



professional

Agenda:

- Occupational Hygiene
- Sleep and Fatigue in Industry
- Sleep and Fatigue in Professional Sports

Winner of the “Not my Job” Award

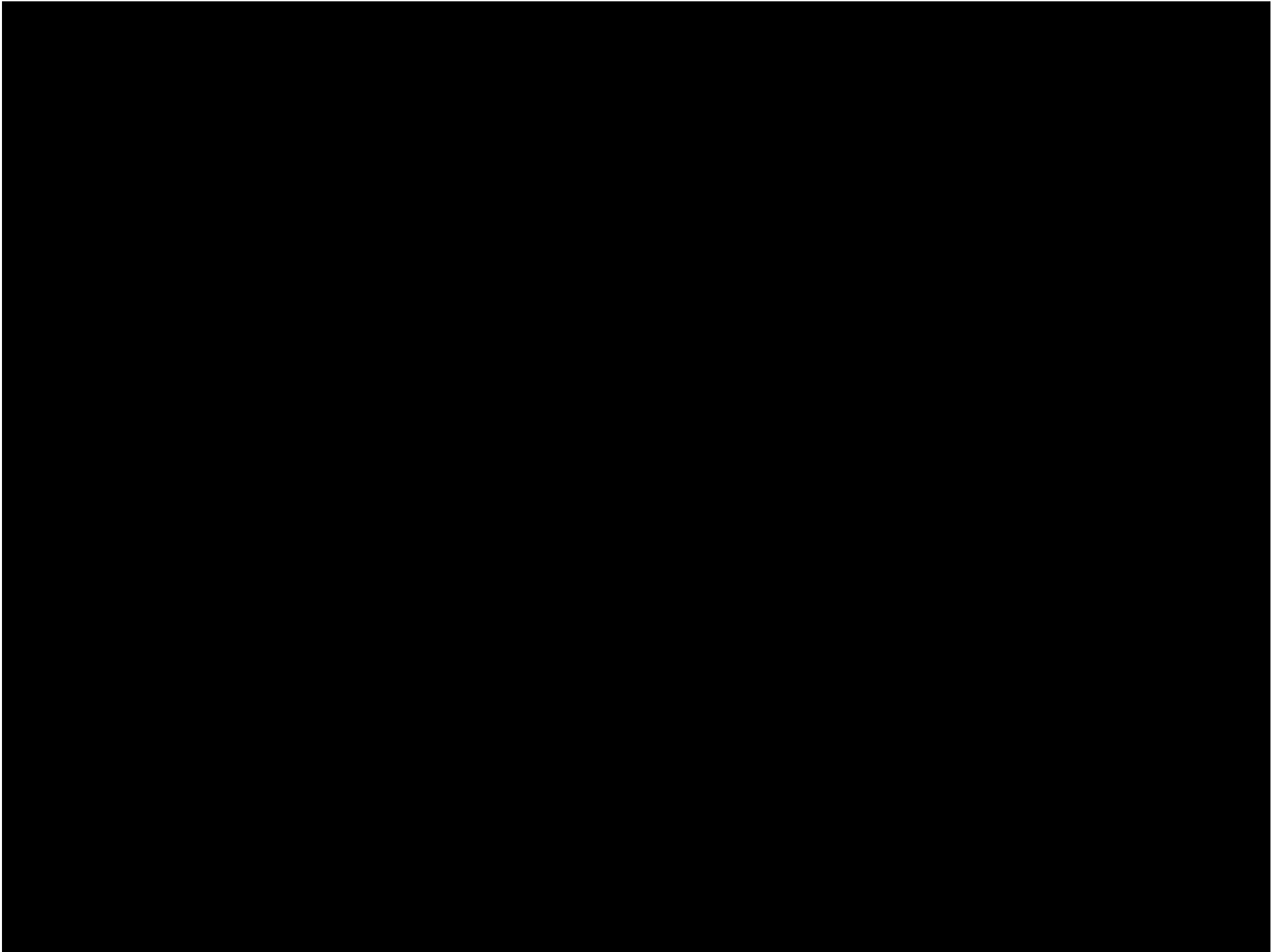


... “that science and art devoted to the anticipation, recognition, evaluation, and control of those environmental factors or stresses arising in or from the workplace, which may cause sickness, impaired health and well-being or significant discomfort among workers or among the citizens of the community.”

National Sleep Foundation

Consequences of Poor Sleep

- Increased risk of motor vehicle accidents
- Increase in body mass index – a greater likelihood of obesity due to an increased appetite caused by sleep deprivation
- Increased risk of diabetes and heart problems
- Increased risk for psychiatric conditions including depression and substance abuse
- Decreased ability to pay attention, react to signals or remember new information



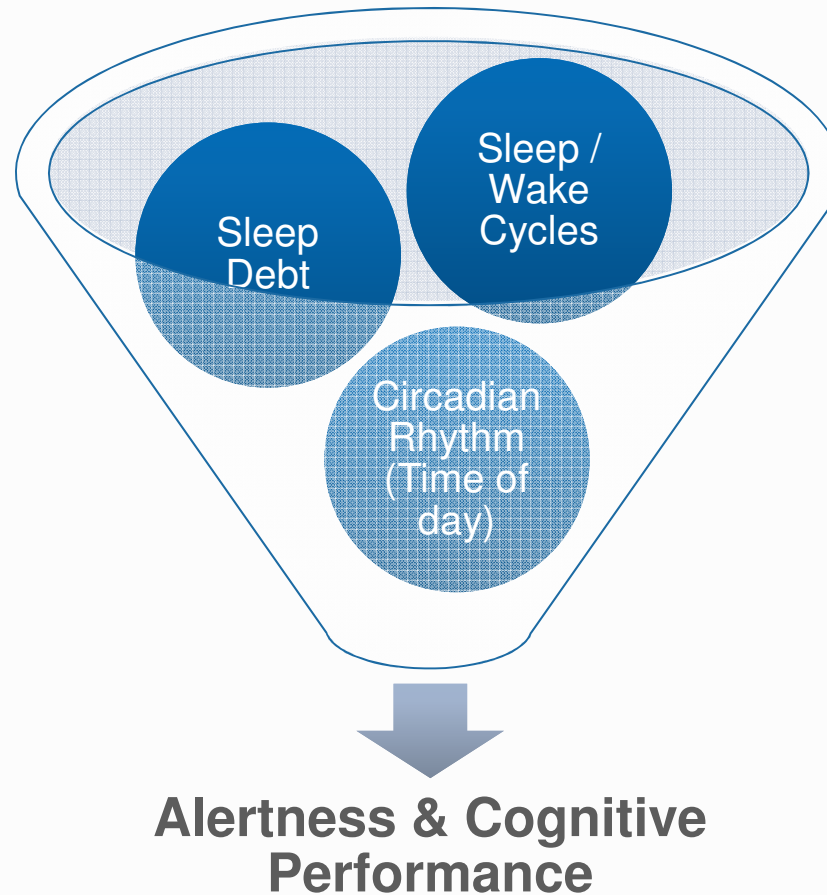


BIOLOGY 101

We are all human beings

Human beings are diurnal animals

ALERTNESS & COGNITIVE PERFORMANCE:

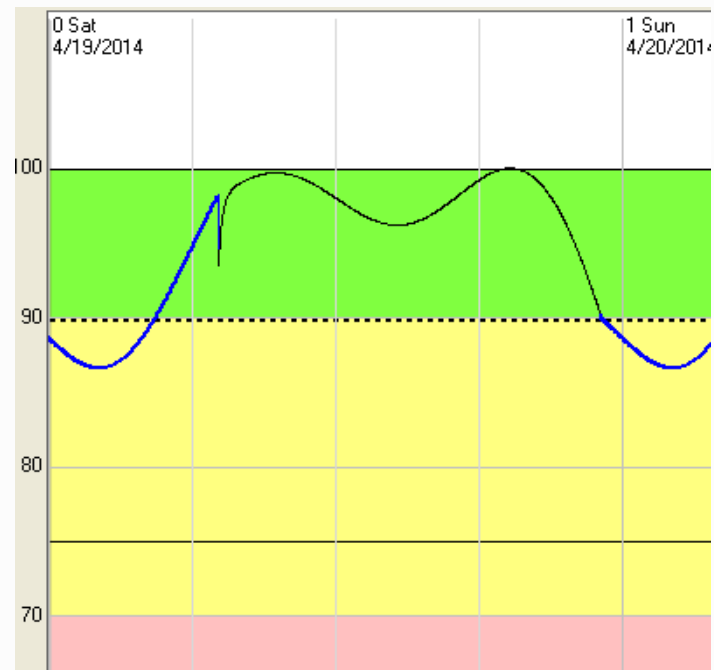


CIRCADIAN FACTORS:

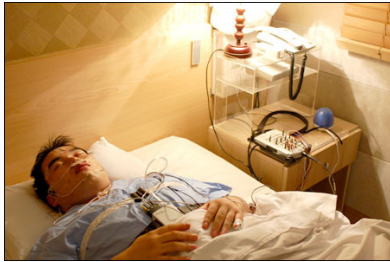
8 hours of sleep, 11 PM-7AM

Effectiveness

9:30 am	100%
2:30 pm	96%
7:30 pm	100%
11:00 pm	90%



MEASURING SLEEP



- ✓ Polysomnography
100% accurate



- ✓ Actigraphy
94% accurate



- ✓ Self-reported Sleep
50 – 60% accurate

MEASURING FATIGUE



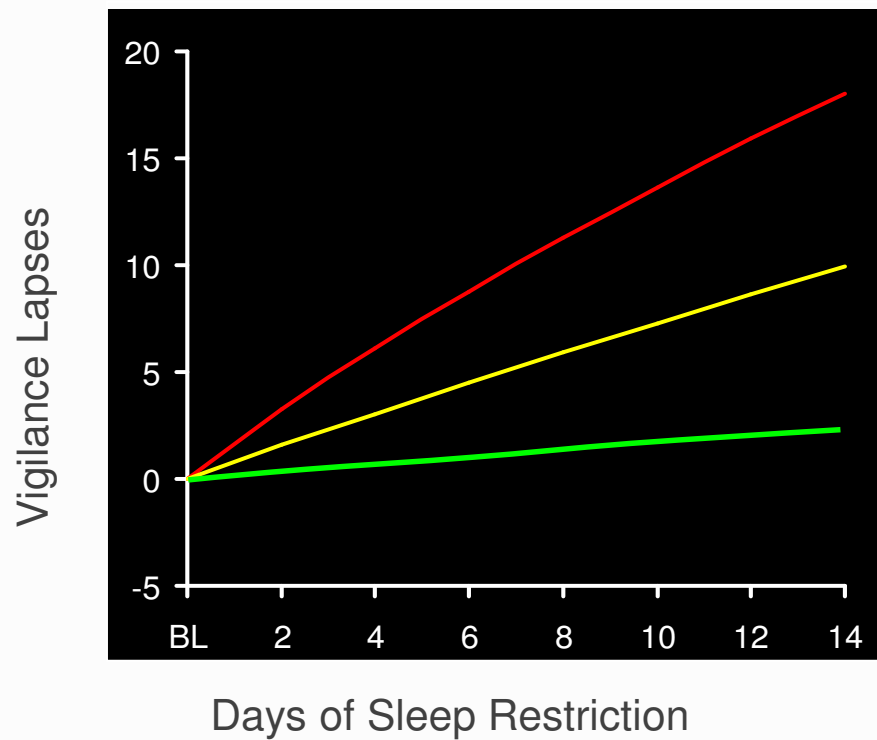
**Psychomotor
Vigilance
Task (PVT)**

BAC SCALE (Blood Alcohol Concentrate)

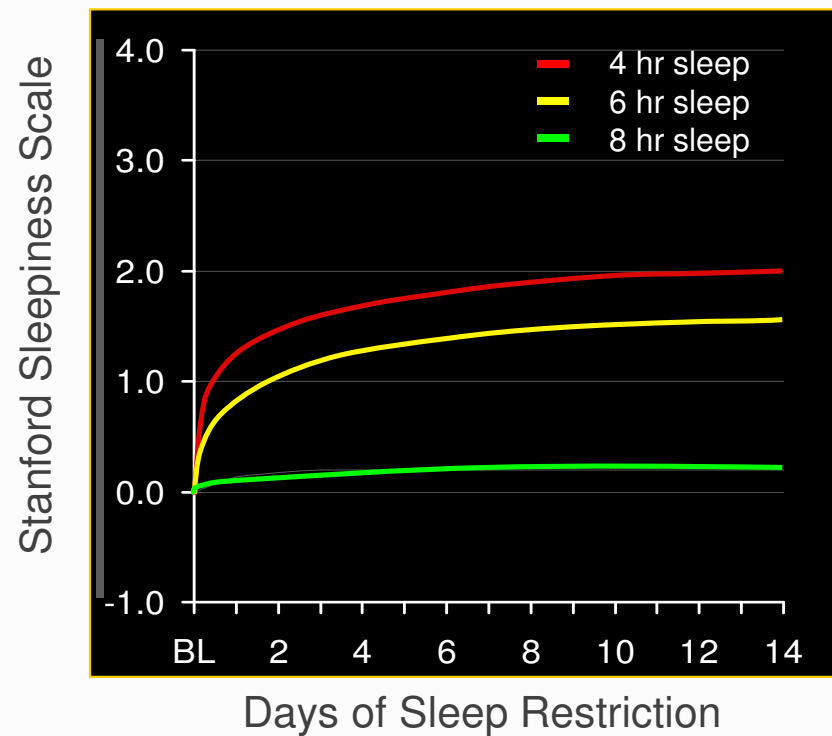
Score	Continuous Hours of Wakefulness	Reaction Time % Slower	Blood Alcohol Concentration (BAC)
77	18.5	30%	0.05
70	21	43%	0.08

- The effects of fatigue can be compared to those of blood alcohol
- Fatigue and the effects of alcohol are NOT identical

Actual Sleepiness

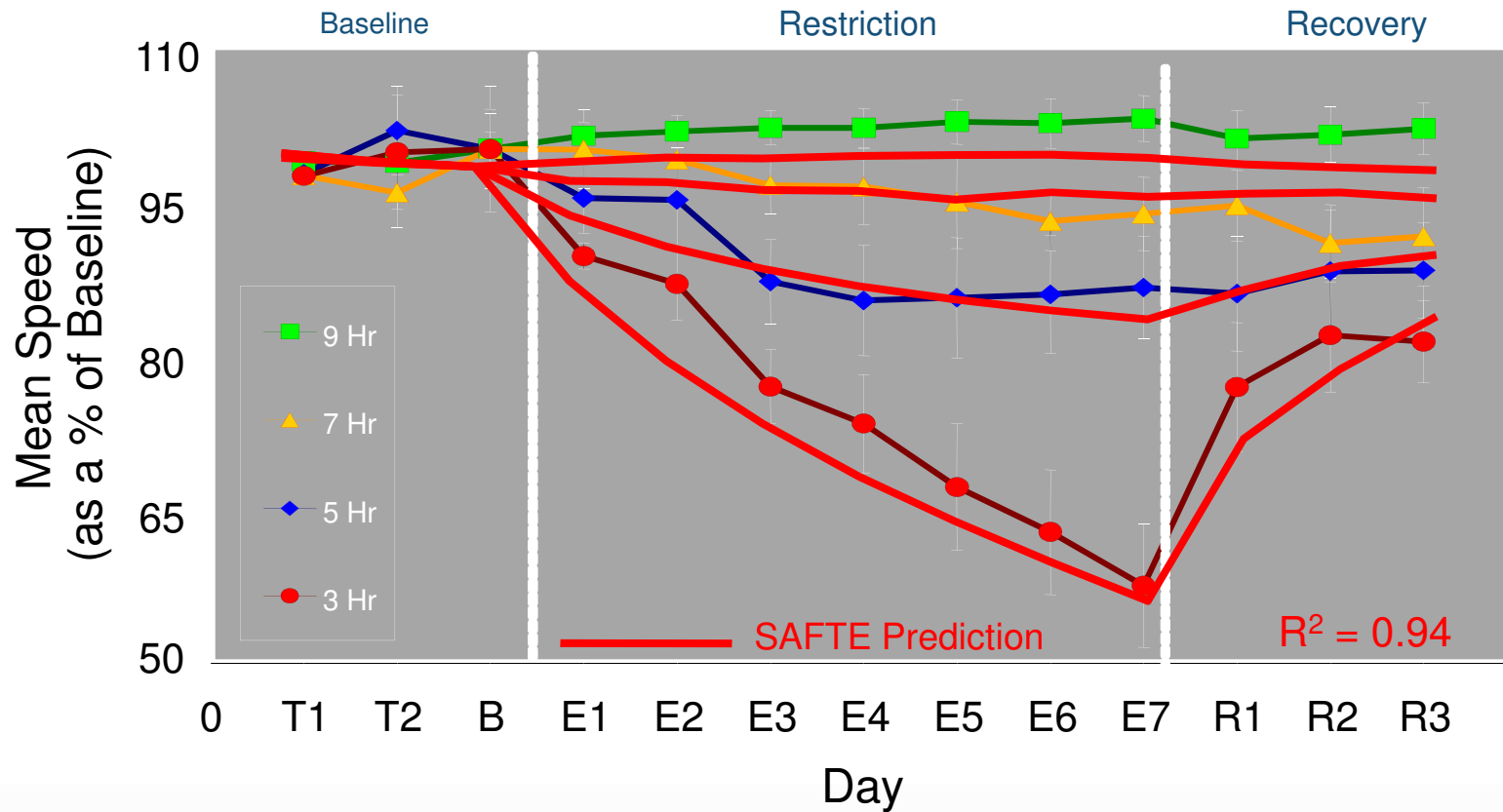


Self-Rated Sleepiness

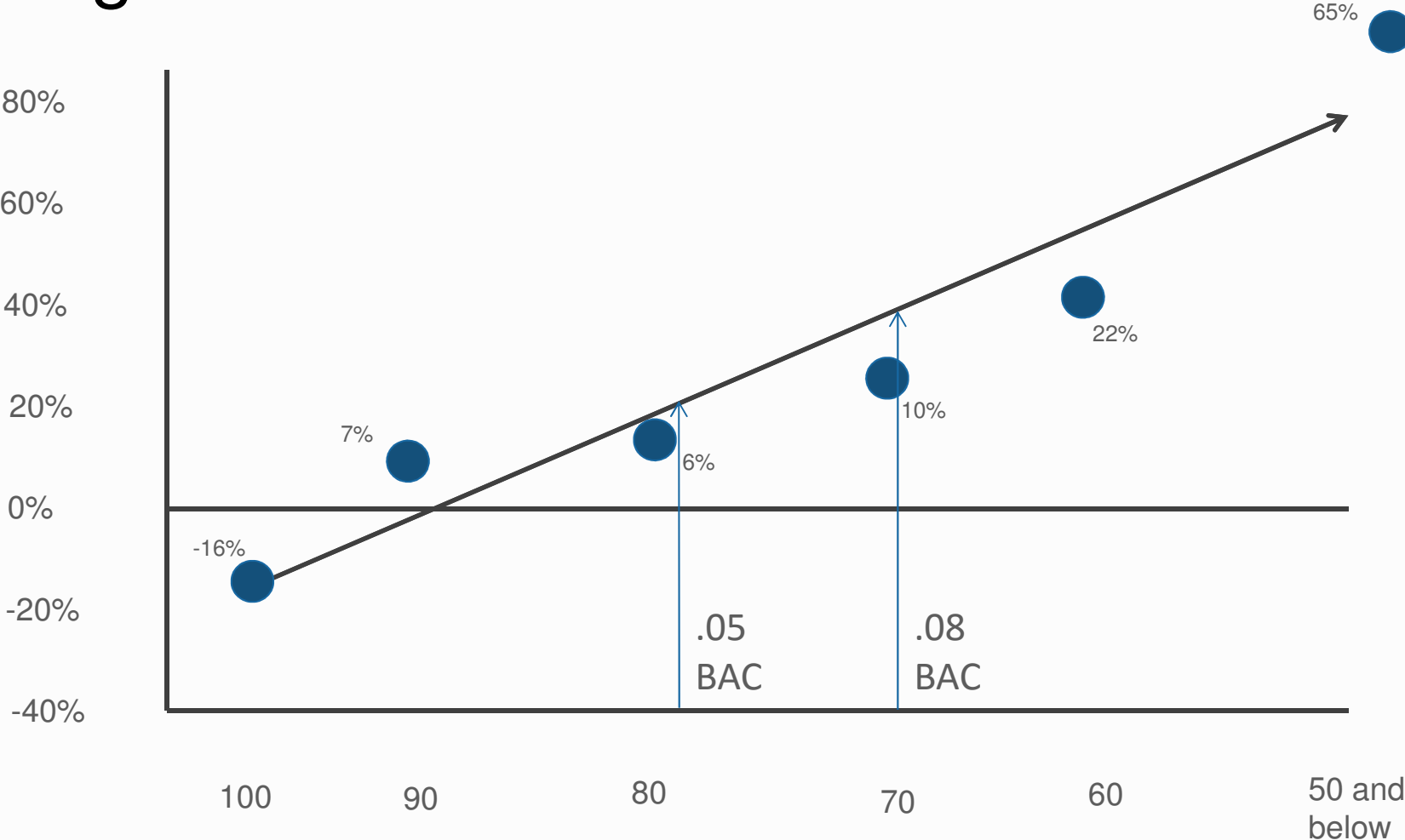


US Army – Walter Reed Study

PVT Speed: Chronic Restriction Adaptation



Fatigue = Accident Risk



● **Human Factors Accidents¹**

¹ US Department of Transportation: Federal Railroad Administration. Validation and Calibration of a Fatigue Assessment Tool for Railroad Work Schedules (2006)

Ministry of Justice:

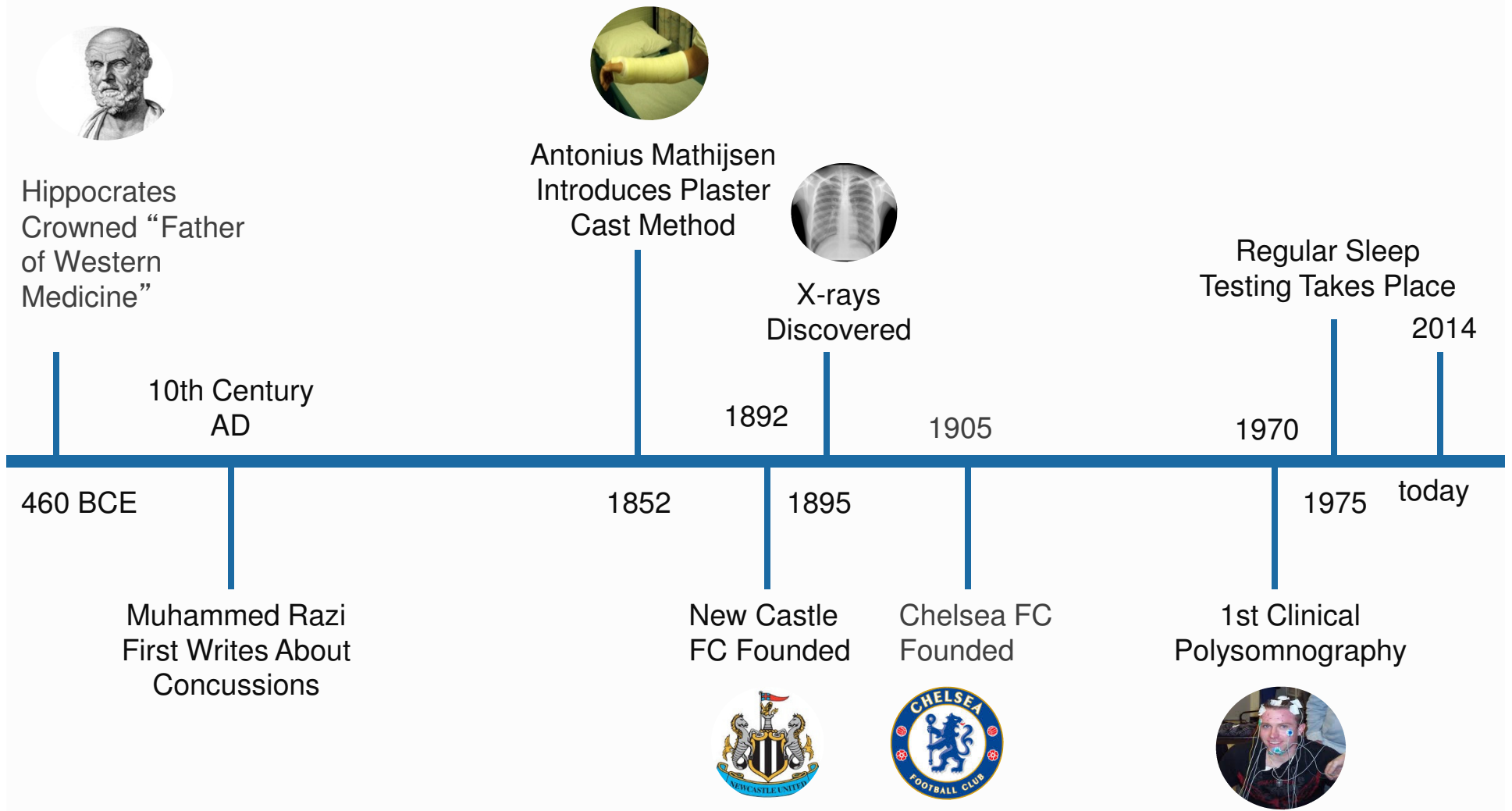
Findings and recommendations as a result of the Coroner's inquest into the death of Bradley Michael Thomas Haslam.



Jury recommends:

1. To develop an educational tool about the risks associated with worker fatigue.
1. To include worker fatigue as a component of the CORE audit.
1. Review and research with industry new training styles/curriculum for young/new workers.
2. That workplace inspections incorporate all shifts including Day, Afternoon, Graveyard, and Weekend shifts.

A Short History of Medicine



Study: Sleep & Collegiate Swimmers

Study: Sleep & Collegiate Swimmers

Task Performed	Two Weeks of Normal Sleep/Wake Patterns (Baseline)	Six-Seven Weeks of Sleep Extension (10 hours)
15m Sprint	6.98 seconds	6.47 seconds
Reaction Time Off The Block	0.88 seconds	0.73 seconds
Turn Time	1.1 seconds	1.0 seconds
Kick Strokes	26.2	31.2

Extended Sleep and the Effects on Mood and Athletic Performance in Collegiate Swimmers; Mah CD, Mah KE, Dement WC, Psychiatry and Behavioral Sciences, Stanford University, CA

Study: Sleep Extension + Basketball Players



After a period of extending time in bed to 10 hours per night for several weeks, collegiate basketball players:

- Improved their free throw percentage by 9%
- Improved 3-point field goal percentage by 9.2%

The Effects of Sleep Extension on the Athletic Performance of Collegiate Basketball Players; *Mah CD, Mah KE, Dement WC, Kezirian, EJ*, Psychiatry and Behavioral Sciences, Stanford University, CA

Study: Sleepiness & Predicting Player Career Longevity in Baseball

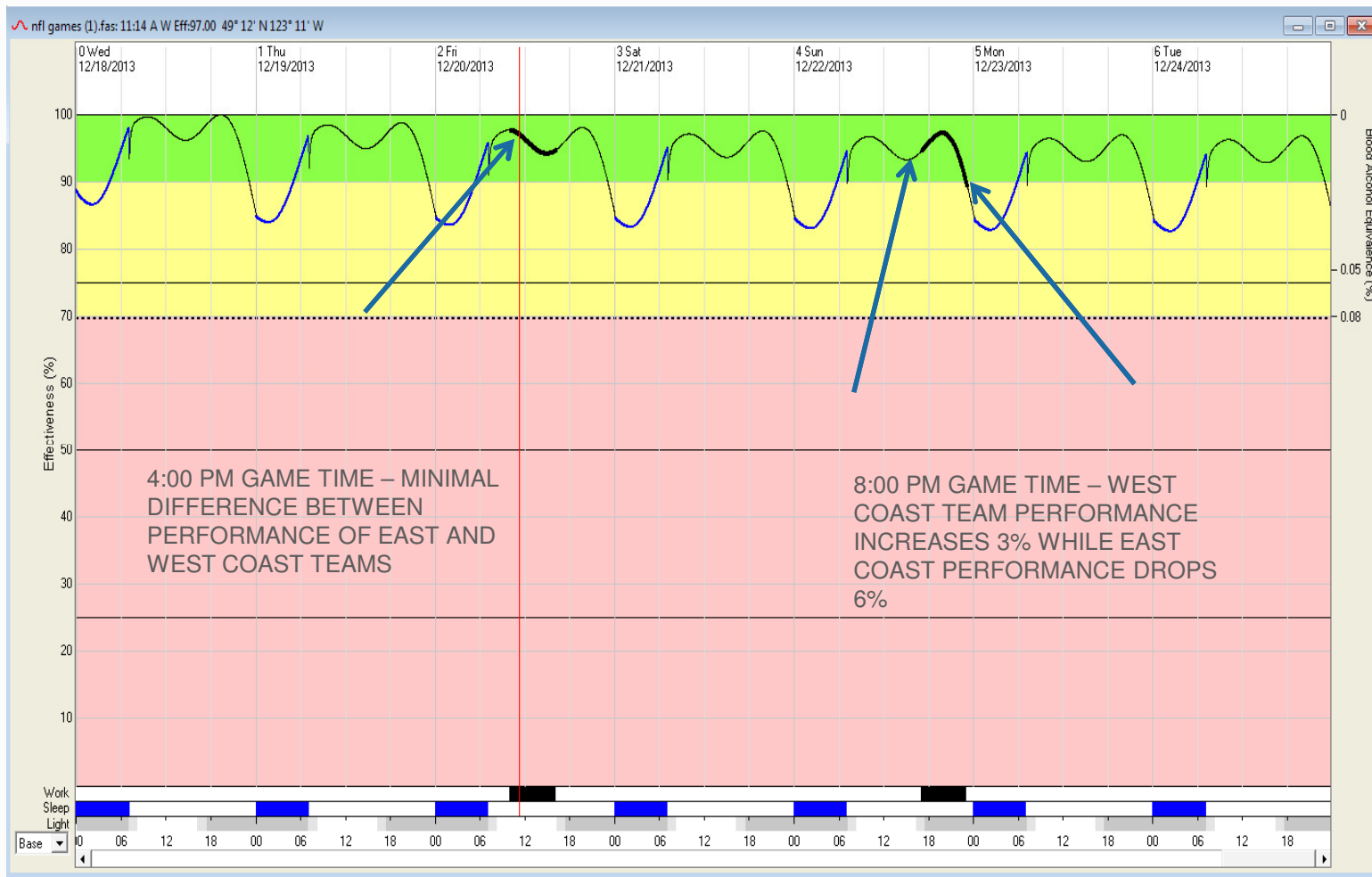


Predicting Major League Baseball (MLB) Player Career Longevity via Sleepiness Measurements; *Winter, W. Christopher*

Winter followed 80 MLB players over 3 years:

- 72% of players with normal sleep were still playing
- 39% of players with reduced sleep were still playing
- 14% of players with severe sleep issues were still playing

Football Study: Circadian Timing of Games



Identify why athletes aren't getting the sleep they need:

1. Sleep disorders

(insomnia, RLS, apnea, etc.)

Solution: Sleep-EVAL, Actigraphy



2. Schedule or environmental factors

(early practice, late games, travel, jet lag, sleep environment etc.)

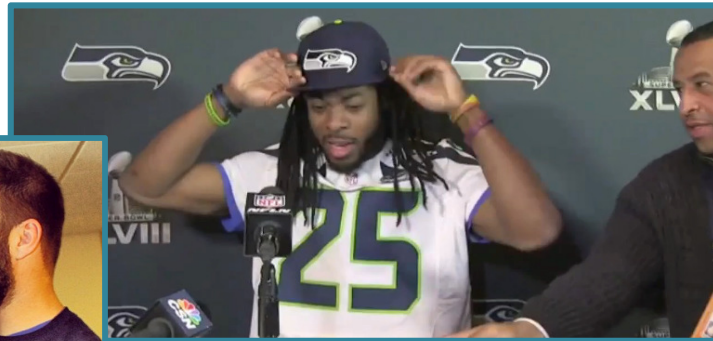
Solution: Planning, Bio-mathematical modelling

3. Self-imposed factors

(sleep hygiene, lifestyle, etc.)

Solution: Education, PVT Feedback

Technology



Game by Game Analysis

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Effectiveness

Recent
Sleep

Chronic
Debt

Hours
Awake

Time
of Day

Out of
Phase

86

Performance		Fatigue Factors		
Effectiveness	86%	Sleep (last 24 h)	8.00	< 8 h
Mean Cognitive	93%	Chronic Sleep Debt	6.44	> 8 h
Lapse Index	2.0	Hours Awake	10.73	> 17 h
Reaction Time	116%	Time of Day (base)	1543	2338-0538
Reservoir	80%	Out of Phase	1.42	> 3 h

Questions?

pat.byrne.sports@gmail.com

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