

# Driving Fatigue in Rail Operations

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**Rail Wellbeing LIVE**

Inspiring healthy lives across the railway

# Introduction



How do drivers become fatigued?



What is the effect of fatigue on driving performance?

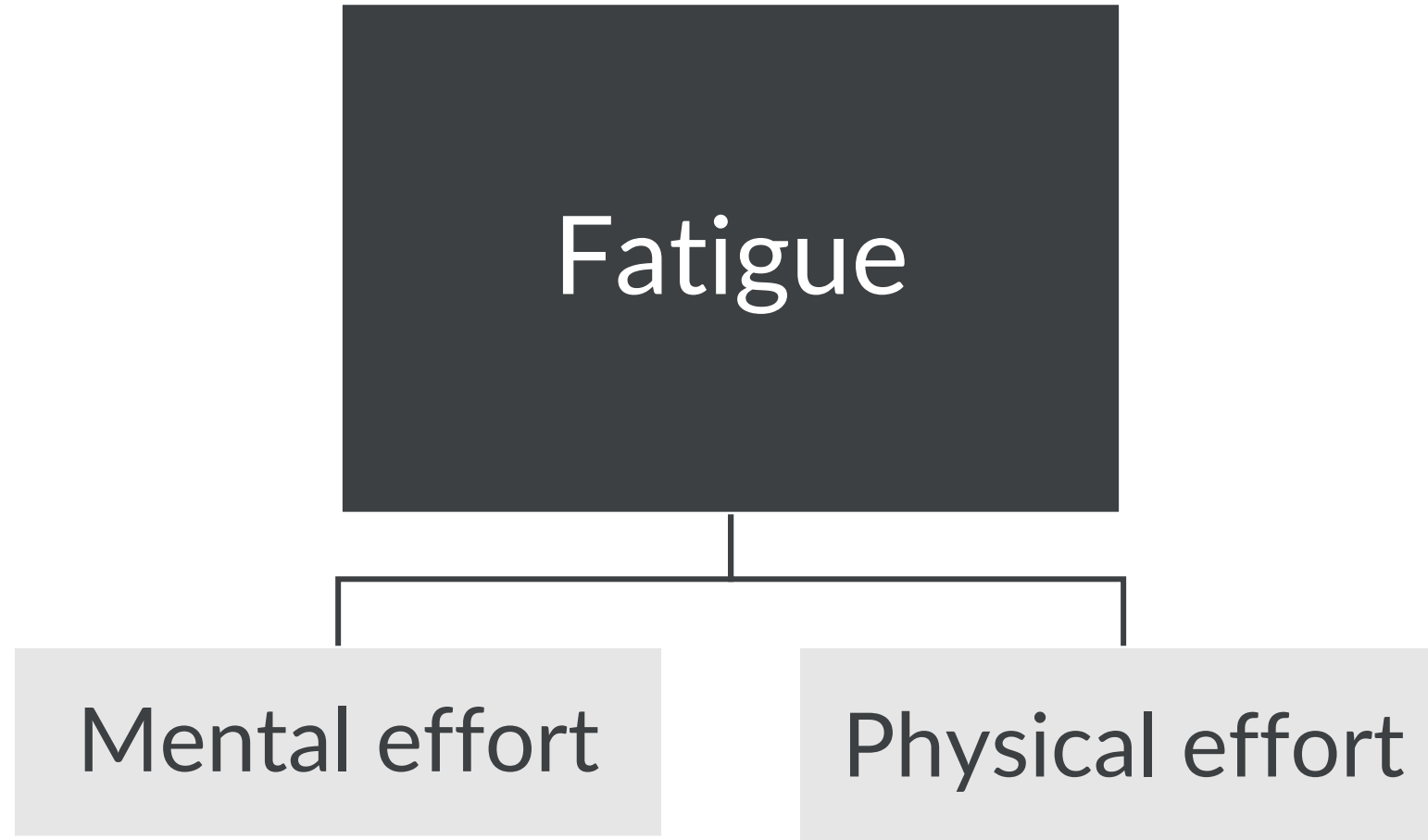


What is the effect of fatigue on crash involvement?

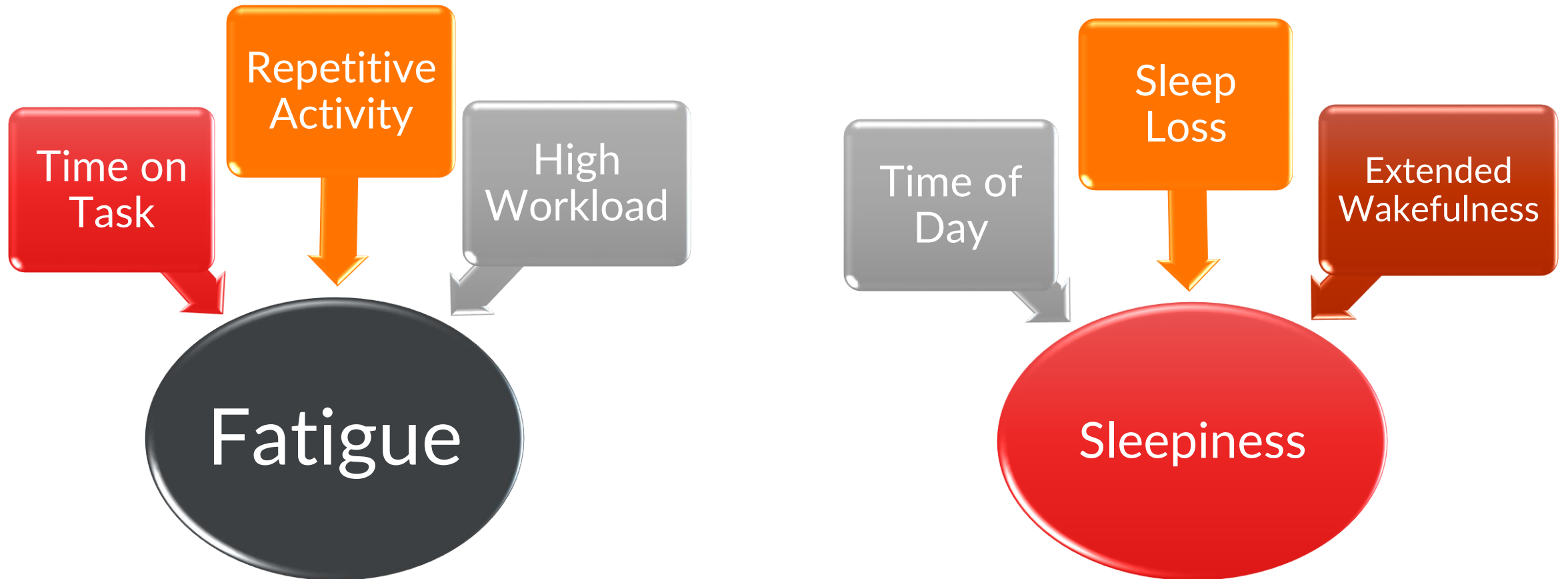


Possible countermeasures

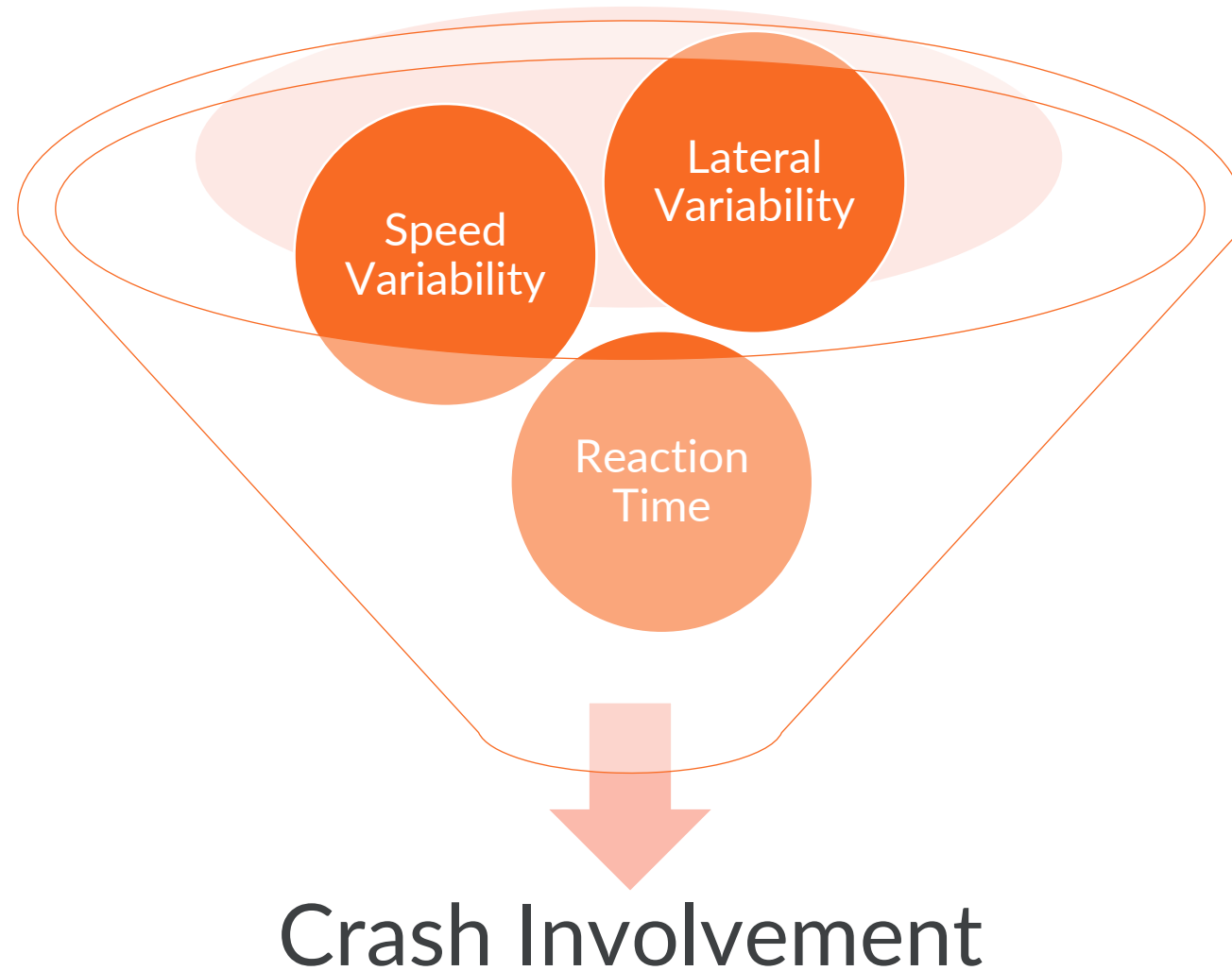
# How do drivers become fatigued?



# Distinguishing between fatigue and sleepiness



# What's the effect of fatigue on driving performance?



# Task Factors

- Sedentary task
- Active and Passive Fatigue states
- Monotony
- Boredom
- Engagement with unrelated tasks



# Driving for Work in the UK

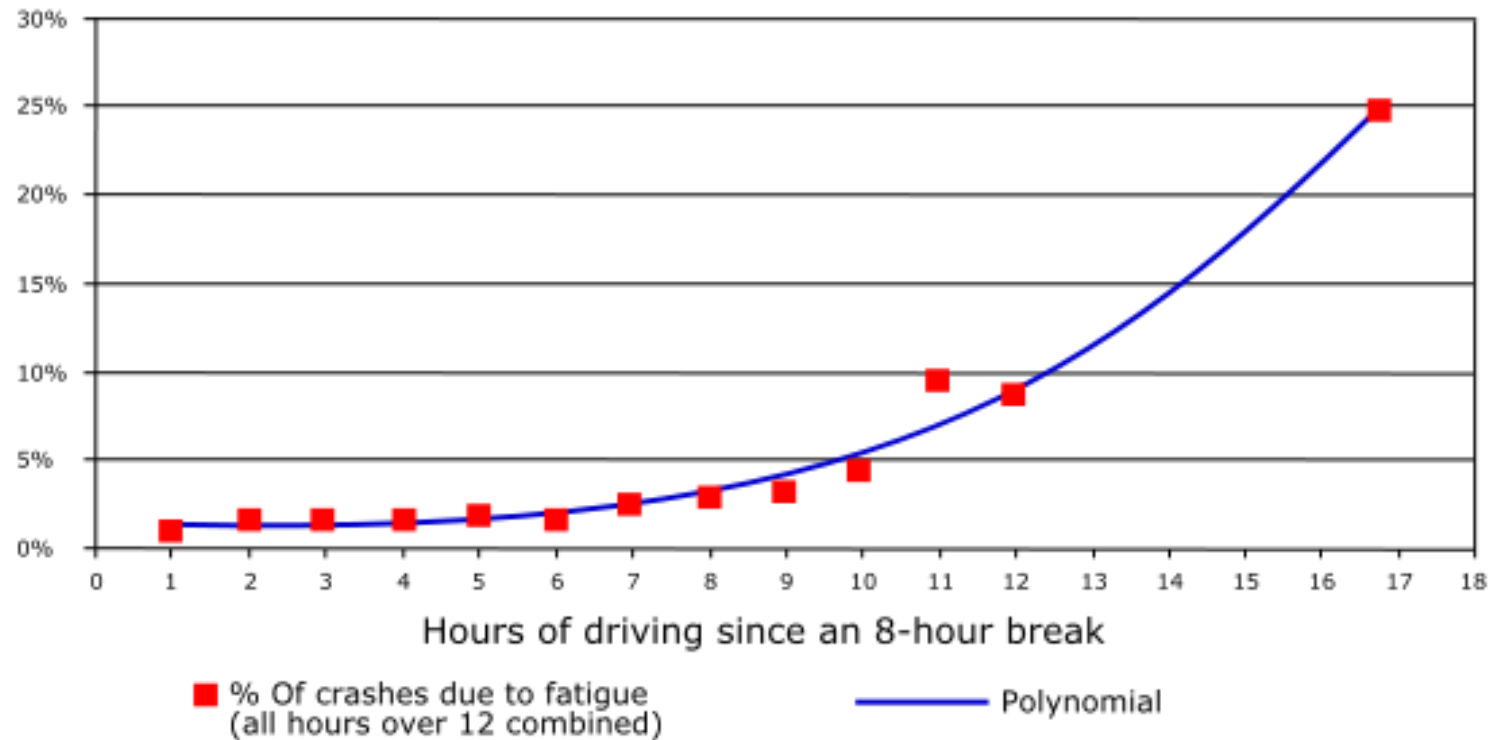


- About 1 in 3 road deaths, 1 in 5 seriously injured and 1 in 4 casualties of all severities when driving for work
- 4 in 10 fatigue-related crashes driving a commercial vehicle
- About 40% of killed pedestrians hit by a working driver

(DfT, 2018)

# Time on Task Effects

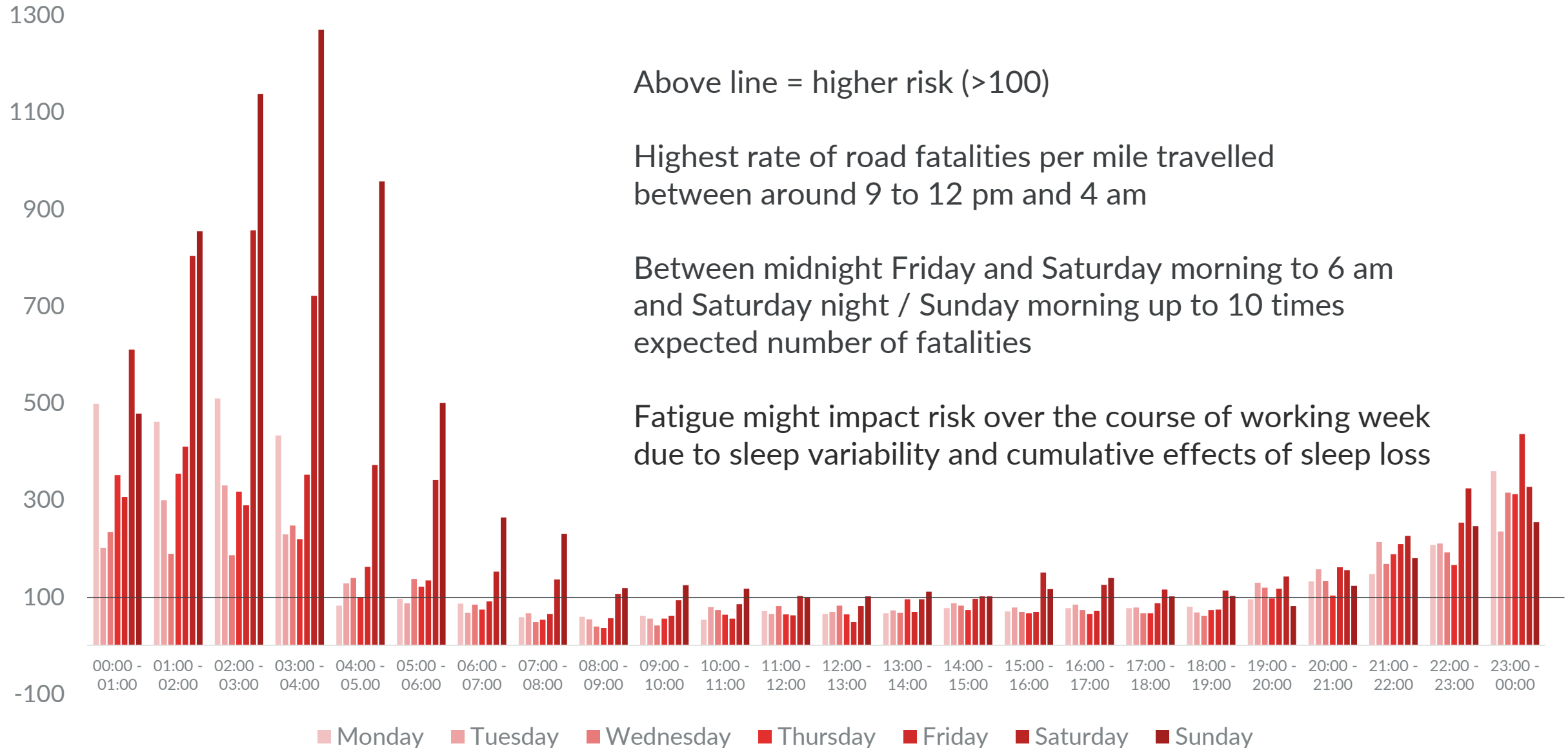
Percentages of crashes due to fatigue  
as a function of hours of driving



- Reduced vigilance
- Reduced ability to respond fast and adequately



# Time of Day Odds Ratio for GB Fatalities (2009 to 2013)



# Automation and Fatigue

Increasing automation in vehicles may negatively impact on driver behaviour

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REDUCED COGNITIVE WORKLOAD

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PAY LESS ATTENTION

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TRUST THE SYSTEM

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SECONDARY TASK ENGAGEMENT

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'OUT OF THE LOOP'

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OVER-RELY ON/IGNORE ALERTS

# Countermeasures



# Fatigue and Sleepiness resolves differently

## Fatigue: Time on Task

- Gradual and cumulative disinclination towards effort
- Resolves after rest

## Sleepiness: Time of Day

- Difficulty in staying awake due to body clock
- Resolves after sleep including naps

# Fatigue Monitoring Devices

- Wearable EEG-based monitors for self-assessment
- Eye closures
- Head-nodding
- Detect at later stage when fatigue too advanced?
- May rely on warnings to maintain alertness?
- Devices not currently well validated



# From an organisational perspective...

- What do managers do when a driver is sleepy/fatigued?
- Self-report fatigue/sleep problems?
- Visibility of working hours?
  - Swaps?
  - Unrecorded overtime
  - Agency drivers
  - Second jobs?
- Crashes correctly recorded?
- Driver training in fatigue risk management



# Human Factors and Road Risk Management

- Module 1: Safe Systems
- Module 2: Human Error
- Module 3: Human Performance
- Module 4: Fatigue and Workload
- Module 5: Road Risk Management

## Dates

6<sup>th</sup> – 7<sup>th</sup> December 2023

23<sup>rd</sup> – 24<sup>th</sup> January 2024

28<sup>th</sup> – 29<sup>th</sup> February 2024

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