


Metro South Health  
Princess Alexandra Hospital

## Surviving shift work

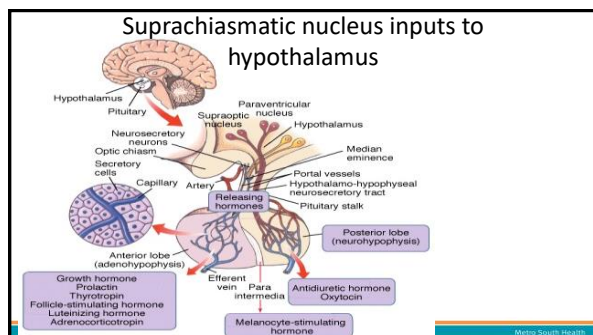
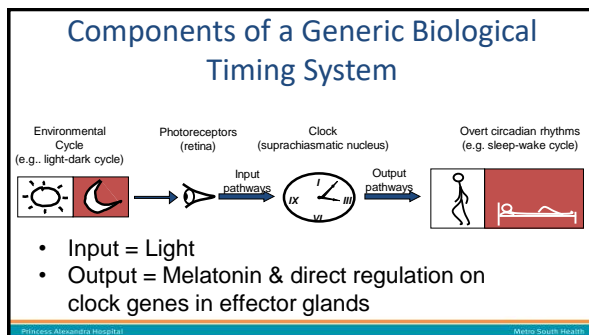
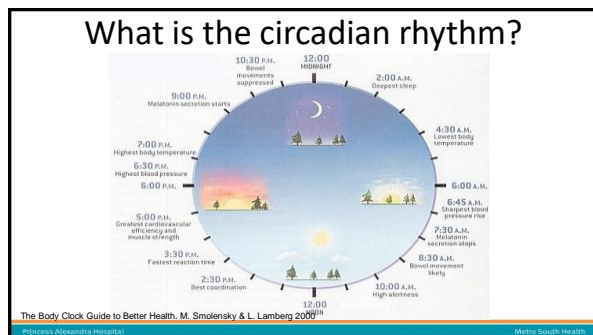
Dr Claire M. Ellender  
Respiratory and Sleep Physician  
Princess Alexandra Hospital



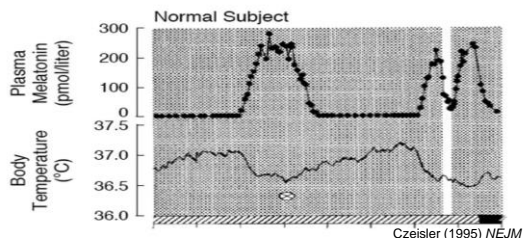
## Overview

- Conflicts - nil relevant
- Circadian rhythm
- Impacts of shift work on health
- Case example
- Circadian rhythm management in your patients

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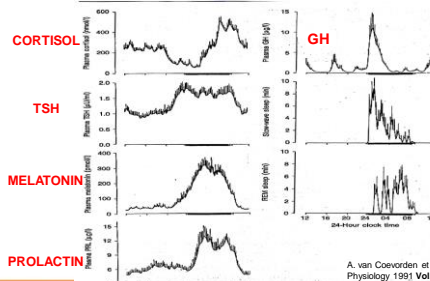
## Light acutely inhibits melatonin production



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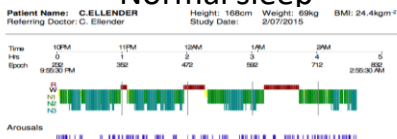
## Most hormones have diurnal variation



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## Normal sleep



### SLEEP STAGES

Stage 1: alpha and theta waves (initial)

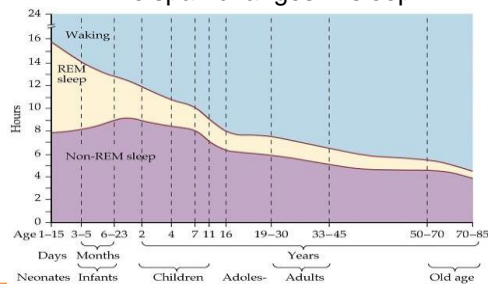
Stage 2: K complexes, sleep spindles

Stage 3: 20-50% delta (SWS)

REM (emergent stage 1)

Young Adult sleep patterns consist of 7-8 hours of 90-110 min. repeating cycles

## Life span changes in sleep



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## Sleep disturbance Acute Illness

Environmental	Disease	Treatment
Light	Pain	Patient-care activities, ie vital signs, medication administration, diagnostic testing
Noise	Delirium	
	Increased arousal threshold	Dysynchrony with ventilation
	Lower melatonin amplitude e.g. in sepsis	Medications

Impact = sleep tends to be

- Severely fragmented, although total sleep time over 24 hours may be normal
- Sleep may be evenly distributed between day and night Increased time in stage 1 sleep
- Decreased time in stages 2, 3, and REM
- Increased arousals and awakenings

SLEEP 2006;29(5): 707-716.

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## Outcomes for Shift Workers

- Disturbed sleep
- Decreased TST (average 5hrs)
  - Worse with permanent night shifts
  - Rapid rotations worse than slower rotations
- Increase workplace errors
- Increased motor vehicle accidents

Akerstedt Sleep Med Clin. 2009 Jun 1; 4(2): 257-271.

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## Issues

1. No sleep disordered breathing
2. Insomnia
3. Shift work shift wake disorder

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## Principles of management

Improve Alertness	Improve sleep
Forward rotating roster, avoiding long duration shifts (>10hrs)	Adequate opportunity for sleep. Nap for 30 minutes to 2 hours before evening or night shifts to supplement main sleep episode
Caffeine - high frequency low dose	
Strategic blue light exposure	Strategic blue light avoidance
Exercise	Exercise
Scheduled napping - 20 to 40 minutes taken during night shifts (eg. between 2 am and 3am)	Environment
(Stimulant Medications in Shift workers SWD)	Timing of meals
	Melatonin
	(Hypnotic medications short term)

MJA 2013; 199: S11-S15

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## Evidence?

Agent	Trials	Conclusion
Melatonin	9 RCTs (n = 251)- Doses varied 1-10mg	Increased sleep length (low evidence grade) No dose response effect
Armodafinil	2 RCTs (n = 345) - titrated dose 50-150mg prior to night shift	Improved sleepiness scores and MSLT (moderate + poor evidence grade)
Modafinil	1 RCT (n = 153) 200mg	Improved sleepiness scores and MSLT (moderate + poor evidence grade)
Caffeine plus naps	1 RCT (n = 53) 300mg	Improved sleepiness scores
Zopiclone	1 RCT (n = 60) post night shift	No significant improvement in TST

Lina J. et al. Pharmacological interventions for sleepiness and sleep disturbances caused by shift work. Cochrane Database of Systematic Reviews 2014, Issue 8. Art. No.: CD010506.

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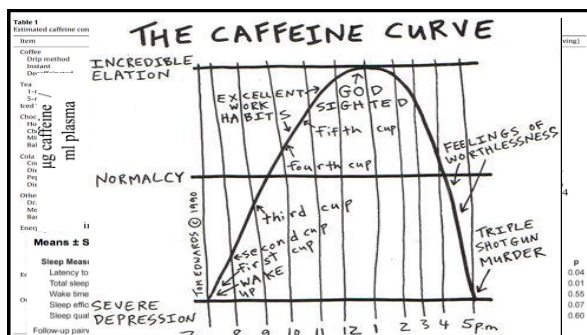
## Pharmacotherapy

- Melatonin - 1-5mg immediate release, 2mg slow release

## Modafinil & Ar

- Stimulant
- Pros
  - Improve alertness during shift work, & benefit is relatively modest
- Cons
  - Nausea
  - Headaches
  - Tremor
  - Anxiety
  - Cost

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## Blue light exposure



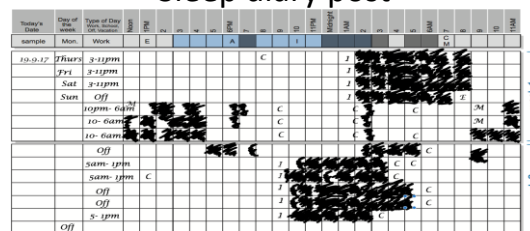
## Blue light avoidance



## Mr JW - Interventions

- Exercise / Diet / Light therapy / Melatonin
- Day shifts
- Evening shifts
- Night shifts

## Sleep diary post



## Take Home Messages

- Circadian rhythm = master clock
- Light is key
- Shift work has multi-modal impacts
- Insomnia is common even years later
- Intervention – light, exercise, diet & stimulants as last resort

<http://sleephub.com.au/tag/shift-work/>

## Good Luck!

