

**UMA** MOTORCOACH  
**EXPO 2024**



# FRMS Part II: Sleep Hygiene & Disorders Management

Raleigh, North Carolina

February 5, 2024

# Instructions

Go to

**www.menti.com**

Enter the code

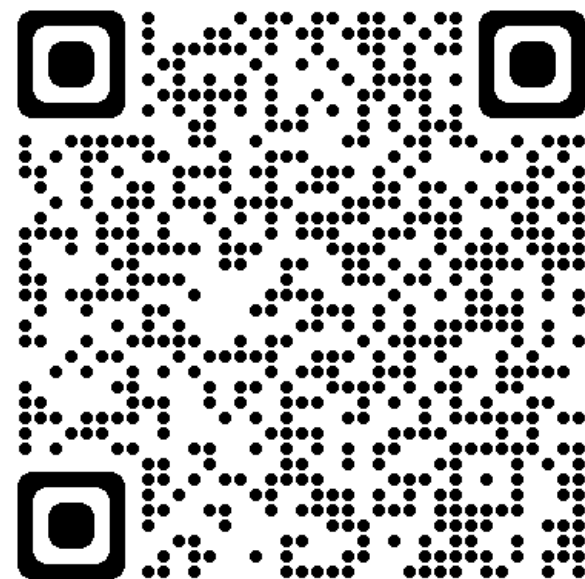
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Or use QR code



[nafmp.org](http://nafmp.org)



# The only cause of fatigue is insufficient sleep...



- True
- False

# Alertness Has Supply & Demand



- Supply Factors

- Internal individual susceptibility: circadian rhythm, amount of sleep, time of day, time awake, stimulants, other drugs, health, genes, mood

- Demand Factors

- Task related: Time on task, task complexity, task monotony
- Environmental: Road conditions, weather, stress (heat, noise, vibration), vehicle design, social interaction, other stimulation

# Vigilance Spectrum



- **Delta brain waves:** Deep sleep. 1 to 4 Hertz
- **Theta brain waves:** Sleeping or daydreaming when awake. 4 to 8 Hertz
- **Alpha brain waves:** Awake and calm. 8 to 12 Hertz
- **Beta brain waves:** Awake, alert, busy, and focused. 12 to 38 Hertz
  - **Low beta waves:** Thinking. 12 to 15 Hertz
  - **Beta waves:** Performing or focusing. 15 to 22 Hertz
  - **High beta waves:** Excited or anxious. 22 to 38 Hertz
- **Gamma brain waves:** Highly alert and conscious. 30 to 80 Hertz

# What will kill you faster?



- No Sleep
- No breathing
- Starvation
- Dehydration

# How Much of a Problem?



- According to the National Sleep Foundation, between 10% and 30% of adults struggle with insomnia
- 2% – 9% of adults are affected by obstructive sleep apnea (OSA)
- 28.1% of commercial driver's license holders affected by obstructive sleep apnea (OSA)\*
  - 17.6% Mild
  - 5.8% Moderate
  - 4.7% Severe

\*FMCSA Sponsored Study conducted by the University of Pennsylvania, Center for Sleep & Respiratory Neurobiology in conjunction with ATRI

*A Study of Prevalence of Sleep Apnea Among Commercial Truck Drivers*



# Your Questions Are Welcome Anytime



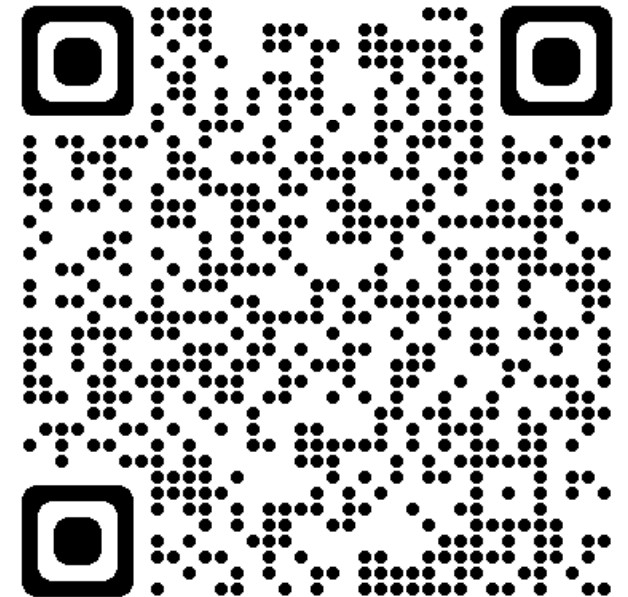
- What This Webinar Is Not About
  - Regulatory environment
  - FMCSA policy or rulemaking
  - Individual-specific clinical questions
- Consult your medical provider before following any lifestyle recommendations or if you feel any discomfort

1. Fatigue Management Program (FMP)
2. Fatigue Risk Management System (FRMS)
3. Sleep Hygiene vs Sleep Disorders
4. Sleep Disorders Management Program (SDMP)
5. Next Steps

# Fatigue Management Program (1 of 2)

- Safety Culture
  - NAFMP Module 2: Safety Culture and Management Practices
  - NAFMP Module 3: Driver Education & Training

[lms.nafmp.org](https://lms.nafmp.org)

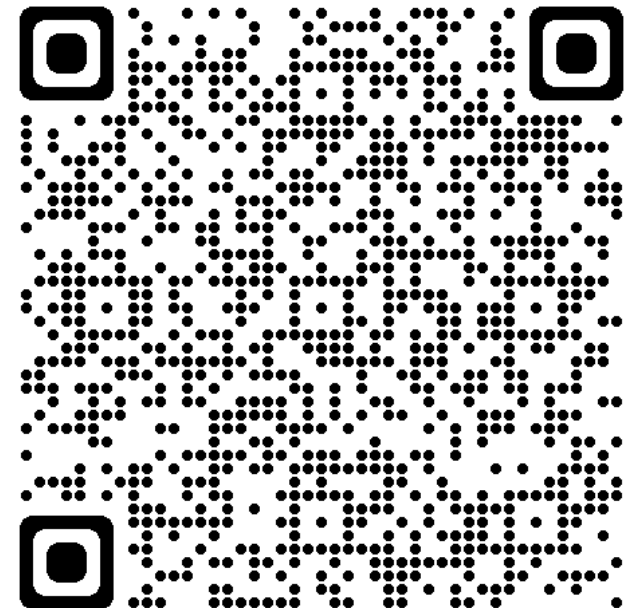


# Fatigue Management Program (2 of 2)

- Fatigue Risk Management System (FRMS)

- Operation scope
- Identify Risks
  - Predictive processes
  - Proactive processes
  - Reactive processes
- Assess
  - Tolerability
    - Probability
    - Severity
- Measures and Counter Measures
  - Predictive controls
  - Proactive controls
  - Reactive controls
- Evaluate

FRMS Slide Deck

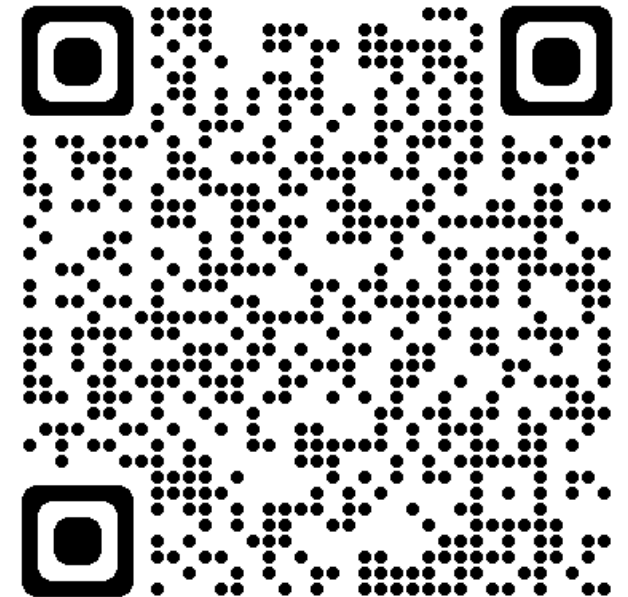


# NAFMP Recommendations



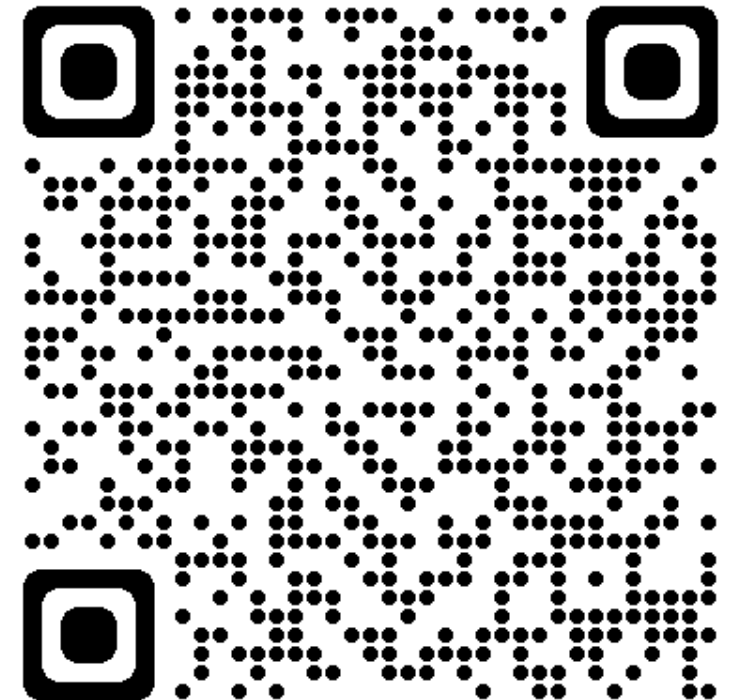
- Sleep Disorder Screening Program
  - NAFMP Module 7
  - NAFMP Module 8
- Sound Scheduling Practices
  - NAFMP Module 9
- Fatigue Management Technologies
  - NAFMP Module 10

[lms.nafmp.org](https://lms.nafmp.org)



UMA 2023 Safety Management Seminar  
FRMS – Part 1 – Fatigue Management Technologies

- Get the slides at the bottom of the page of **[nafmp.org/webinars](https://nafmp.org/webinars)**



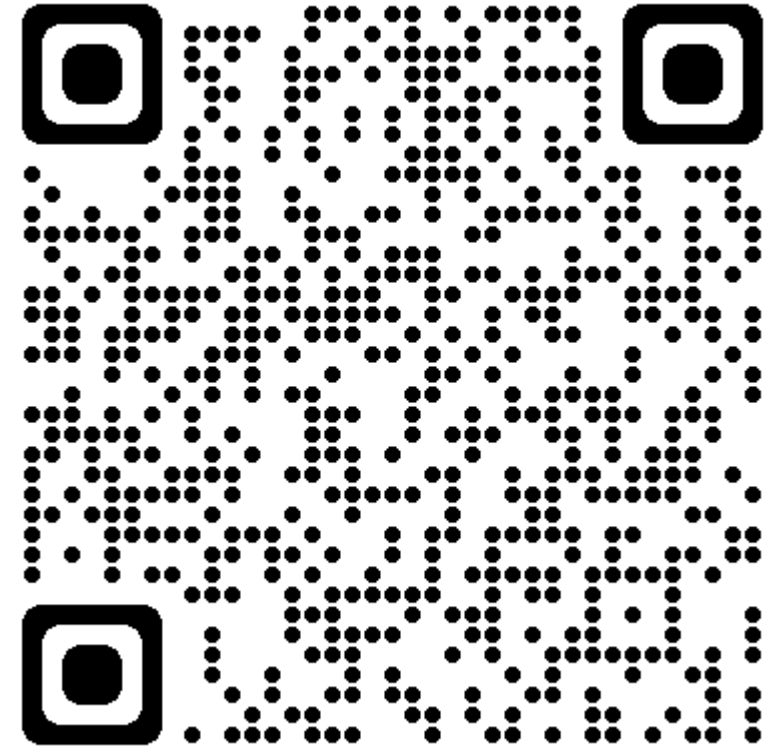
# NTSB Crash Investigation



<https://www.nts.gov/investigations/Pages/HWY21MH008.aspx>



At-rest position of the truck-tractor and Chevrolet. (Source: AZDPS with annotations by the NTSB.) Alt-text : On-scene, postcrash photo of the severely collision-damaged and burned-out remnants of the truck-tractor and the Chevrolet, seen from the right-side.



# Importance of Sleep: Biology



## Sleep Functions

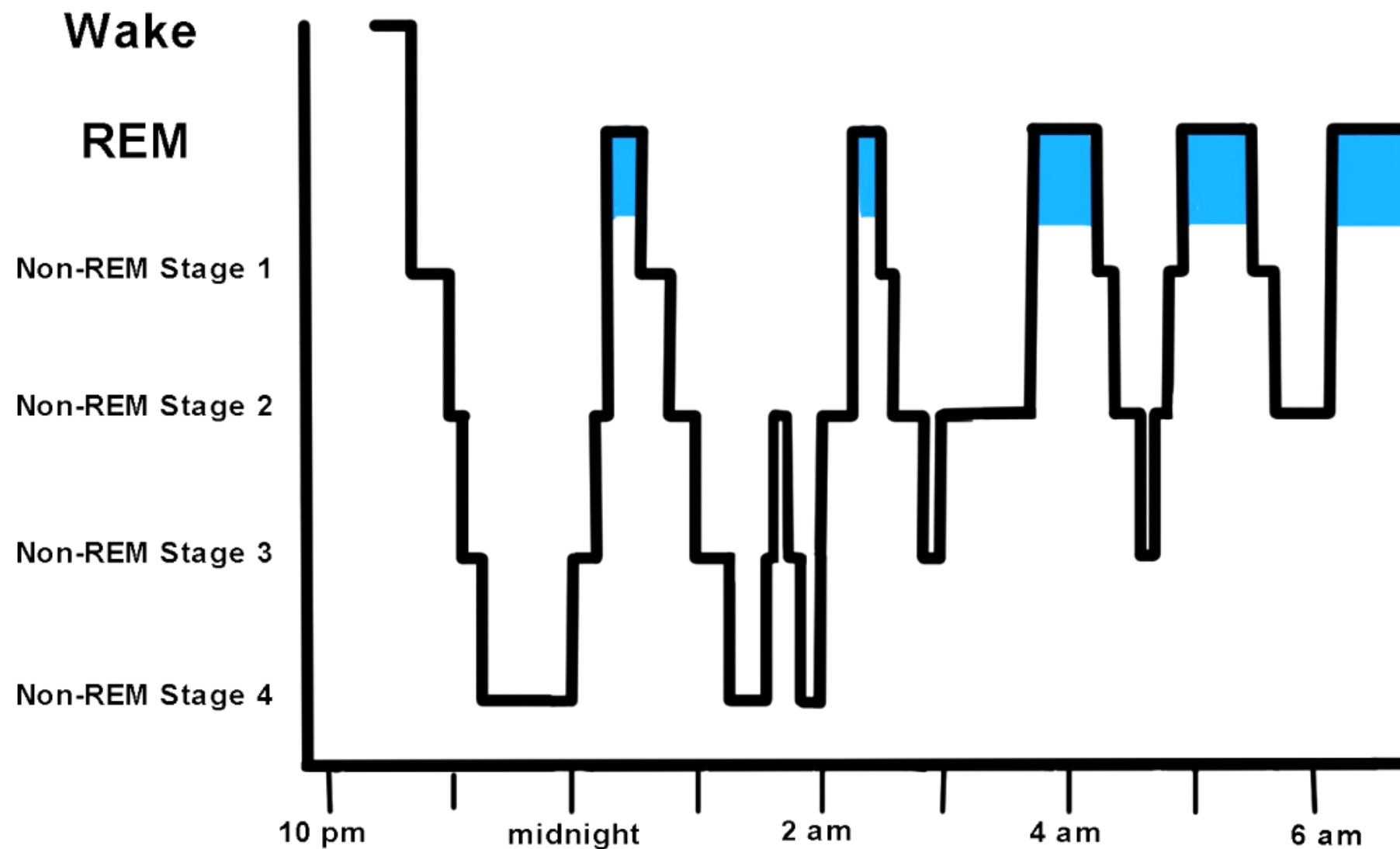
- Energy recharge
- Cellular restoration
- Brain function
- Emotional wellbeing
- Metabolism maintenance
- Immunity enhancement
- Heart health

## Sleep Deprivation Effects

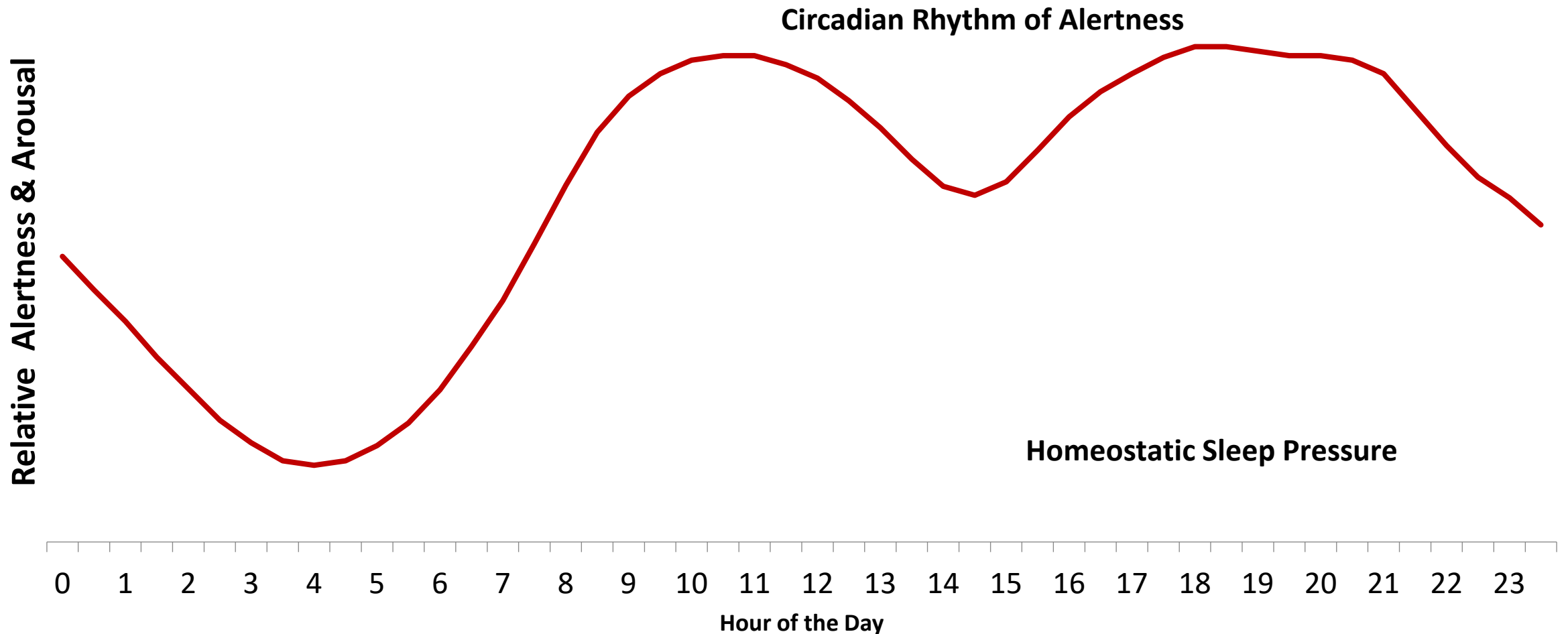
- Metabolic disorder
  - Increased appetite
  - Obesity
  - Increased diabetes risk
  - Increased blood pressure
  - Increased risk of heart disease
- Reduced immune system functioning
- Gastrointestinal problems
- Disrupts relationships
  - Irritability
  - Infertility
- Worsens psychiatric conditions
  - Alzheimer's disease, anxiety, depression, bipolar disorder, suicide, stroke, chronic pain
- Decreased quality of life & Increased sick days



# Sleep Architecture



# Sleep Drivers: The Clock & the Timer



# Energy Stimulation Hygiene



- Light
- Temperature
- Sound
- Substances
  - Food
  - Caffeine
  - Alcohol
  - Nicotine
  - Amphetamines
  - Medications

# Energy Release Hygiene



- Exercise
  - Early: Cardio & Strength
  - Anytime: Stretching & Breathing (Blow your nose & sleep position)
- Make bed the sleep trigger
  - Spine alignment
    - Supportive bed & pillows
- If cannot sleep and are anxious
  - Get up
  - Don't throw a party
  - Do something relaxing
- Relax
  - Land worries on paper
  - Meditate, practice yoga, pray or read something calming
  - Positive relationships

# What is the optimal duration of a nap?



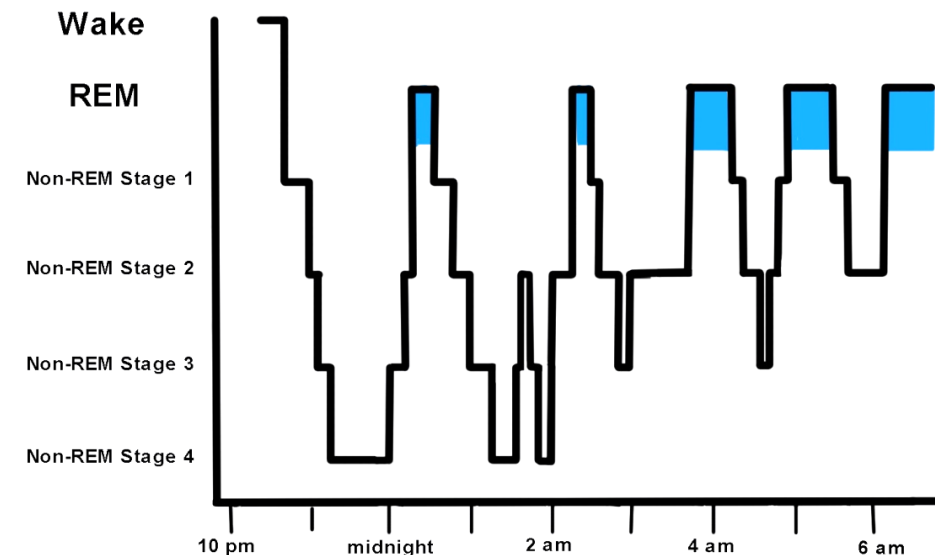
Select all that apply:

- 5 min
- 20 min
- 60 min
- 90 min
- 120 min

# Naps & Sleep Inertia



- Naps
  - Best fatigue countermeasure
  - Improves alertness & performance
  - Planned naps reduced subsequent dozing by 50% & errors by 34%
  - Optimal duration 20 min / 90 min
  - Longer naps may delay onset of next main sleep
- Sleep inertia
  - Grogginess upon awakening
  - May last 20 minutes or more
  - May affect driving
  - Caffeine may help



# Do you fall asleep while watching a movie or while stopped at a traffic stop?



- Yes
- No

# How to Payback a Sleep Debt?



- Sleep debt
- Full night sleep
- May require several nights of full sleep
- Avoid deprivation
- Sleep until you wake up
- Make extra deposits on the weekend



# Fatigue Susceptibility



- Sleep Deprivation
  - Sleep-related behaviors
  - Sleep hygiene
- Individual Differences
  - Genetic variations
  - Health & fitness
- Medical conditions
  - Medications
  - Sleep disorders
    - Insomnia, narcolepsy, restless leg syndrome, sleepwalking, abnormal circadian rhythms, obstructive sleep apnea (OSA)

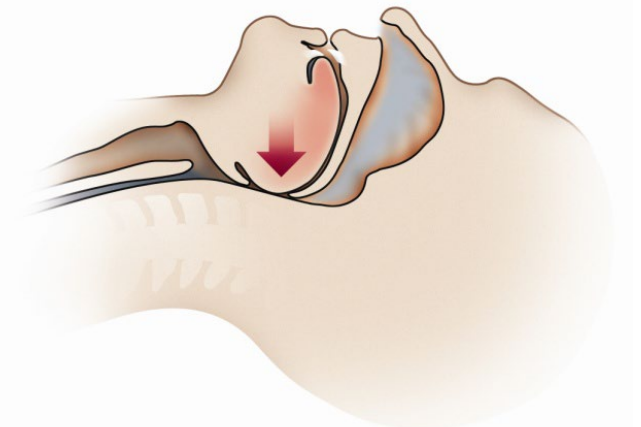
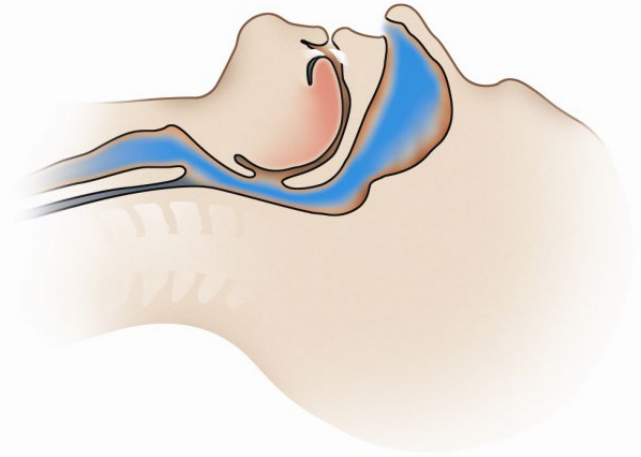
# Warning Signs & OSA Risk



- Sleep disorder symptoms
  - Excessive daytime sleepiness (EDS), extremes in ability to go to sleep
- OSA warning signs
  - Reduced performance, loud and irregular snoring especially with gasping, high blood pressure, diabetes
- OSA higher risk
  - Obese individuals, male, 45+ years old, large neck size, recessed chin, small jaw, large overbite, family history

# Obstructive Sleep Apnea

- **Apnea** = stoppage of breathing lasting 10+ seconds
- OSA = breathing stops repeatedly during sleep due to closures of the upper airway
- Apnea rate per hour:
  - $<5$  = normal
  - $\geq 5$  = OSA
- OSA severity (mild, moderate, severe) based on rate
- Some people with severe OSA can have 100 per hour



# OSA Health & Safety Implications



- Health Implications

- Metabolic syndrome
  - Non-alcoholic fatty liver disease
  - Diabetes
  - Cardiovascular disease
  - Hypertension
  - Lipid abnormalities
  - Polycystic ovarian cancer
  - Dementia
- Diminished quality of life
- Clinical depression
- Decreased sex drive and performance

- Safety Implications

- EDS – Asleep at the wheel
- Decline in cognitive function
- Impaired driving performance
- Decreased reaction time
- No braking: serious crashes
  - More fatalities
  - More costly

# Corporate Responsibilities Poll



- Implementing a SDMP may result in a significant ROI from
  - Savings on medical costs
  - Reduction in crashes
  - Greater retention rate
  - All of the above
  - None of the above

# Carrier Corporate Responsibilities

## - Return-On-Investment



- Report on Schneider National Inc. OSA Implementation Program showed a significant return on investment
  - Significant savings on medical costs for diagnosed and treated drivers
    - Drivers diagnosed and treated with CPAP, **average savings of \$550 per driver/month**
  - 73% reduction in preventable crashes among drivers treated for OSA
  - Retention rate of treated OSA drivers was 2.3 times greater than for all company drivers

# Carrier Corporate Responsibilities - Potential Legal Liability Issues



- Currently no federal mandates requiring carriers to screen, test, treat, and monitor drivers with OSA
- Motor carrier may not require or permit a driver to operate a CMV if the driver has a condition — including OSA— that would affect his or her ability to safely operate the vehicle
- Successfully treated drivers may regain their “medically-qualified-to-drive” status

# Carrier Corporate Responsibilities - Legal Risk Management Strategies



- Carrier Policies
  - Consistent with federal regulatory rules and recommendations
- Education
  - Safety culture: Managers, trainers, dispatchers, drivers, families
  - NAFMP Modules
- Documentation
  - Accurate & up-to-date documentation showing consistent implementation of FMP
- Communication
  - Verify and document PAP compliance
  - Remove any driver who fails to meet regulatory minimum requirements
- Confidentiality
  - Driver health records
- Consultation
  - Regularly consult with legal counsel on related policies, procedures, and practices



# Carrier Corporate Responsibilities

## - OSA Crashes Sample Claim Litigation



- Carrier should have known the driver had a sleep disorder
  - Evidence: driver medical examination reports, carrier health records, reports of witnessed EDS in the workplace
- Carrier did not monitor and follow-up with a driver with OSA who was prescribed PAP treatment
  - Evidence: driver logs, treatment records
- Carrier's Fatigue Management Program (FMP) was inappropriate, incomplete, or not implemented
  - Evidence: carrier records, driver logs, employee testimonials

# SDMP Implementation Steps



1. Education
2. Screening
3. Testing
4. Treatment
5. Monitoring

# Step 1: Education



- OSA Education – NAFMP Module 8 for Drivers
  - Signs and symptoms of OSA and sleep disorders
  - Health and safety implications of OSA
  - Testimonials (success stories)
  - Health & wellness
  - Treatment options
- OSA testing and treatment information
- Your sleep disorders program
  - Roles, responsibilities, policies & procedures
- Announcements, fliers, newsletters, videos
- Family Support – NAFMP Module 4

# Step 2: Screening - Methods



- Questionnaires
  - Epworth Sleepiness Scale, Berlin, Functional Outcomes of Sleep, Pittsburgh Sleep Quality
  - Limitations: Subjective & rely on willingness of respondent to report symptoms
- Objective assessments
  - Multiple Sleep Latency Test
  - Maintenance of Wakefulness Test
  - Limitations: Labor intensive, expensive
- Physical Examination
  - >30 BMI, > 15.5/17 neck circumference, >36/40 waist circumference, craniofacial features (receding chin, large tongue, small airway/mallampati score), micrognathia or retrognathia
- History
  - Family, metabolic disease, age 42 or older, male or postmenopausal female, untreated hypertension, type 2 diabetes, untreated hypothyroidism, loud snoring, witness apneas, stroke, coronary or artery disease

# Step 2: Screening - Recommendation



- Drivers who meet the following criteria should be required to undergo OSA testing:
  - Categorized as high risk for OSA according to the Berlin Questionnaire, **OR**
  - BMI  $\geq 40$  kg/m<sup>2</sup>, **OR**
  - Judged at risk for OSA from clinical physical examination evaluation **OR**
  - Admitted fatigue or sleeping during wakeful period **OR**
  - Involved in a sleep-related CMV crash

# Step 3: Testing



- Laboratory polysomnography (PSG) gold standard
  - Brain (EEG), heart, airflow, O<sub>2</sub> saturation, body movement
  - Apnea Hypopnea Index (AHI)
    - Mild: 5-15 per hour
    - Moderate: 15-30 per hour
    - Severe: >30 per hour
- Home Sleep Apnea Test (HST/HSAT)
  - Only appropriate for evaluation in high-risk populations without significant medical problems
  - Chain of custody must be secured
  - Validated against PSG
  - Objectively records oxygen saturation, nasal pressure, and sleep/wake time for a minimum of 5 hours

# Step 4: Treatment



- Positive airway pressure (PAP) devices
  - Continuous, automatic, bi-level
  - Effective when used properly/consistently
- Dental/oral appliances
  - Only for mild/moderate; Not for severe OSA
  - Monitoring compliance can be a challenge
- Surgery
  - Primarily for severe obstructive anatomy
  - Secondarily when PAP is not tolerable/adequate
- Lifestyle habits
  - NAFMP Module 3 & Driver Series Webinars on Keys to Wellness
  - Manage metabolic disease
  - Avoid alcohol/sedatives
  - Wellness keys
    - Sleep hygiene, positive relationships, positive behaviors, nutrition, exercise

# Step 5: Monitoring



- Compliance coaching & education
  - Mask discomfort, nasal congestion, eye irritation
- Drivers with OSA must demonstrate adequate PAP compliance and effectiveness to continue driving legally
- PAP treatment monitoring procedures must be in place for drivers
- Web-based
  - Recommended for monitoring following initiation of PAP treatment and at least until consistent and adequate PAP use has been established by patient
- PAP data cards
  - Recommended for alternative long-term compliance monitoring or as backup to web-based data collection



# Step 5: Monitoring - Recommendations



- Individuals on PAP treatment for OSA must demonstrate and document compliance
  - Graded certification upon proof of compliance
    - 1 month, 3 months, 12 months
- Annual recertification required for individuals who have undergone surgical treatments
  - Sleep disorders testing with  $AHI < 10$  AND
  - No daytime sleepiness

# Supporting a SDMP Poll



- Drivers must use their PAP device when at home; while on the road, PAP use is optional
  - True
  - False

# Supporting a SDMP - Non-compliance



- Identify reasons
  - Personal
    - Don't like being tied to a PAP machine
    - Poor/restless sleep with PAP machine
    - Partner dislikes PAP machine
  - Motivational
    - Benefits of PAP use do not out-weigh drawbacks
    - Drivers dislike carriers mandating PAP use while drivers are not in service
  - Driver bearing the cost
- Take actions
  - Flag non-compliant drivers
  - Verbal warnings
  - Identify reason(s) for non-compliance
  - Work with driver to address problem(s)
  - Pay for or help with driver costs
  - Technical issues
  - Motivational issues
  - Temporary driving restrictions
  - Continued coaching/support
  - Termination/job redistribution

# Supporting an SDMP

## - Carrier Managers Can Help



- Advise driver on locations where idle restrictions are an issue
- Help locate PAP suppliers while driver is on the road
  - Supplies, repairs, replacement parts
- Shared efforts by managers and drivers contribute to the FMP
- Organize a PAP-users group to support drivers
  - Drivers may discuss experiences, challenges, solutions, tips, etc.
  - Support groups should actively engage & offer tips to drivers who experience challenges
  - Successful PAP users can provide invaluable help to others just starting treatment
  - Monitoring recommended

# Supporting an SDMP

## - Common Myths & Misperceptions



- PAP therapy causes more sleep disruptions than having OSA
  - Proper equipment, mask fit and machine settings are imperative
- All PAP machines are created equal
  - Vast differences in PAP machine types and brands
- PAP machines are noisy and disruptive
  - Current PAP devices are much quieter compared to snoring
- PAP is impossible or difficult to use in the vehicle
  - Technology enables PAP use in the vehicle
- Patients diagnosed with OSA and prescribed PAP will likely be on PAP for the rest of their life
  - Metabolic syndrome may increase the severity of OSA
  - Controlling metabolic syndrome may eliminate the need for PAP in some cases

# Facilitating Driver Behavior Change



- Establish safety culture
- Set good example
- Assess needs
- Develop a plan
- Implement program in supportive environment
- Evaluate and improve program
- Overcome ambivalence
- Target specific behaviors
  - PAP compliance
  - Communicate with staff
- Specific goals
  - Increasing PAP use
  - Lifestyle improvements
- Social support

# OSA Case Study Focused Group Report



- NAFMP Implementation Manual: Pages 85 – 118
- Recommendations
  - Trust & cooperation requires being up front and honest with drivers about OSA Program and what they are being screened for is important for drivers
  - Include subjective & objective assessments to screen drivers for OSA
    - Questionnaires, physical examinations and personal observations
  - Involve the carrier's occupational health team
  - Have a graded rating system for OSA screening to prioritize highest risk drivers
  - Provide early OSA educational video and information
    - Drivers and other staff to support drivers
    - Carrier's OSA Program
    - Treatment options, especially lifestyle modification and wellness habits

# Additional Report Recommendations



- OSA Testing
  - Laboratory PSG is gold standard for diagnosing OSA but it's expensive and requires access to sleep laboratory
  - HST is cost effective and convenient but there are chain-of-custody concerns
- OSA Treatment
  - APAP is the recommended first-line treatment
    - Providing drivers with the appropriate mask is crucial for success & compliance
    - Drivers should be aware of the detailed compliance monitoring protocols in place
      - Wireless compliance monitoring devices better for newly diagnosed
      - Data cards are acceptable for drivers with an established record of PAP compliance



# Final Report Recommendations



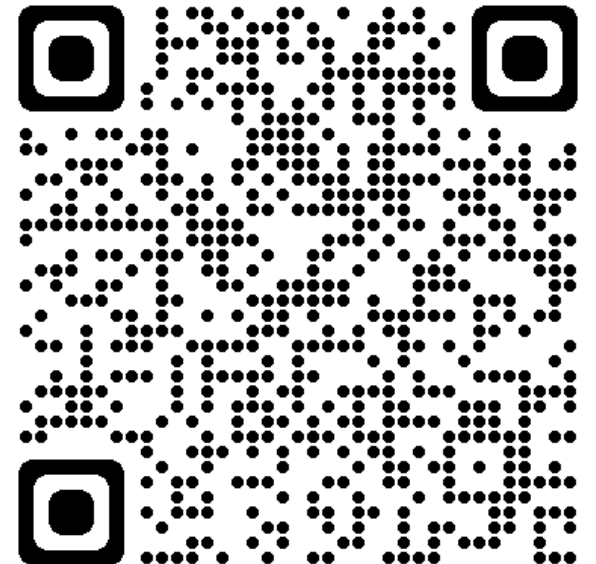
- Provide drivers with 24/7 support as they adjust to PAP treatment
  - First two weeks are critical
  - Parts, supplies, equipment
  - Solid support team
    - OSA program team
    - OSA provider staff
- Driver support groups
  - Life changing event
  - Share problems and solutions
  - Driver champions to support fellow drivers
- Less than 24-hour turnaround
  - From tested to treatment set-up and sending OSA-positive drivers back on the road
- Communication and coordination by all OSA program players
  - Drivers, carrier staff, OSA provider staff

# 1. Next Step: FMP Template



- Microsoft Form
- Navigate with form controls
- Don't use browser controls
- Save PDF at the end
- Edit form with MS Account

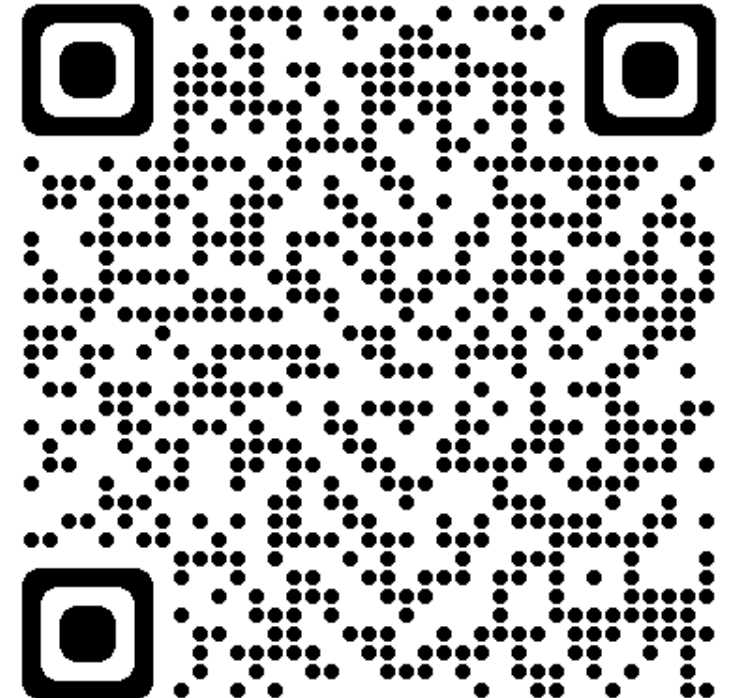
[FMP Template](#)



## 2. Next Step: Register for course/webinar

- FMP Roadmap Course
- NAFMP Solutions Webinars

Register at the top of the page of  
**[nafmp.org/webinars](https://nafmp.org/webinars)**



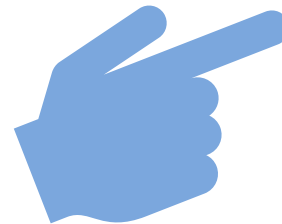
# FMP Roadmap Course Rubric



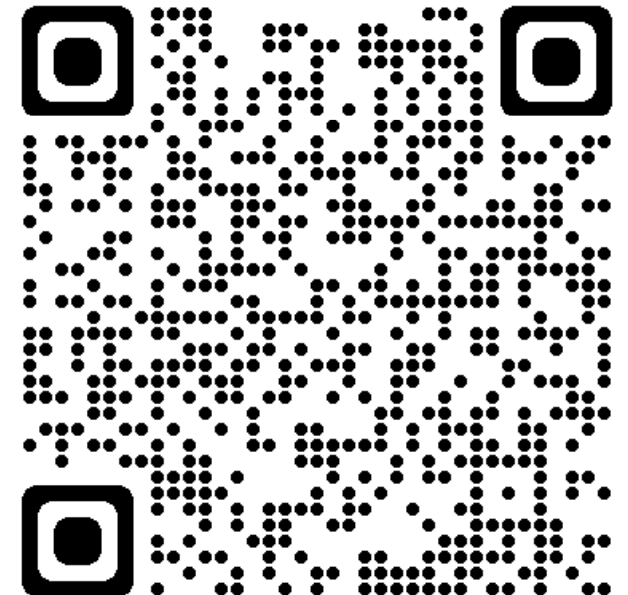
1. Terms of reference	10%
a. Policy	
b. Responsibilities	
c. Documentation process	
<hr/>	
2. Safety Culture	40%
a. Education - 10%	
b. Training - 10%	
c. Ongoing communication - 20%	
<hr/>	
3. Fatigue Risk Management System	40%
a. Operation - 2%	
b. Predictive, Proactive, & Reactive Controls - 20%	
c. Risk Assessment - 5%	
d. Measures and countermeasures - 5%	
e. Evaluation - 8%	
<hr/>	
4. Timeline	10%
a. Introduction	
b. Training	
c. Evaluation	
<hr/>	
5. Total	100%

# 3. Next Step: Driver Education & Training

- Module 8
  - Sleep disorders education
- Module 3
  - Driving and fatigue science
  - Five keys to wellness
  - How to recognize objective signs of fatigue
  - Fatigue management strategies
    - General
    - Home
    - On-the road
    - Night driving
    - Team driving



[lms.nafmp.org](https://lms.nafmp.org)



## 4. Next Step: Course Requests and Contact CVSA®



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Fatigue Management Specialist



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202-998-1830

# 5. Next Step: Resources



1. [nafmp.org](http://nafmp.org)
2. [Implementation Manual](#)
3. [eLearning Platform](#)
4. [Train-the-Trainer: Module 5](#)
5. [PowerPoint Presentations](#)
6. [ROI Calculator](#)
7. [Courses/Webinars – Slides/Recordings](#)
8. [FMP Template](#)

A blue-tinted photograph of a white commercial bus with "Washington, DC" on its destination sign. Two inspectors, one in a uniform and one in a safety vest, are standing near the front of the bus. The CVSA logo is prominently displayed in the center.

# CVSA<sup>®</sup>