You’ve just transferred from a 12 hour rotation to a new division offering a 24 hour schedule that works well with school. After three months, staff raise concerns about the way the car is being utilized. Concerns are: the unit is averaging 10 calls per shift and it’s not uncommon to have less than one hour in the station to rest. Staff went directly to the VP with road supervisions blessing and professionally presented the case. The VP responded to concerns by mandating that staff provide a typed detailed unit utilization summary for each shift (times, etc). He requested that details about how time on shift is utilized. Over the next three months the team obliged and call volume continued to climb. The team struggled to create the unit hour utilization worksheet due to fatigue and realized that this data could be pulled from the CAD. Frustration grew and team members began to not submit their UHU worksheet. Nothing was done to better manage the unit. The VP was asked why he wanted the sheet done manually he simply said it’s easier for him. Meanwhile, safety was a concern. It was not uncommon for staff to shut the unit down due to fatigue.
Scenario:

- Bob works in a frontier EMS system. His agency is short staffed and struggling to staff ambulances. The community expects adequate EMS coverage and response times. Bob has picked up 5 ALS shifts in a row on the schedule helping with staffing. This gives Bob a total of 120 hours worked in a row. You speak to Bob about this expressing concern, Bob explains that he will be fine. You then present this to your superior and he approves the time.

- On day 3 of Bob’s schedule, at 230 am your EMS cell rings, it’s Bob. He fell asleep at the wheel and drove the ambulance into a ditch with a patient and his partner in the back.

- Could this have been prevented? How would you handle this moving forward?
Evidence-Based Guidelines for Combating Fatigue In EMS, JEMS [3]

- More than half of EMS workers have a second job. Others that do not, report working copious amounts of overtime.

- Median pay for EMT’s and paramedics in 2016 was 15.71 per hour. This means half earn less than 15.71 per hour.

- “I get between five and six hours of sleep per day. I am capable of dealing with little rest during the week, yet when the end of the week comes, I’m a zombie. There are times I’m up all night on a 24 hour shift, and that just destroys me.” - Nancy paramedic

- “I get as little as three hours of sleep between shifts for six days straight. It’s dangerous as hell. It’s horrible. There are times when I dread going to work.” - Jamie paramedic works a rotation of 6 on 2 off.

- “We’re not afforded the opportunity to obtain sufficient or adequate sleep. People are just trying to make ends meet. It’s cultural in EMS that sleep deprivation is part of the job.” - Scott paramedic
Fatigue Defined

- A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental or physical activity) that can impair a crew members alertness and ability to safely operate an aircraft.

- Source: Icao.int [6]
Sleep Deprivation Defined

- Sleep deprivation: a condition of not having enough sleep. Can be chronic or acute.
- **Fatal familial insomnia**

  - **Signs/Symptoms of sleep deprivation:**
    - Memory problems
    - Feeling depressed
    - Decreased immunity
    - An increase in pain perception
    - Fatigue
    - Increased appetite
    - Day time sleepiness
    - Clumsiness
    - Headaches
    - Periorbital puffiness
    - Increased blood pressure
    - Increased cortisol levels
    - Irritability
    - Increased risk for type-2 diabetes
What Causes Fatigue?

- Prolonged mental and physical activity
- Sleep loss and prolonged wakefulness
- High workload
- Work at night or early in the morning
- Circadian phase/time of day
- Is all work created equally?
- Let’s talk about factors not related to work that could contribute...
Signs of Fatigue

- **Physical signs:**
  - Yawning
  - Poor hand/eye coordination
  - Slower reflexes and reaction times
  - Lack of energy and lethargy
  - Speech difficulties
  - Blurred vision or reduced visual perceptions
  - Microsleeps

- **Mental signs:**
  - Irritability, impatience
  - Difficulty concentrating and limited attention span
  - Increased risk taking
  - Auto pilot behavior
  - Impaired judgement, problem solving
  - Difficulty making decisions
  - Inability to be motivated to complete required work
Measuring Fatigue

Measuring fatigue can be challenging.

- Samn Perelli Crew Status Check (fatigue)
- Karolinska Sleepiness Scale (sleepiness)
- Visual analogue scales
- Psychomotor vigilance tasks
- Model: SA (South Australia) Ambulance Service
### Samn-Perelli fatigue checklist

1. Fully alert, wide awake
2. Very lively, responsive, but not at peak
3. Okay, somewhat fresh
4. A little tired, less than fresh
5. Moderately tired, let down
6. Extremely tired, very difficult to concentrate
7. Completely exhausted, unable to function effectively

### Fatigue Assessment

#### Step 1: Sleep in prior 24 hours

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<th>Points</th>
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<td>3</td>
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<tr>
<td>4</td>
<td>4</td>
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<td>&gt;5</td>
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#### Step 2: Sleep in prior 48 hours

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<td>6</td>
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<tr>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>&gt;12</td>
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</table>

#### Step 3: Prior wake

Count the total hours you will have been awake at the end of your shift (excluding any anticipated sleep during the shift).

For every hour more than your sleep in the prior 48 hours, add one point.

<table>
<thead>
<tr>
<th>Total points</th>
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<tbody>
<tr>
<td>Rate</td>
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<td>7</td>
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<td>8</td>
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<td>9</td>
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</tbody>
</table>

Karolinska Sleepiness Scale
How Much Sleep is Enough?

- Every adult is different in their sleep needs.
- What we do know is sleep deprivation recovery is not hour for hour.
- According to The National Sleep Foundation most adults require between 7-9 hours per 24 hour period [2].
- Statistics: 50% of EMS personnel sleep only 6 hours per 24 hour period not meeting the NSF guidelines, more than half report poor sleep quality, 70% report problems with sleep.
- Preparatory sleep vs. recovery sleep
'Fit for Duty' is a state in which an individual presents for work adequately prepared so as to be in a physical, mental and emotional state that enables them to perform the essential functions of their work in a manner that does not threaten the safety or health of themselves, co-workers, property, patients or the public. (Sources: Fatigue Risk Management SA Ambulance Service, Fitforduty)
Who’s Responsible for Managing Fatigue?

- Managing fatigue is a shared responsibility by management and staff.
- Preparatory and recovery sleep are key.
- Management and supervision of staff workload, time on task, rest periods, etc. is important.
- On shift time management is essential. Making time for rest and relaxation. Self care.
RECOMMENDATIONS FOR MITIGATING FATIGUE

1. Reliable and/or valid fatigue and sleepiness survey instruments should be used to measure and monitor fatigue in EMS personnel.  

2. EMS personnel should work shifts shorter than 24 hours in duration.  

3. EMS workers should have access to caffeine as a fatigue countermeasure.  

4. EMS personnel should have the opportunity to nap while on duty to mitigate fatigue.  

5. EMS personnel should receive education and training to mitigate fatigue and fatigue-related risks.  

NASEMSO.org [7]
Andrea’s Tips for Managing Fatigue

1. You are ultimately responsible for self-care on and off shift.
2. Have a morning routine. Limit MSD’s.
3. Don’t get to bed late the night before a 24 hour shift. Get your preparatory sleep. Plan to be awake for 24 hours.
4. Pick up OT responsibly. Don’t overextend yourself.
5. Eat well. Cook your food. Be sure to bring ready to eat snacks in case you have a bad day and don’t have time to cook or stop. Avoid fast food and junk food. Drink water not sugary drinks.
6. Use caffeine but, moderate it. Avoid caffeine at night unless you know you will be up all night.
7. Use white noise (fan) to drown out noise while resting.
8. Don’t allow others to drain your energy with negativity or drama while on duty.
9. Be self aware. Work with your supervisor if you’re unable to function on duty. Keep yourself and others safe.
Healthy Sleep Tips: The National Sleep Foundation [2]

- Stick to a sleep schedule
- Practice a relaxing bedtime ritual
- Exercise daily
- Evaluate your bedroom to ensure ideal temperature, sound, and light
- Sleep on a comfortable mattress
- Beware of hidden sleep stealers, like alcohol and caffeine
- Turn off electronics before bed

How do these tips align with an EMS work environment?
The Health Consequences Associated With Fatigue and Sleep Loss

- 75% of EMS personnel are classified as obese or overweight.
- 50% of EMS clinicians have at least one of the following: hypertension, sleep apnea, breathing problems, diabetes, depression.
- A single night without sleep can manifest as a greater resistance to insulin.
- Chronic sleep deprivation has been linked to an increased risk of cardiovascular events.
- “Short sleep” defined as any cycle lasting between 4-7 hours is associated with an increased risk of coronary artery disease, stroke, type 2 diabetes, obesity and weight gain, depression, workplace accidents and mortality.
Administrative Considerations

- Do we have sufficient staffing?
- Are we asking for excessive amounts of OT?
- Do we provide sufficient sleep opportunities while on duty?
- Are sleeping quarters conducive to sleep?
- Do we have a system in place to empower peers to call out fatigue?
- Do we have oversight over our 24 hour units?
- Do we have a culture that supports these initiatives?
Montgomery Community Hospital District EMS and Williamson County EMS both suburban agencies in Texas.

Measure each unit's UHU, complex geofences were used to measure times on task out of the station.

Dispatchers used a Tableau dashboard to measure real time busyness.

A unit was considered resting if:
- Not assigned to a response and within a specific geofenced area
- Placed out of service for downtime

A unit was considered busy if:
- Assigned to a cover station or post
- Assigned to a call
- Outside a geofenced area near the home station
The busy timer was set to reset to zero after 45 minutes of rest, accounting for ambulance restock, paperwork, etc.

The program notified dispatchers on their dashboard when a unit was approaching over utilization.

The deployment committee and EMS command staff established a goal of at least 6.5 hours of rest for a particular unit. If the unit failed to meet this target utilization was investigated. Adjustments or an additional unit was considered.

Agency guidelines were created around fatigue modeling SA ambulance service guidelines.

Training was provided to staff about sleep related issues. “We wouldn’t expect our caregivers to provide a high-risk medical procedure without training, however we were expecting them to function on a 24 hour shift without education.”

A fatigue assessment tool/score was developed using SA Ambulance Services model.
file:///C:/Users/f0007229/Downloads/FRMS_eLearning_Content_170529.pdf
1. Data Driven Approaches to Reducing Provider Fatigue, M. Knipstein, J. Cospner, J. Foretti. Published: JEMS 5.6.19

2. How Much Sleep Do We Really Need? Published: The National Sleep Foundation. www.sleepfoundation.org

3. Evidence-Based Guidelines for Combatting Fatigue in EMS, Daniel Patterson Published: JEMS 2.1.2018.


6. Measuring Fatigue, Dr. Michelle Millar Published: International Civil Aviation Organization 2012.

7. Fatigue Guidelines Published: NASEMSO.org 5/4/2018