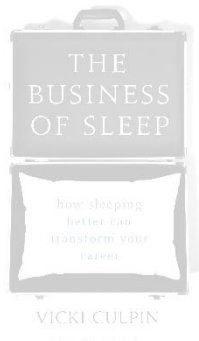
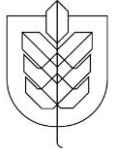


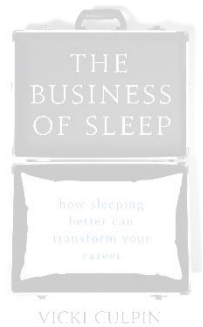
The Business of Sleep – The Wake Up Call

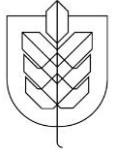
Vicki Culpin



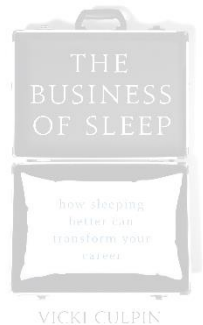


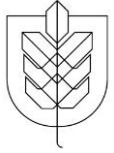
Last week, John, a junior doctor, admitted that for the past six months he had battled with alcoholism. John felt that initially he was able to cover up the effect of his drinking at work, but lately this has become more and more difficult, and he now feels that his drinking is significantly impacting his ability to do his job





- He is often clumsy and has poor coordination
- He often arrives at work with a headache
- He feels constantly sluggish and has difficulty concentrating
- He is able to carry out routine tasks but struggles with anything relying on higher level cognitive skills, e.g.
 - He finds it difficult to generate new solutions to problems
 - He has become more risky, and often becomes over confident with these risky decisions
 - He often struggles finding appropriate words when communicating verbally

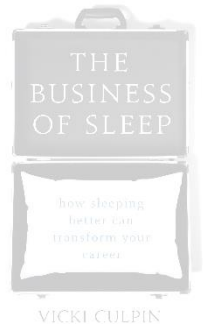


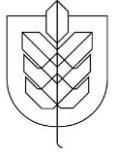


After about 17 hours, alertness sharply declines, to the point where our wakefulness is similar to the effects of a blood alcohol concentration of 0.05%

After 24 hours, alertness is equivalent to a blood alcohol concentration of 0.1%

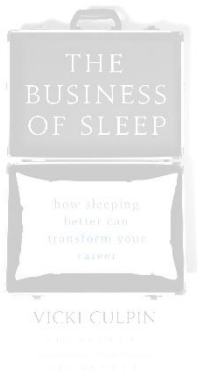
The legal driving limit in the UK is 0.08% in England and Wales, and 0.05% in Scotland

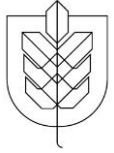




Traffic *Accidents*

- Research in the US found that doctors who work extended shifts of 24hrs are twice as likely to be involved in a traffic accident on their way home from work
- The likelihood of crashing a car is significantly greater after a night shift than any other shift pattern
 - AND, the more tired a person becomes, the less able they are to accurately gauge their performance

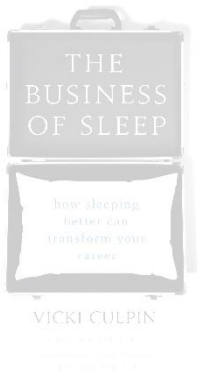


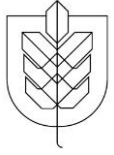


Every adult human spends approximately
 $1/3^{\text{rd}}$ of their life on this activity

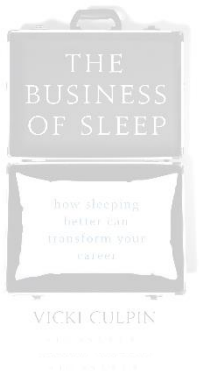
Failure to take part in this activity will always
ultimately prove fatal

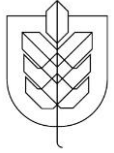
Ineffective completion of this task can
increase mortality by up to 13% and is related
to 7 of the top 15 causes of death



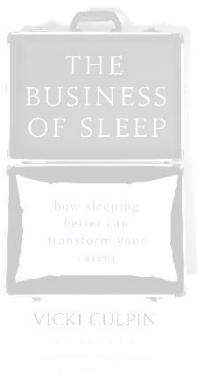


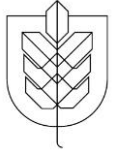
Adults who regularly sleep fewer than 6hrs per night have a 13% increased mortality risk (7% for 6-7hrs per night)





Insufficient sleep has been linked with 7 of the 15 leading causes of death - cardiovascular disease, malignant neoplasm, cerebrovascular disease, accidents, diabetes, septicaemia and hypertension



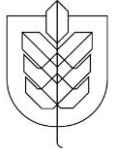


How much training time do you give over to
the topic?

How often do you discuss the topic with
colleagues and trainees?

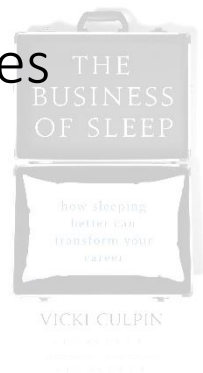
....and the impact of failing to consider this?

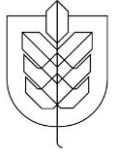




Physical Costs

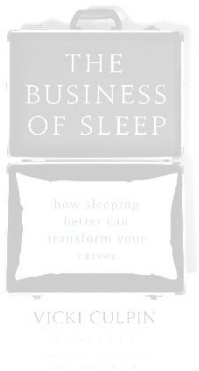
- Hypertension
 - Habitually short (<5hrs) and long sleepers (>9hrs) are more likely to develop hypertension than those sleeping 7-8hrs per night
- Obesity
 - Leptin is reduced and ghrelin increases with poor sleep
 - 5hrs sleep a night or less increases ghrelin by 15% and reduces leptin by 15% compared with sleeping 8hrs per night
- Type II Diabetes
 - Short and long sleepers are significantly more likely to develop Type II Diabetes in adulthood (even after controlling for other predictive factors)

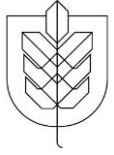




Performance Costs

- Memory
 - 40% reduction in ability to form new memories when sleep deprived prior to being given new information to learn
 - Performance NOT inferior for negative material
 - Sleep before learning benefits encoding
 - Sleep after learning improves memory consolidation
 - 19%-21% enhancement in motor performance after only one night of sleep (up to 12hrs post-training)

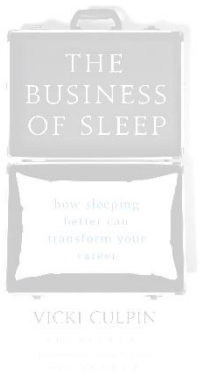


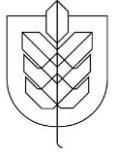


Performance Costs

- Decision-Making
 - Challenger Space Shuttle Disaster

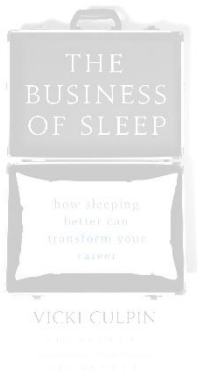
“Working excessive hours, while admirable, raises serious questions when it jeopardizes job performance, particularly when critical management decisions are at stake”
 - Three Mile Island and Chernobyl
 - One night of sleep loss significantly reduced on-call anaesthetists innovative thinking
 - Divergent thinking relies heavily on the prefrontal cortex (30% of brain mass)

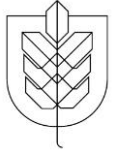




Fatal Mistakes

- Compared to a 16hr shift, on call doctors working a 24hrs shift:
 - Have twice as many attentional failures when working overnight
 - Make five times as many serious diagnostic errors
 - Commit 36% more serious medical errors
 - Report 300% more fatigue-related medical errors that lead to a patients death
 - Suffer 61% more needlestick and other sharps injuries
 - Experience a 1.5 to 2 Standard Deviation deterioration in performance on both clinical and nonclinical tasks

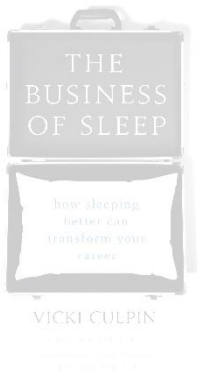


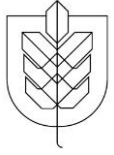


Interpersonal Costs

- In 2007, Bill Clinton was interviewed on the US TV Program, Daily Show, and noted:

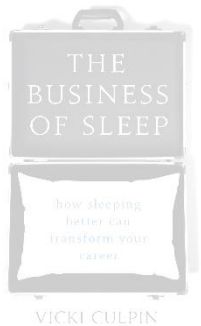
“You have no idea how many Republican and Democratic members of the House and Senate are chronically sleep deprived because of the system. I know this is an unusual theory but I do believe sleep deprivation has a lot to do with some of the edginess of Washington today”



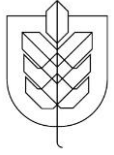


Interpersonal Costs

- Negative Biases
 - ‘Bad’ sleepers have been found to have significantly higher negative biases in how they view the world (see negative events, expect negative outcomes, expect failure and respond poorly to negative mood)
 - AND increased depression, anxiety and stress, AND decreased subjective well-being
- Quality
 - Only one night of being woken up (four times for 10mins) impacts mood in the same way as a night of only 4hrs sleep
- Amygdala Hijack
 - Link between prefrontal cortex and amygdala missing in sleep deprived individuals

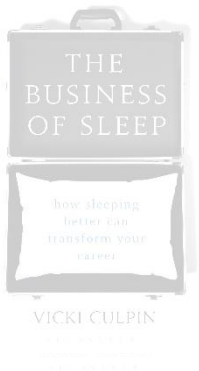


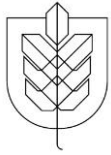
VICKI CULPIN



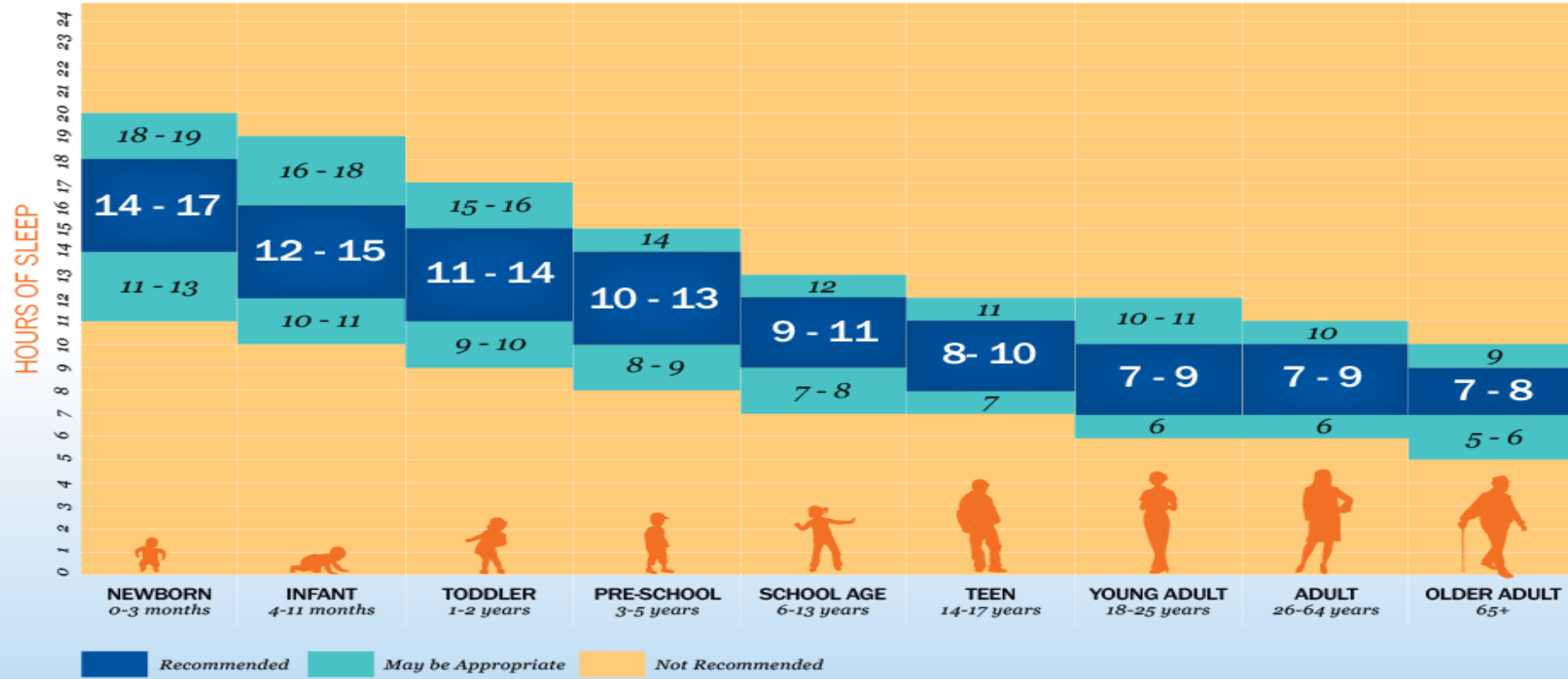
Economic Costs

£25 billion and £36 billion (1.36% - 1.86%
of GDP)



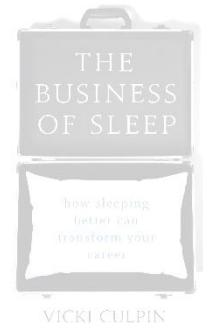


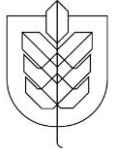
SLEEP DURATION RECOMMENDATIONS



SLEEPFOUNDATION.ORG | SLEEP.ORG

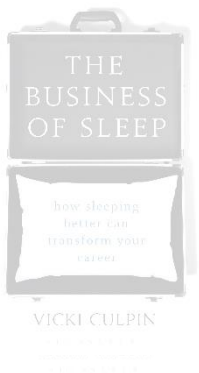
Hirshkowitz M, The National Sleep Foundation's sleep time duration recommendations: methodology and results summary, Sleep Health (2015), <http://dx.doi.org/10.1016/j.sleh.2014.12.010>

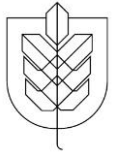




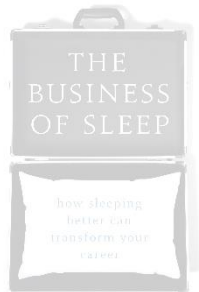
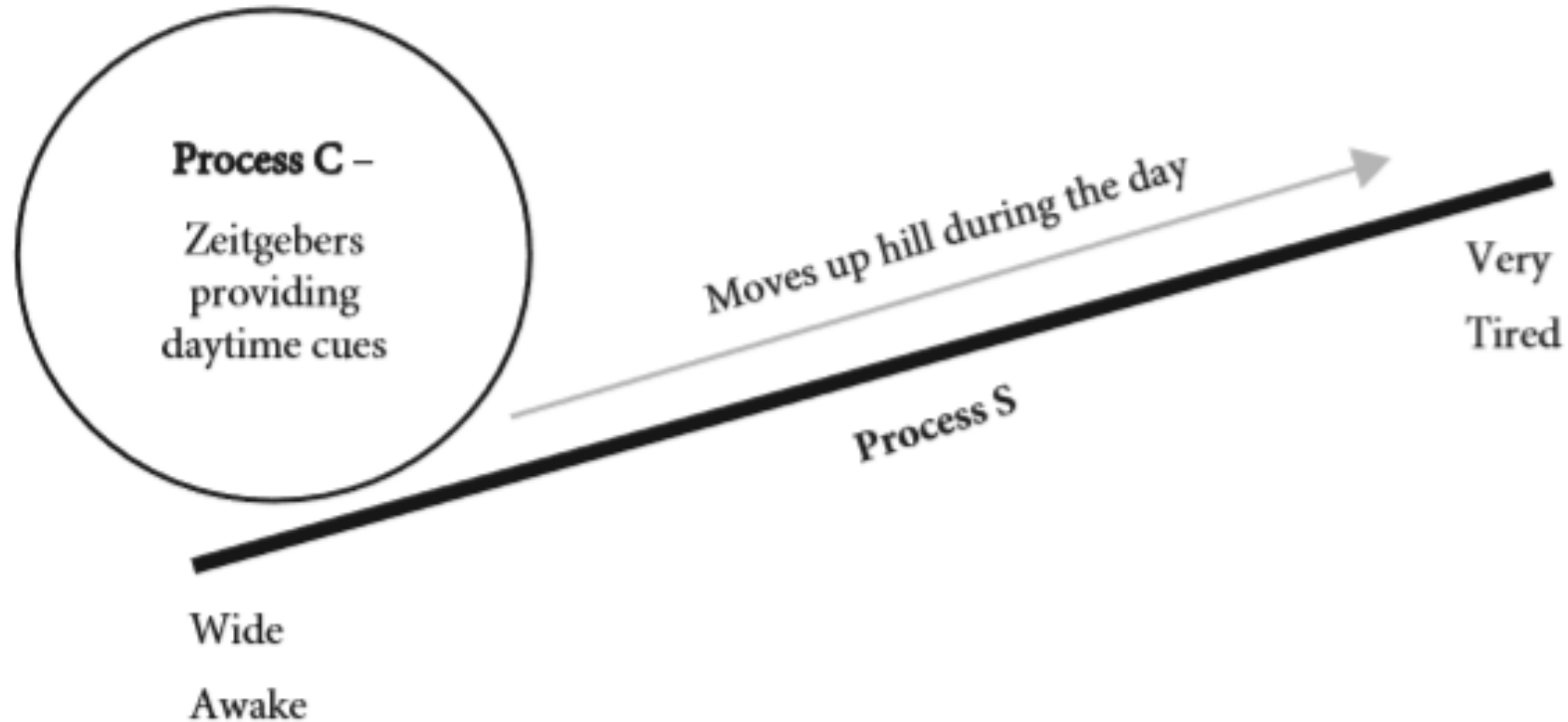
16% of the UK workforce sleep for less than
6hrs per night

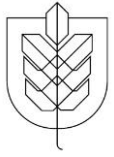
19% of the UK workforce sleep for between
6hrs and 7hrs per night



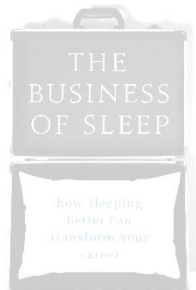
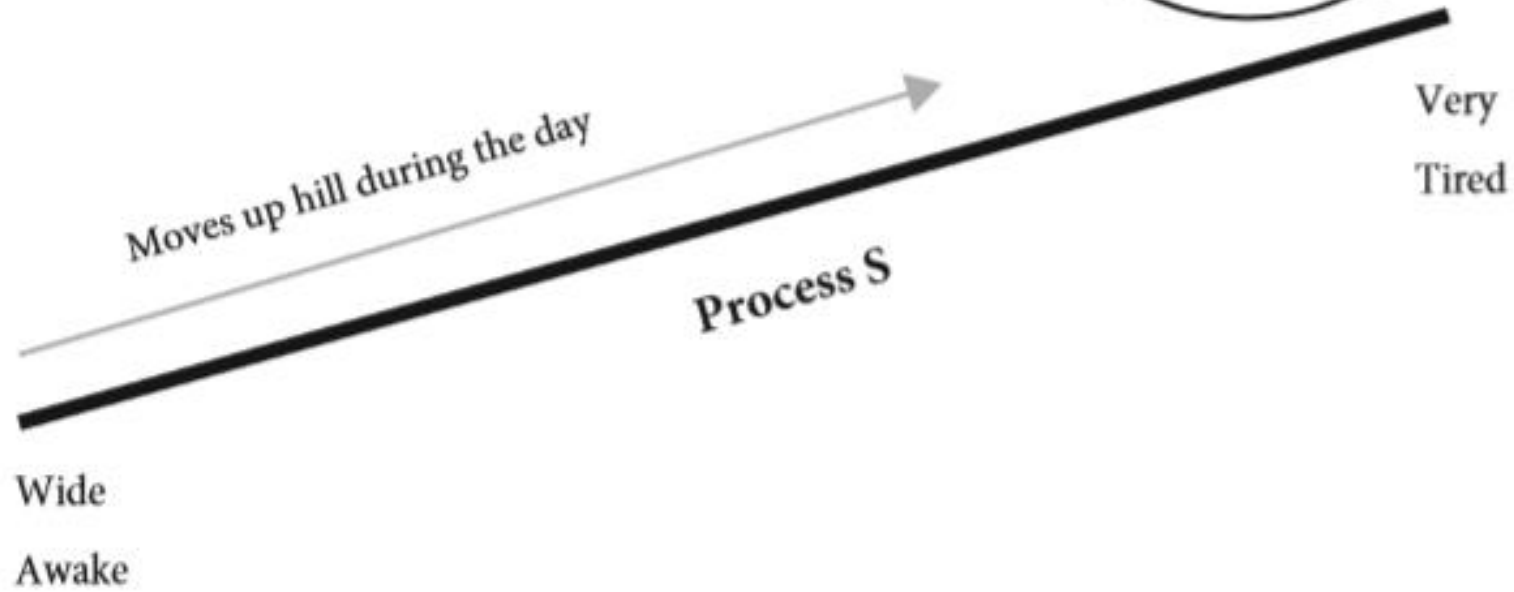
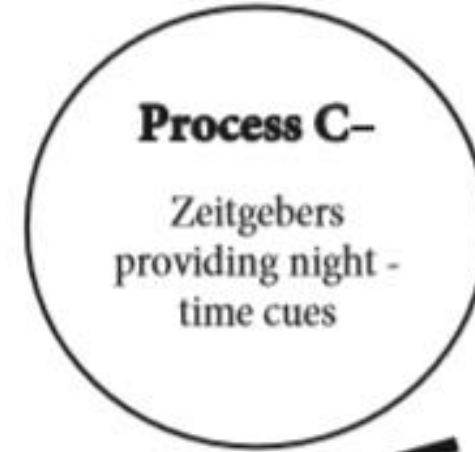


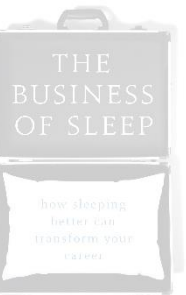
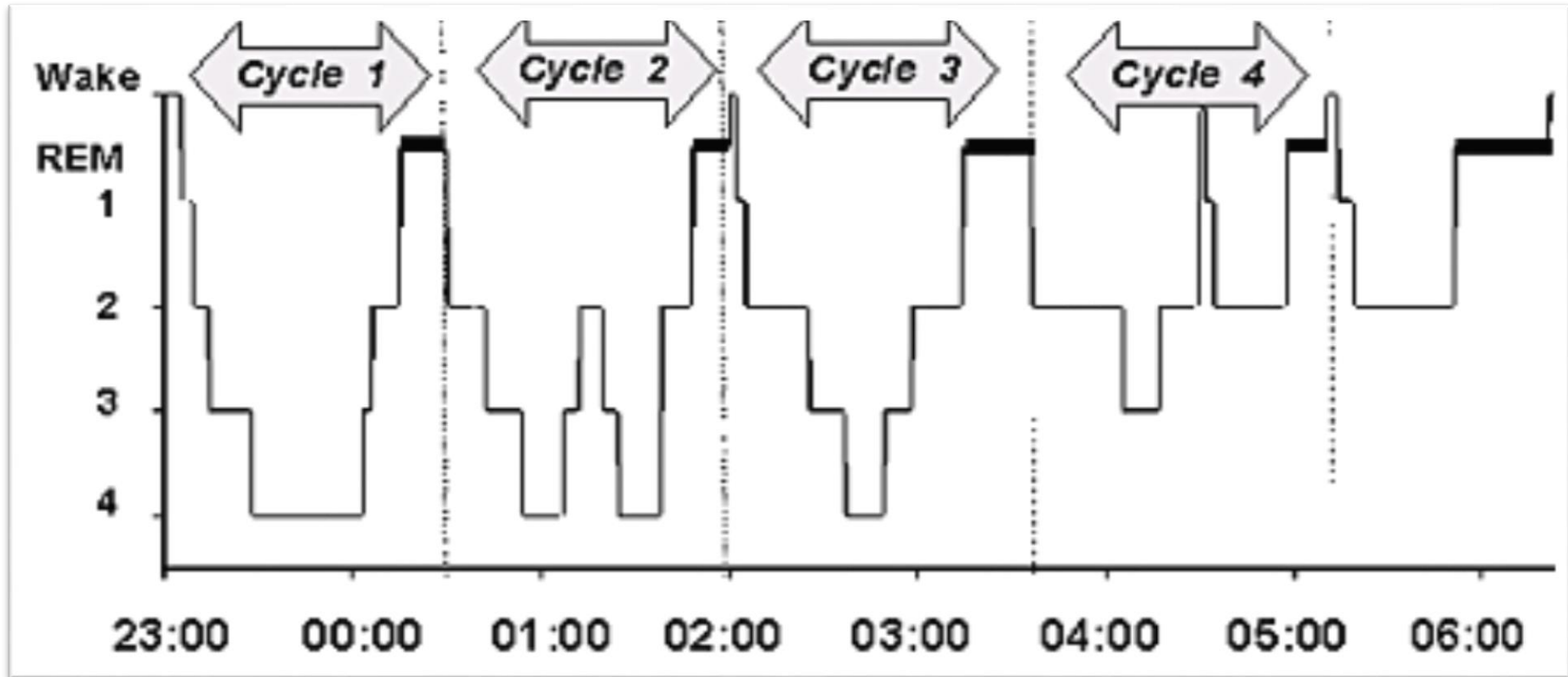
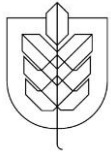
Daytime





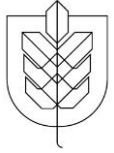
Night time





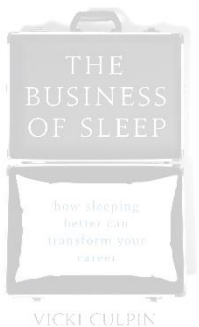
VICKI CULPIN

Author of *The Business of Sleep*

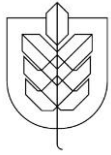


Alertness deficits similar to being drunk
Increased negative mood and negative bias
Reduction or lack of emotional control
Poorer communication skills and empathy
Reduction in ability to learn, both knowledge and
motor skills
Poorer decision making, lack of innovative and
flexible thinking and increased risk propensity

And INCREASED MORTALITY!



VICKI CULPIN

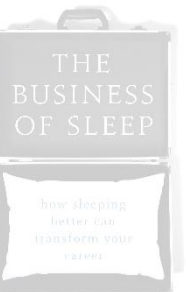


THE BUSINESS OF SLEEP

how sleeping
better can
transform your
career

VICKI CULPIN

B L O O M S B U R Y



VICKI CULPIN

how sleeping better can transform your career