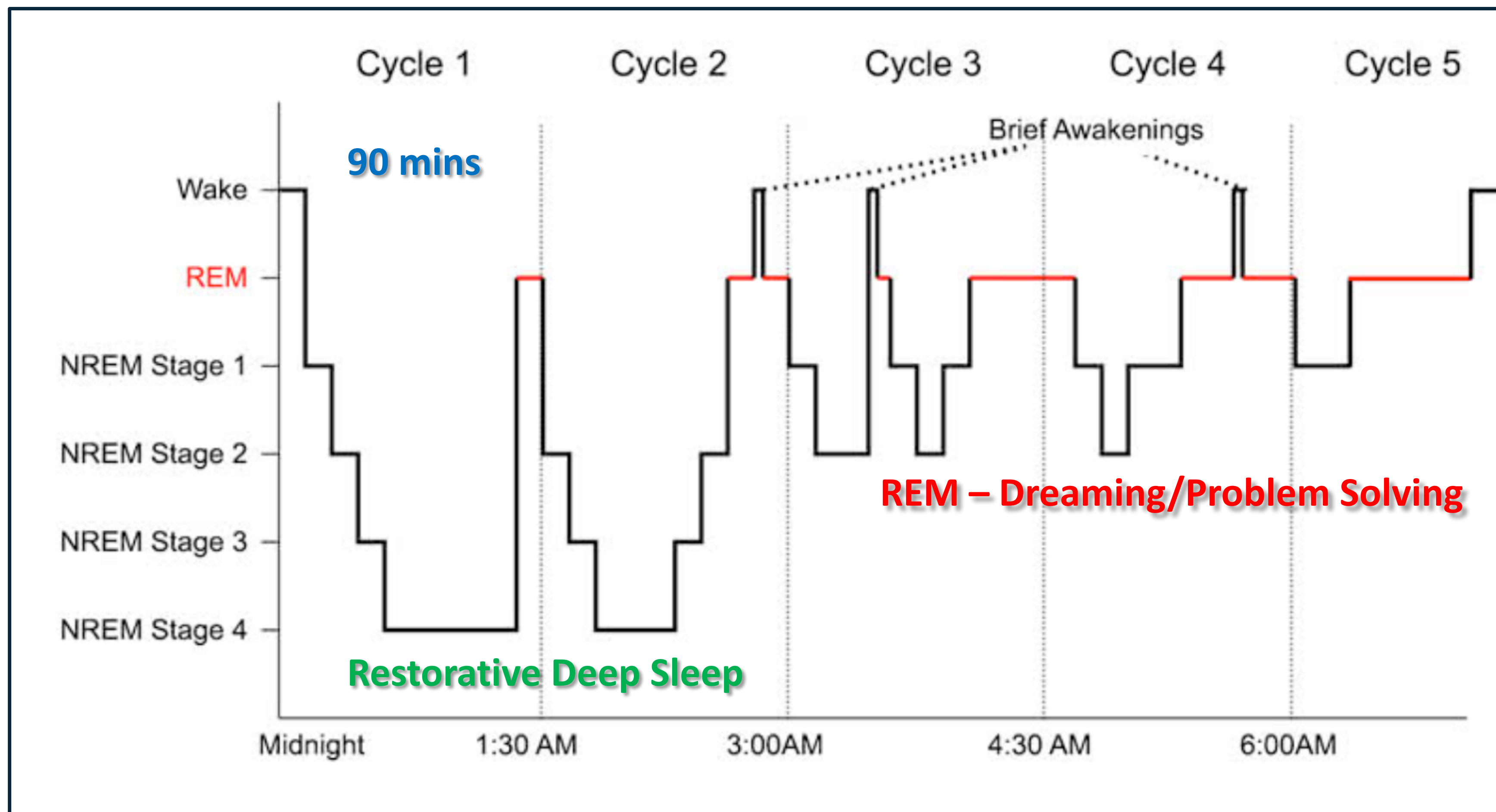
And Breathe

4-7-8



# Optimising Your Sleep Cycle -24 Hour System

NHS - Most adults require between 6-9 hours of sleep per sleep opportunity



- Important to Organise Sleep in cycles.
- At least 3 cycles for effective NREM and REM Sleep.
- Program Sleep Cycles as part of 24 hour system
- Factor the system into rosters

## Lark or an Owl?

- Determine what type you are
- Performance based upon Lark or Owl
- Owl – Adenosine high concentrations in the morning generating sleep pressure and reduced performance
- **Control and Bid for late starts to counteract the natural effect**





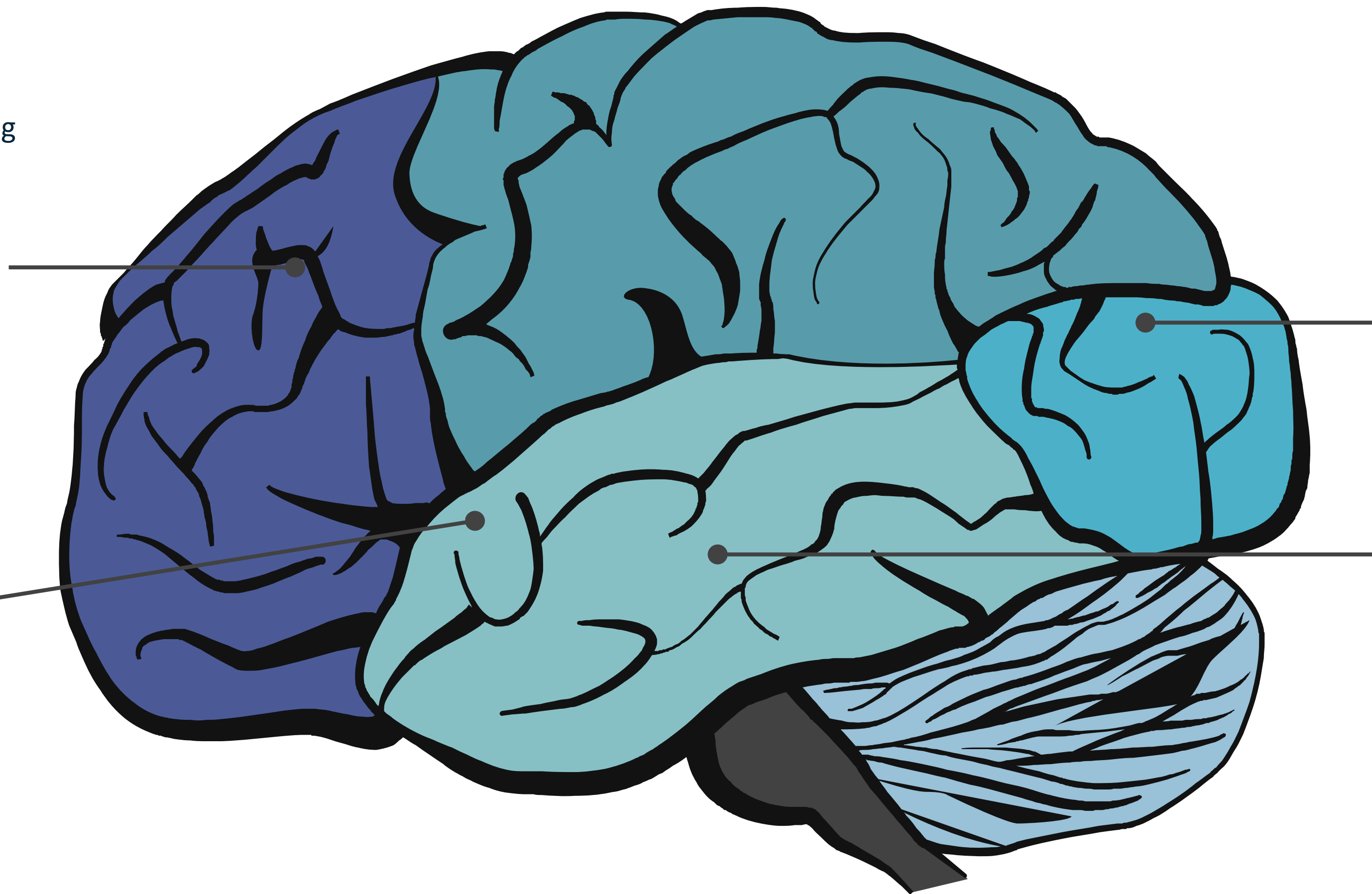
# A Sleepy Brain

## Prefrontal Cortex

- Head Office of the Brain
- Responsible for logical reasoning
- Larks – Efficient in the morning
- Owls – Efficient Later in the day
- **Bid for Late rosters or Earlys**

## Hypothalamus

- Sits **The Suprachiasmatic Nucleus SCN**
- Uses light to reset the Sleep/Wake Cycle.
- Central Conductor or clock
- **Effect of Daylight as Pilots**



## Adenosine

- Sleep Pressure builds as a result of production of adenosine from waking
- Desire to sleep builds through to bedtime
- **Caffeine Latches onto receptors blocking the sleepy action of Adenosine – Tactical Caffeine consumption.**

## Pineal Gland

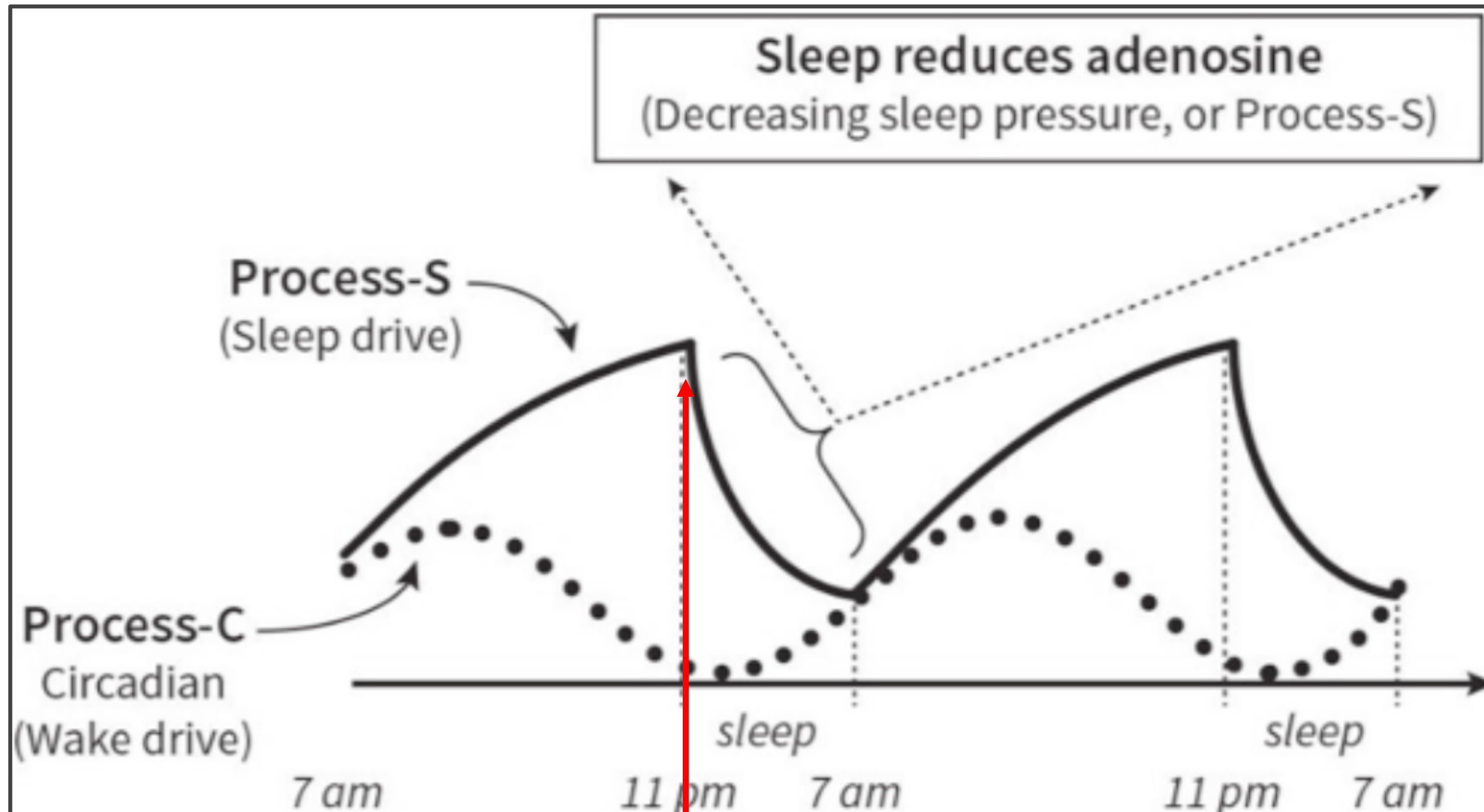
- Signals from **SCN** communicate nighttime
- Increases Production of **Melatonin.**
- Initiates Sleep Process
- Decreases through the night in concentration
- **Supplements NOT allowed for UK Pilots**





# Two Factors Regulating Sleep and Wakefulness

## ADENOSINE



Source: Why We Sleep, Matthew Walker, 2017

Greatest desire to sleep  
How can we recreate this as Pilots?

## MELATONIN

### Our Circadian Rhythm

- 24 Hour biological clock controlled by the SCN
- Release of Melatonin
- Temperature regulation to help induce sleep

### Level of Adenosine in the Brain

- As the day progresses the chemical builds
- At the moment we wake.

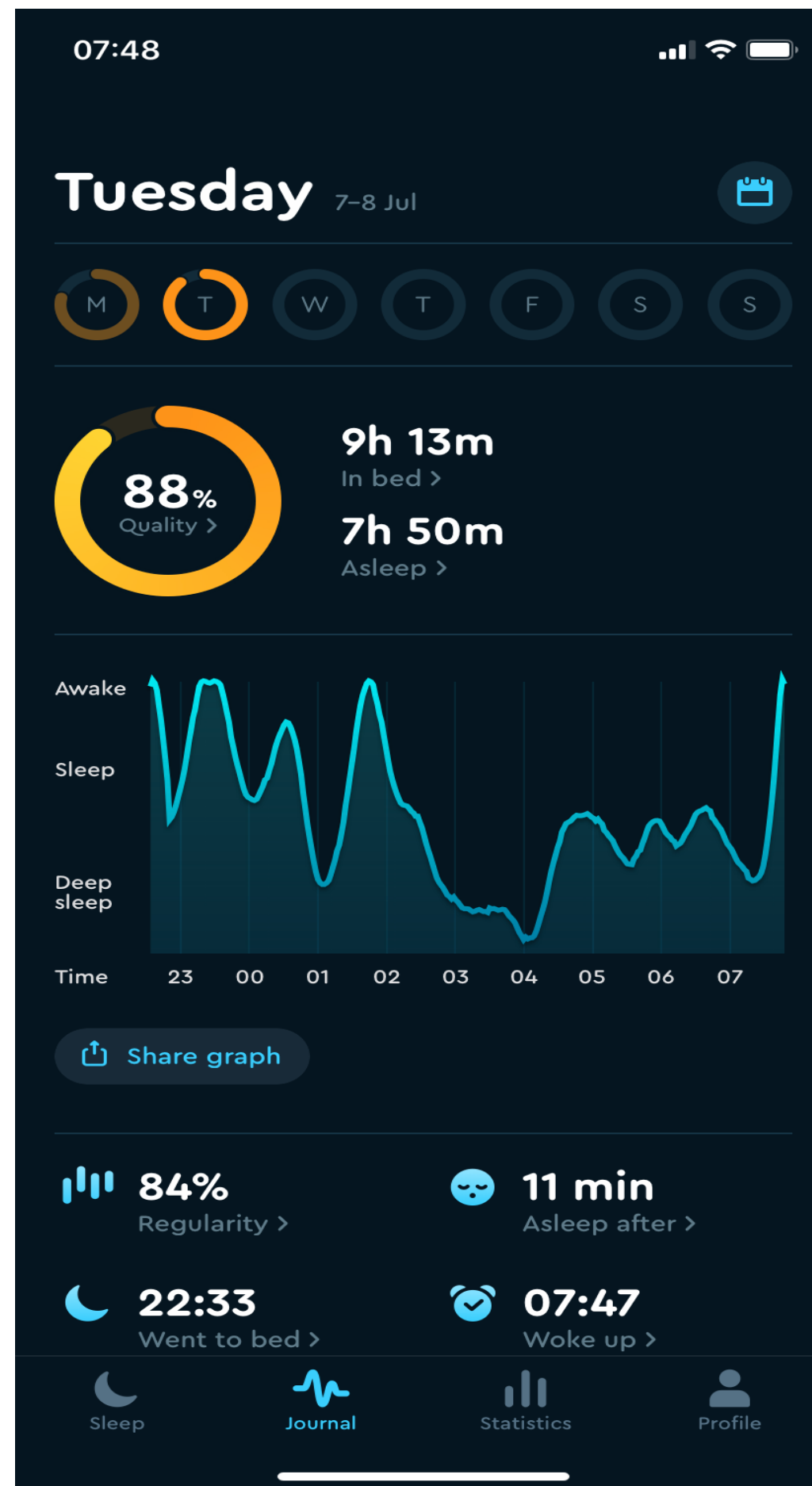
### Strategies for Pilots:

- Determine optimum sleep cycles
- Set Bedtime and wake time based upon cycle
- Work backwards 6 hours for last caffeine consumption
- Bright light when waking
- Total darkness 30 mins before bedtime.
- Reduce Blue Light on phones - Night Mode
- Herbal Pills can recreate similar effect to adenosine
- Use Sleep Cycle App to monitor and wake at Optimum time.

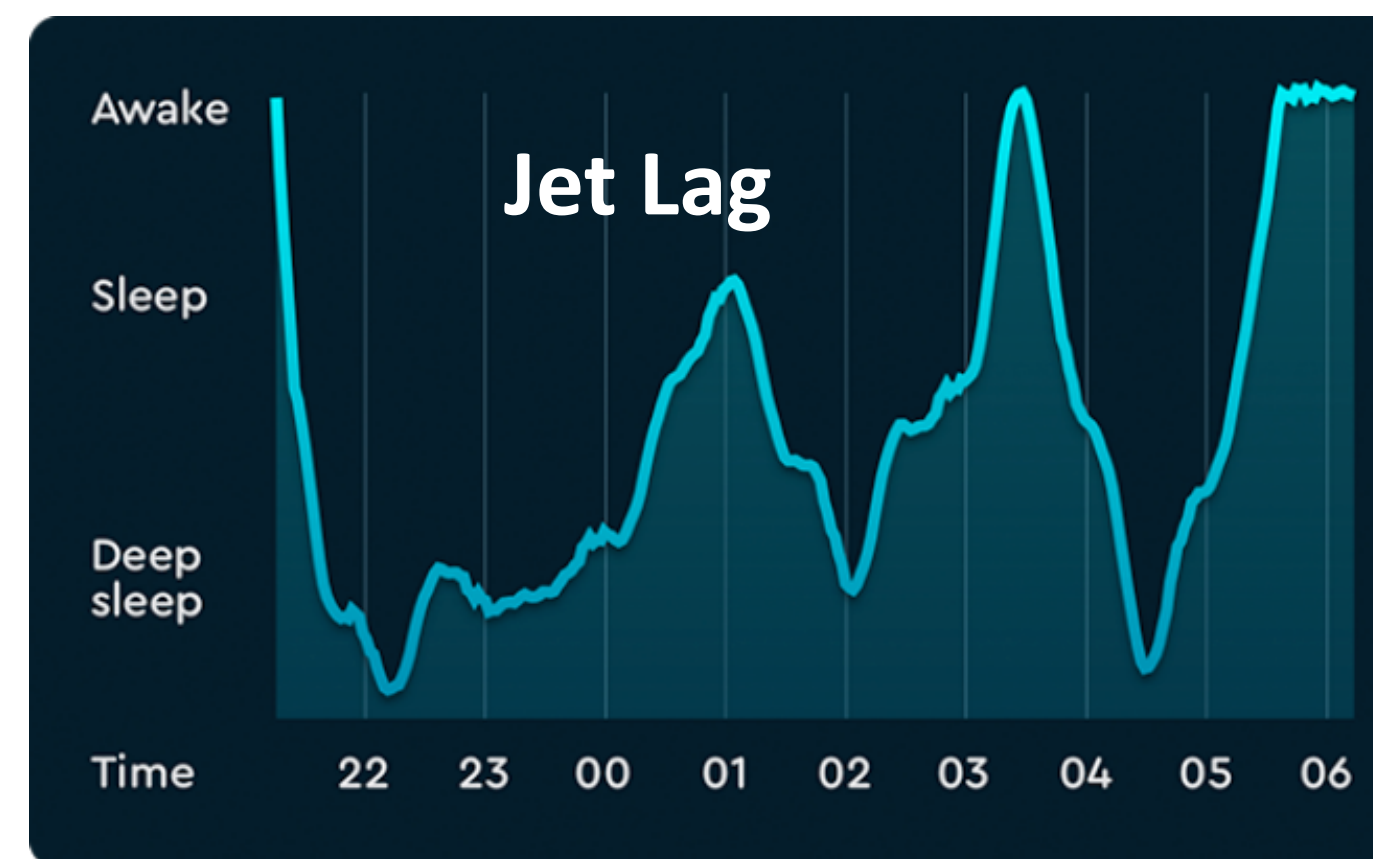




# Effects of Jet-lag and Alcohol



- Intense Sleep Pressure
- Circadian Rhythm out of Sync
- Initial Deep Sleep
- Alcohol same depressant effect
- Roughly 4 hours in – Wake up
- Circadian Clock takes over
- Depressant effect of Alcohol weakens



- Reduce Caffeine intake 6 hours before approx sleep opportunity
- Minimise Alcohol 3 hours before Sleep
- Prepare 3 days prior to duty using Jet Lag Optimiser.
- Plan Wake up exercise routine
- Followed by nutritious meal





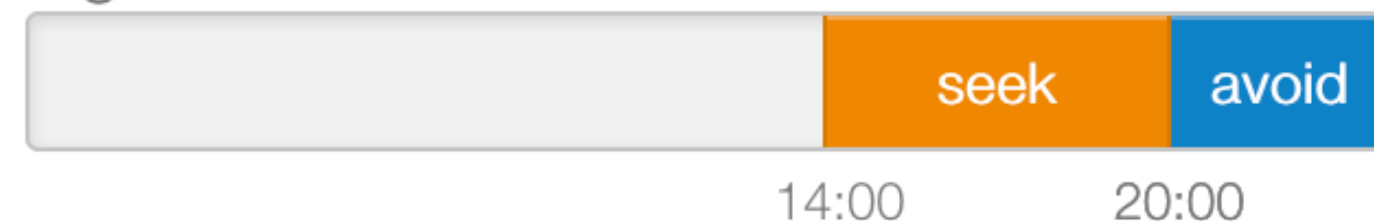
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# Jet Lag Optimizer Tool

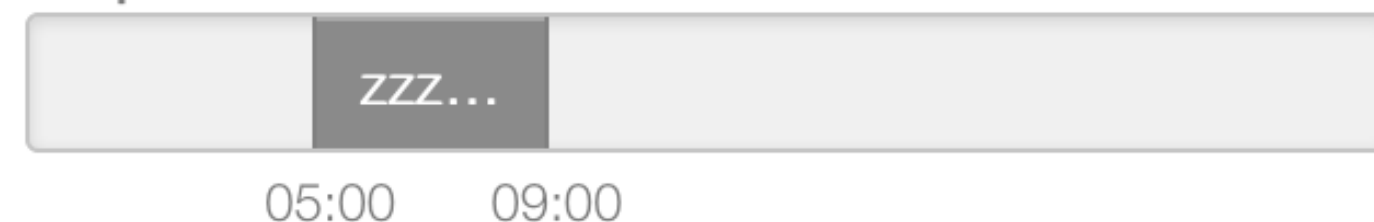
Day 1

Feeling sleepy:  
18:30

Light



Nap



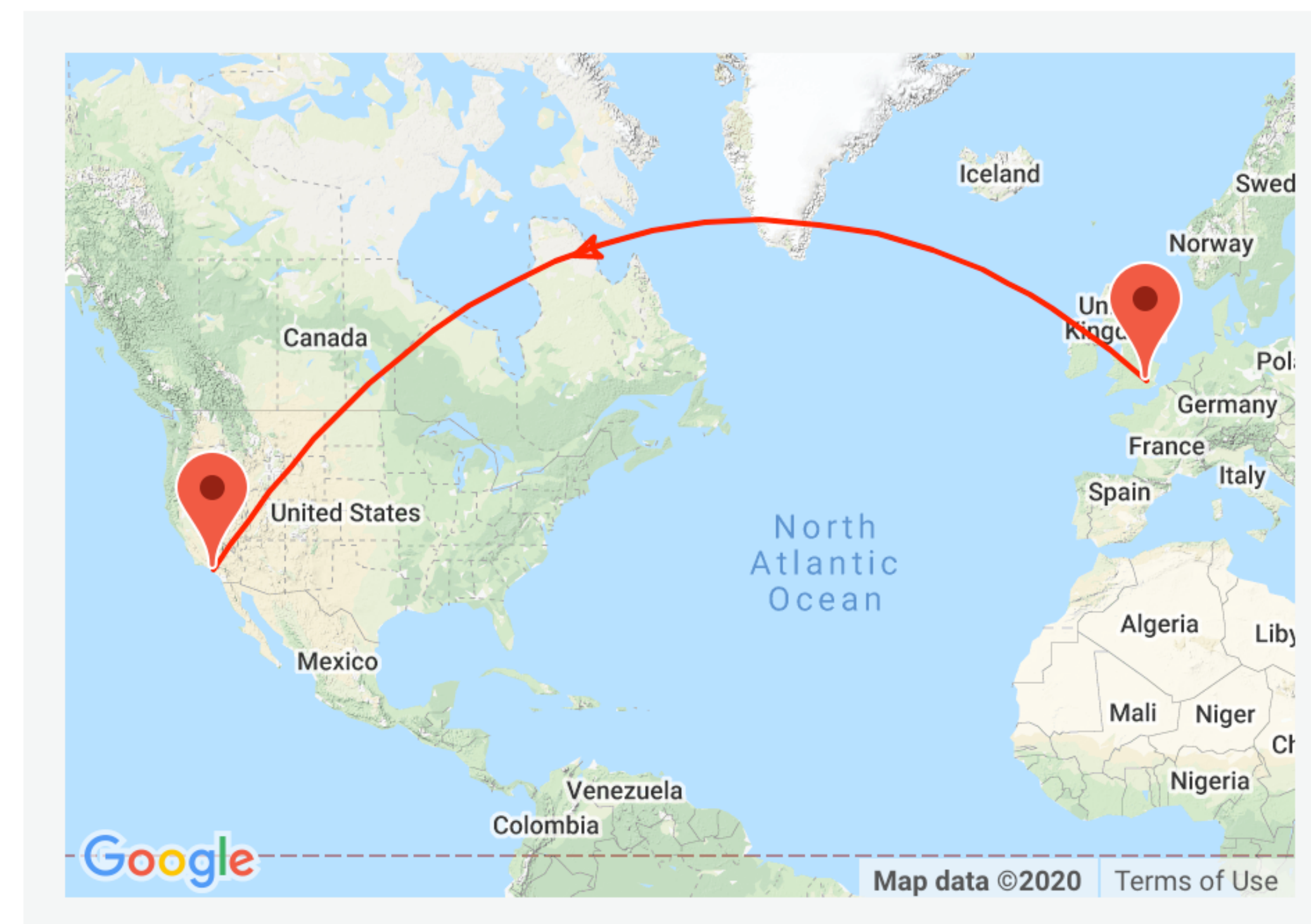
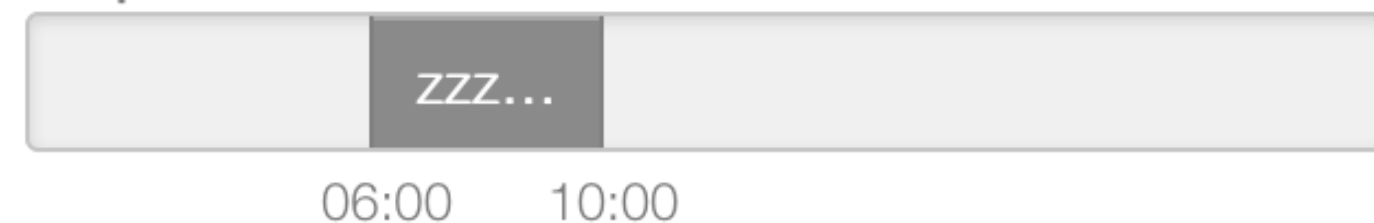
Day 2

Feeling sleepy:  
19:30

Light



Nap



Compact two-in-one device works as a SAD light and wake-up light. Blue-enriched white LEDs gradually brighten to fully wake you in the morning; five light levels provide bright light therapy during the day to lift mood, boost concentration, restore natural energy and treat the symptoms of SAD.





# James' Story

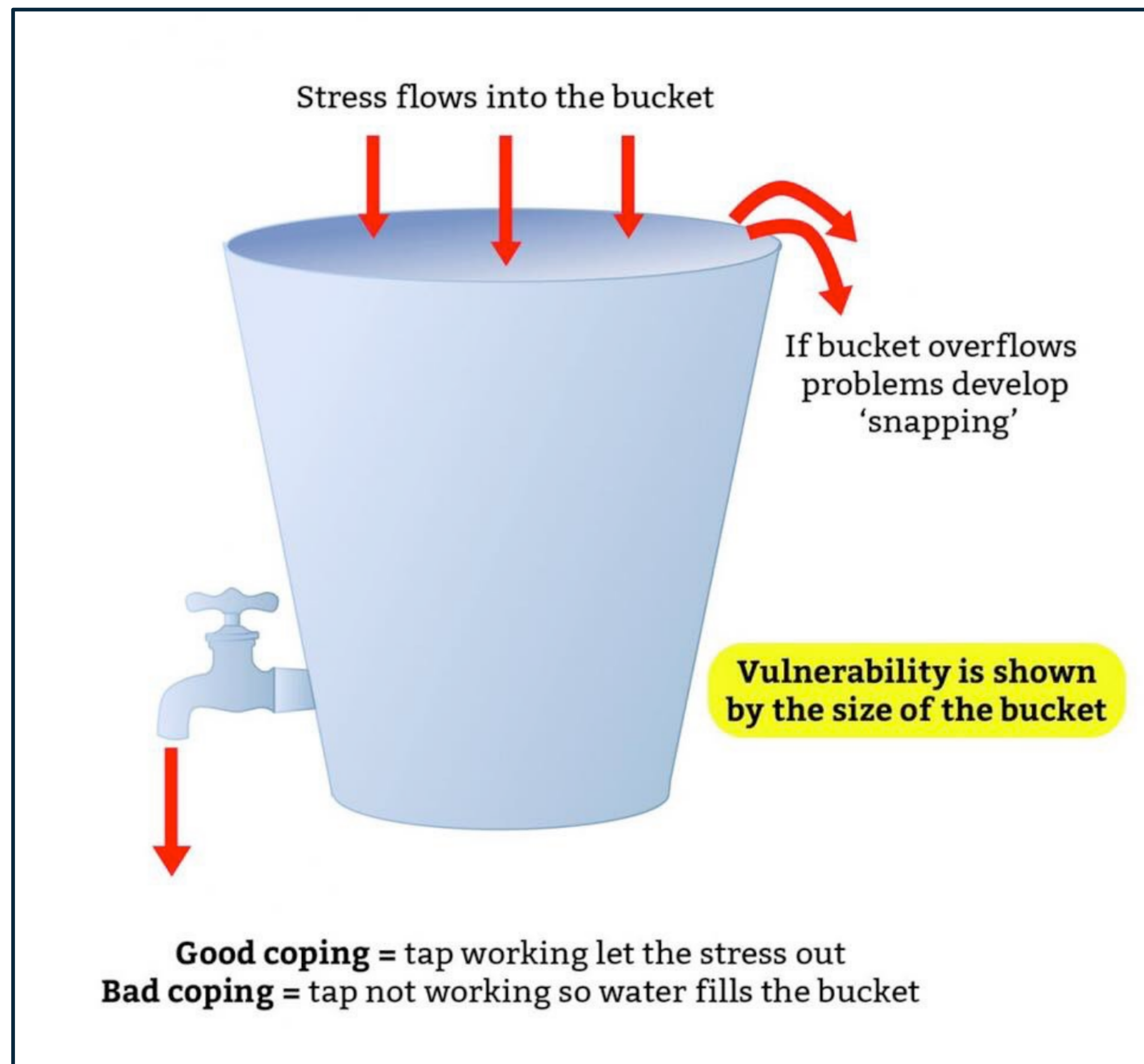


## Consultation with Professor Matthew Walker

- Brief description of events
- Help that was available to me
- Meeting with Prof. Mathew Walker
- Consider different 'helplines' that may be available to you to talk or get help. A friend? Work? Family? Doctors?



# Stress Bucket



## EXERCISE:

1. Quickly Find Pen and paper
2. Draw your stress bucked/container
3. In 2 mins write down as many stresses you can
4. Enquire how you can reduces the size of the stresses and pressure in container



# Importance of Hydration, Nutrition and Fitness

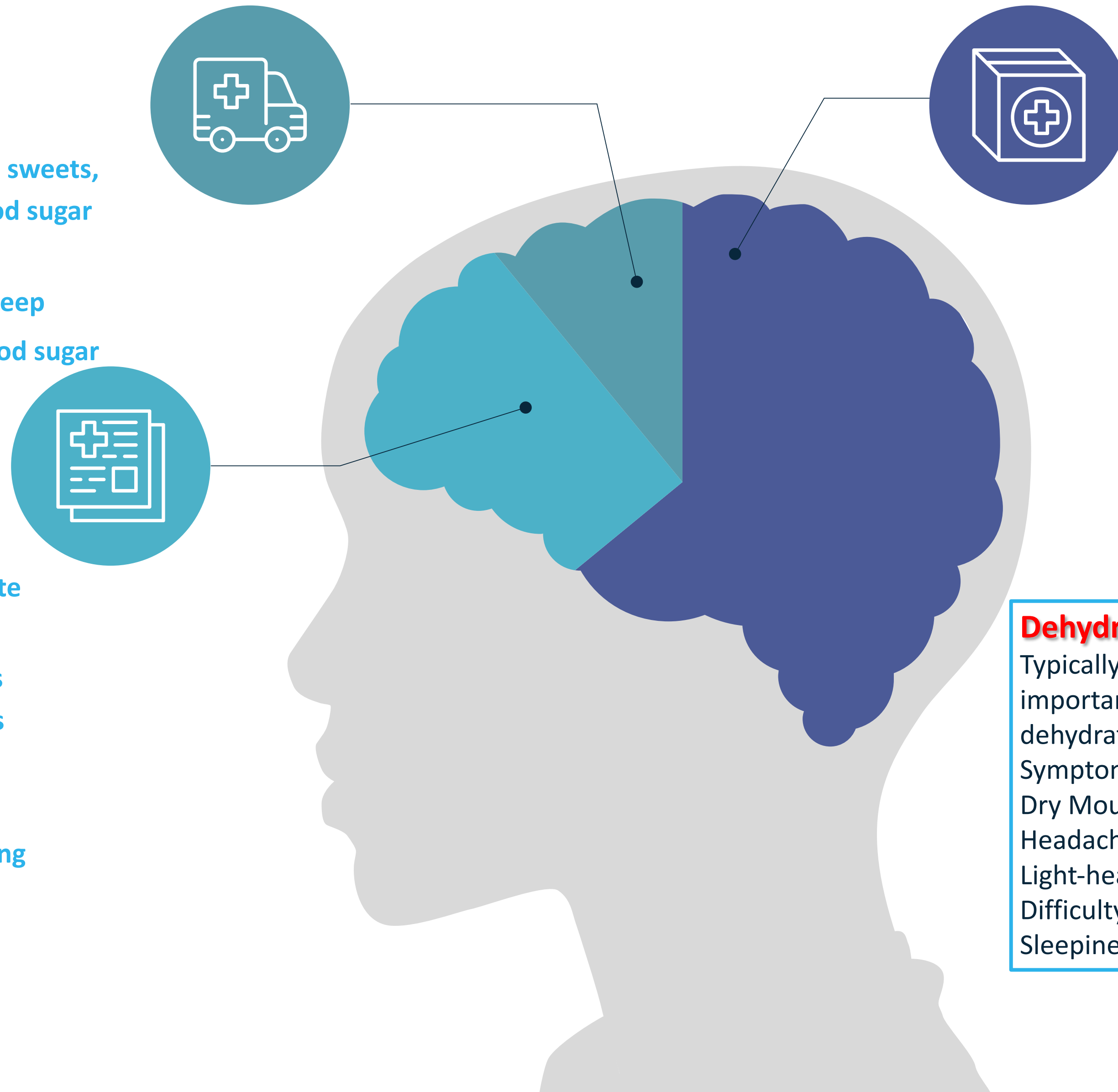
Tweak these elements to improve our sleep

## Nutrition

- Avoid simple sugar foods such as sweets, chocolate generally to avoid blood sugar level crash.
- Avoid Caffeine 6 hours prior to sleep
- High Protein Diet – regulates blood sugar
- Awareness of nutritional intake
- Be aware of crew food available

## Fitness

- Are you a morning person or a late person?
- It doesn't entirely matter but it is important to identify what works best with your routine and body clock & make it work for you.
- The best rule to follow is exercising at the same time every day - regardless of morning, noon or evening.
- Plan ahead facilities down-route



## Hydration

- Water is better than other drinks generally. However, other drinks will still hydrate you – Food also contains a lot of water -Soup
- Around 2L of fluid per day in addition to other drinks while flying.
- 8 x 8 Rule – 8 Glasses fluid - 8 Ounces
- Consider climate and aircraft altitude, exercise duration, activity level to adjust this accordingly.

### Dehydration: Reduction in performance

Typically symptoms are very subtle at first, so it important to be proactive in avoiding any kind of dehydration.

Symptoms:

Dry Mouth

Headache

Light-headedness

Difficulty Concentrating

Sleepiness and Fatigue





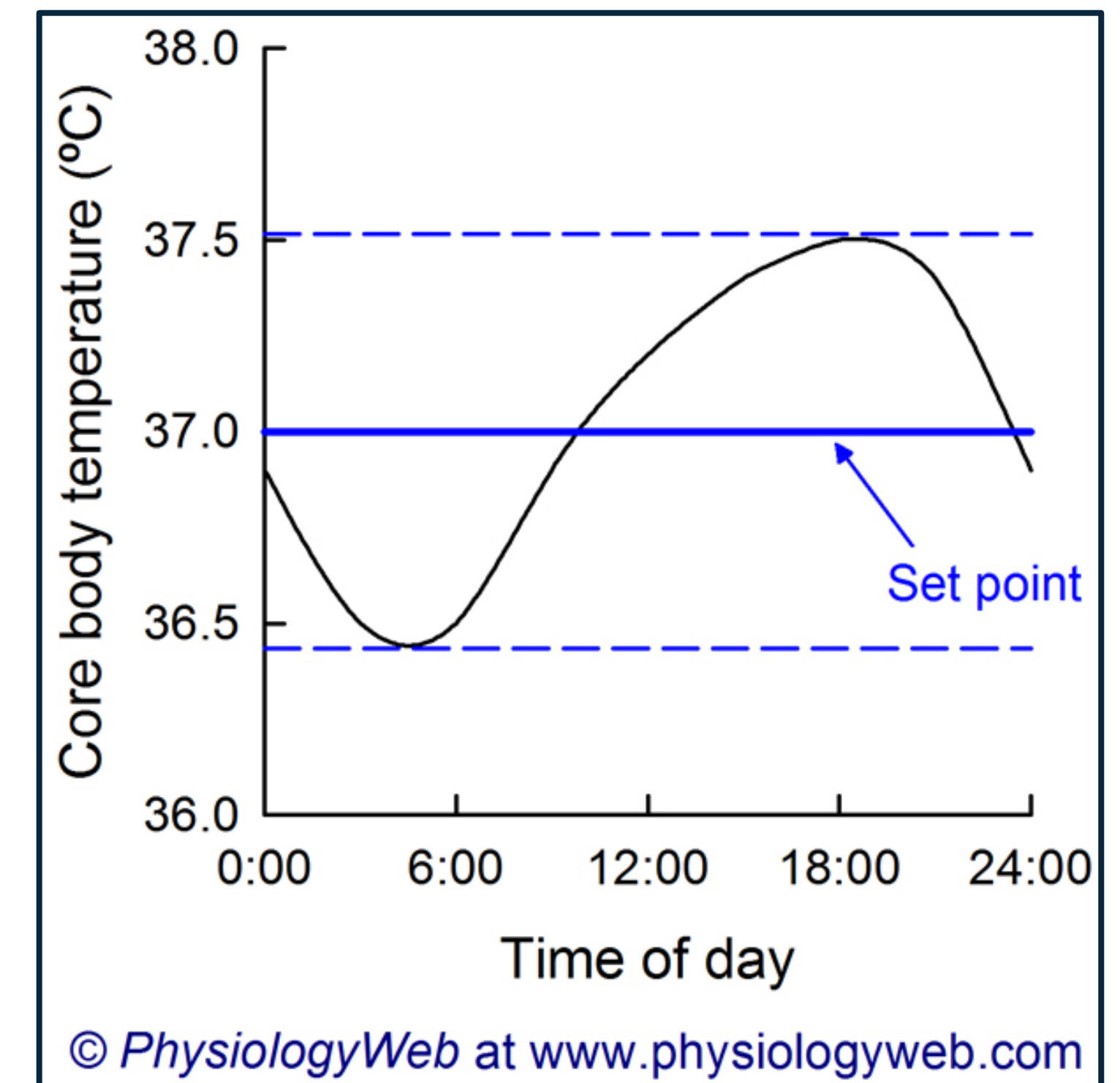
# What Time of Day to Work Out?

## •Morning workouts:

- Typically mean you're less prone to distractions. ...
  - Beat the heat. ...
- Healthier food choices. ...
  - Increased alertness. ...
- More overall energy. ...
  - Better focus. ...
  - Better mood. ...
- Support weight loss.



## Afternoon Workouts



**Your core body temperature is on the rise!**

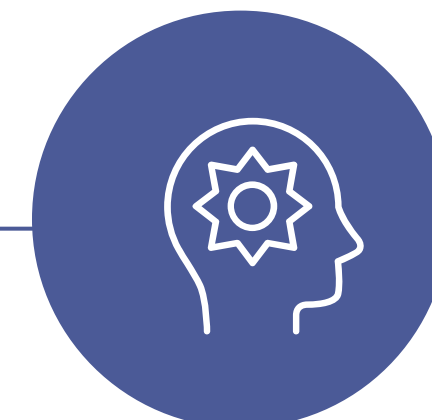


# SHORT Haul Tool Kit

Optimising In-flight Performance



**S**peak up if keeping things yourself or struggling



**H**ydrate 6-8 glasses of fluid



**O**ptimise workout for body clock



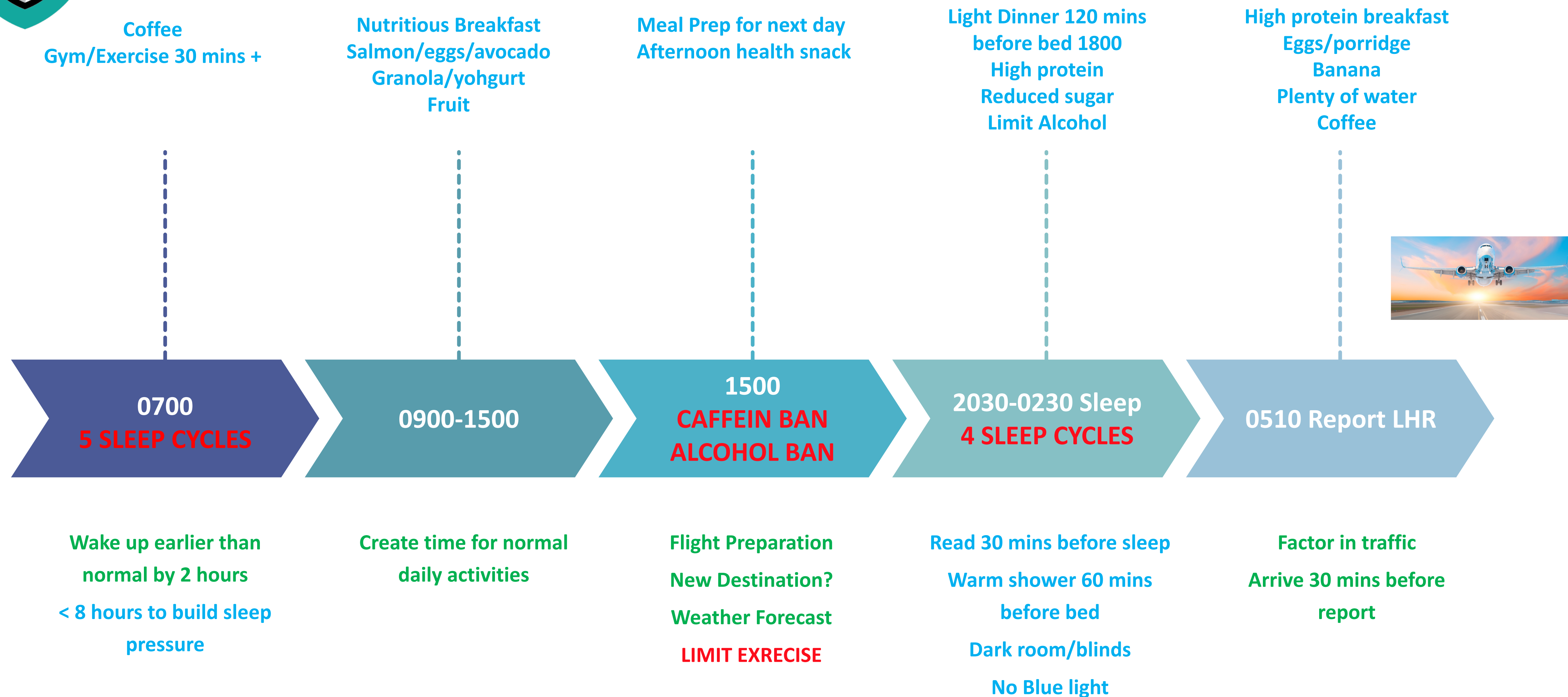
**R**est and **R**ecover – 4-6 Sleep Cycles



**T**ime meals and workouts:  
Avoid exercise 2 hours before bed



# Short Haul Report Timeline – LHR/MAN







# LONG Haul Tool Kit

Optimising In-flight Performance

NASA's research showed that naps really can fully restore cognitive function at the same rate as a full night's sleep. The space agency found that pilots who slept in the cockpit for 26 minutes showed alertness improvements of up to 54% and job-performance improvements by 34%

<https://science.nasa.gov> - 2005 NASA Directorate

## Limit

High content sugary foods and carbs –to reduce spikes and slumps, improving performance and lowering fatigue.

## Optimise – NASA 26 MIN Nap

Combine Caffeine consumption prior to optimum nap. Double effect to improve alertness for another 2 hours

## Nutrition and Hydration

Plan in-flight high protein meals and 2L of water per 10 hour flight.

## Generate

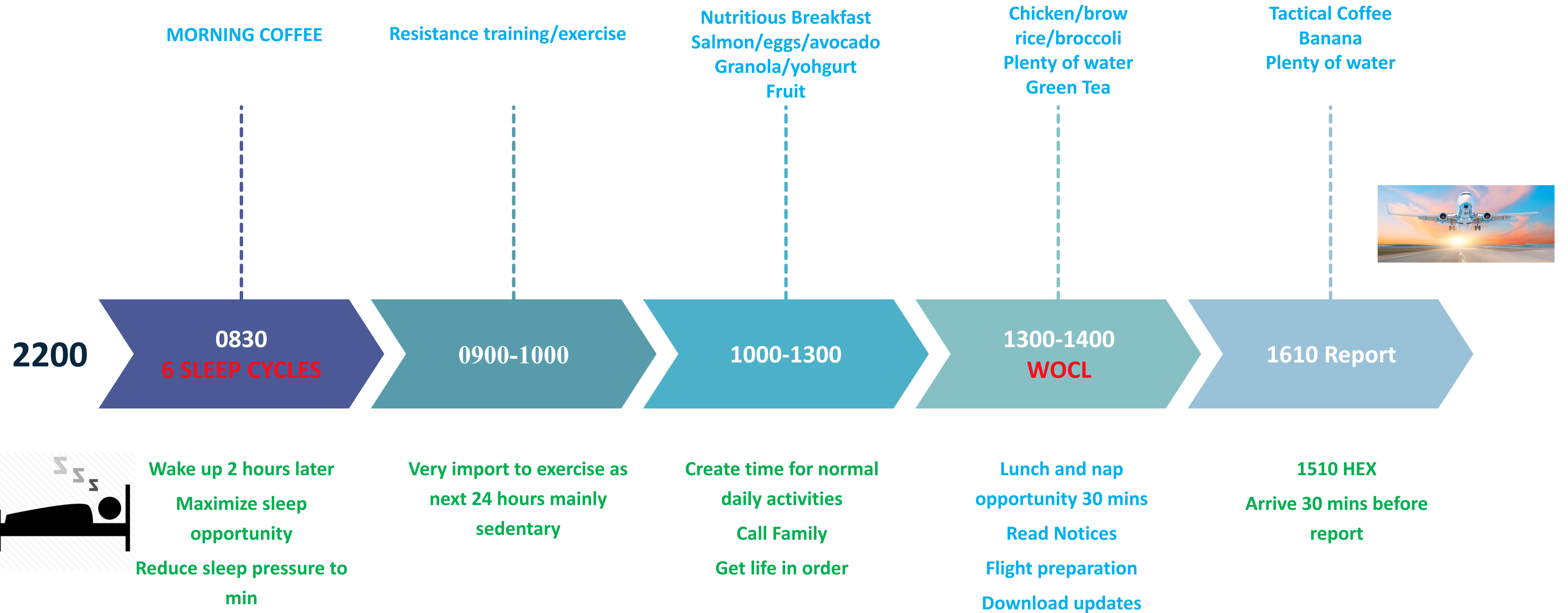
Use period of alertness and low work loads to brief and plan ahead so crew can optimise in-flight rest.

Factor in 5 mins after rest for inflight stretching and breathing

4-7-8



# Long Haul Report Time Line – LHR/JNB - Operating







# A Well Spent Day Brings Happy Sleep Any Questions?



## Resilient Pilot