



ACT

Tools are available to
foster change.



SNEAK PEEK

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Executive Summary

Support and enable the creation of FRM plans that ensure effective management of fatigue during training and throughout practice; for patients, learners, practitioners and teams.

Managing fatigue signals a turning point for Canadian medical training as we move to join leading countries and best practices in the management of fatigue risk. If we are successful, we will promote the establishment of training environments where fatigue risk is acknowledged, individuals and teams are enabled to recognize the risks and empowered to take action to apply adaptive strategies suited to local contexts. Focusing on fatigue risk management does not imply that long work hours are acceptable; rather, this approach recognizes the risk associated with extended work hours and aims to identify practical approaches to managing the risk.

Recognizing that there are many factors that contribute to fatigue during residency, a comprehensive approach to minimize fatigue and fatigue-related risks should be developed and implemented in residency training in all jurisdictions in Canada. Strategies must be adaptive to specific contexts and specialties. This national tool-box resource of fatigue mitigation strategies and techniques, adaptable in a variety of settings and for a variety of disciplines, has been created to support this change.

Acknowledge. Act. Adapt

Fatigue Risk is actionable
on all levels.



Background

Self-assessment of fatigue impact on performance often underestimates the true impairments experienced, as identified in the work by Dorrian, Lamond and Dawson (2000).

While individuals may be aware that they are indeed fatigued or feeling tired, their ability to accurately assess or predict the impact on increasingly complex tasks diminishes with greater levels of extreme tiredness. Further, as fatigue becomes a chronic pattern during residency training, the ability to assess the degree of sleep-related impairment diminishes, and many incorrectly come to the conclusion that they have acclimated or 'adapted' to a deprived sleep state (Veasey et al, 2002 and Taylor et al, 2016).

Education + Training

- ▶ OBJECTIVES
- ▶ FACTORS TO CONSIDER
- ▶ RECOMMENDATIONS

▶ Education Objectives

At a minimum, fatigue risk education should aim to:

- Promote awareness around the risk of fatigue, for both learners and supervisors/leaders
- Identify the individual and team-based strategies available to manage the risk

► Education and Training: Factors to Consider

Prior to implementing training and education approaches, the following considerations may help to identify the most suitable approaches to orienting learners, supervisors and staff to fatigue risk in their practice environment.

- Determine the level of fatigue risk an organization faces
- Determine the level of existing knowledge around fatigue-related risk
 - Considerations will vary depending on an organization's size, resources and practice context, and the existing awareness and culture around the risk of fatigue

► Recommendations for Training & Education

- Outline a clear description of the duty of all participants to recognize and manage fatigue as risk during their training
- Identifies individual and team-based strategies that enable learners, teams and those in supervisor roles, to recognize fatigue and associated risks in themselves and in others. Include:
 - Acknowledgment that fatigue can manifest differently depending on the local working environment and the individual
 - Identification of available strategies
 - The impact of fatigue, or the fatigue-related risk, may be task or context-dependent
 - For example, can manifest as attentional barriers when interpreting test results, decreased procedural reaction times or as misunderstanding communication/verbal interactions
- Provide information on how to access and use the institutional or program-level FRM Policy, and how to access resources that will enable both learners and supervisors to manage their own fatigue and to comply with the FRM policy as outlined

What Should be Included in FRM Programs

- 1 Information about circadian rhythms + sleep science
 - Refer learners to current evidence on relevant sleep research
- 2 Factors that promote healthy patterns of wakefulness and good sleep hygiene
- 3 Occupational Health and Safety: Individual + Team Level
 - Fatigue recognition and prevention
 - Fatigue contributing factors
 - Implications of fatigue for both trainee and patient safety

FOR EXAMPLE: needle stick injuries, motor vehicle accident involvement



FRM training can be situated in overall resident wellness as demonstrated in Key Competency 4 of the [CanMEDS Professional](#) role, where a physician is able to:

- Demonstrate a commitment to physician health and well-being to foster optimal patient care

► Enabling Competencies reflecting this role include

- 4.1 Exhibit self-awareness and manage influences on personal well-being and professional performance
- 4.2 Manage personal and professional demands for a sustainable practice throughout the physician life cycle
 - 4.3 Promote a culture that recognizes, supports, and responds effectively to colleagues in need

Approaches to FRM Education and Training

► Primary Level

Introductory training aimed at the individual management of fatigue

- Orients learners to the processes and procedures within the FRM policy that support the voluntary identification of fatigue or a fatigue-related impairment in themselves or in others (See sections on pages 22-25: [FRM Policy Template & Recommendations](#))

► Secondary Level

Training to familiarize supervisors and staff with policies and FRM planning, targeting the team level

- Enables supervisors to communicate the rationale and importance of an effective FRM strategy, compliance with the policy and how to support learners in declaring and managing individual fatigue

► Tertiary Level

System level occupational health and safety

- Outlines roles and responsibilities throughout an organization. Aimed at all staff and particularly for supervisors and leaders in medical education and clinical learning environments
- A focus on how to change infrastructure to support FRM - such as delegating certain tasks for time of day when providers are expected to be more rested/alert



► Options for Training Delivery Approaches

- Web-based training modules
- Informal “Physician Wellness” Rounds¹
 - Voluntary and held during protected time, e.g. academic half day
 - Promotes a supportive resident-led initiative
- Opportunities confidentially discuss challenges related to residency, wellness and wellbeing, including factors related to fatigue, burnout/ sleep deprivation or excessive work hours – Resident Wellness Office

Individual Fatigue/Sleepiness Scales

TERM	DEFINITION
<p>Karolinska Sleepiness Scale (KSS) and Questionnaire (KSQ)</p> <p>> See Appendix for a copy of the KSQ</p>	<ul style="list-style-type: none"> • Subjective scale • Quick and simple to administer, paper or electronic format, valid and reliable • Limitations: easy to cheat, face validity may be limited, not reliable in reflecting objective performance measures
<p>Fatigue Severity Scale (FSS) of Sleep Disorders</p> <p>> See Appendix for a copy of the FSS</p>	<ul style="list-style-type: none"> • FSS (note that the PDF is widely accessible online, see also Neuberger, 2003) • Designed to measure fatigue severity in experience of fatigue in a variety of medical and neurologic disorders • 9 statements addressing how fatigue impacts activities of daily living • Higher scores indicate greater fatigue severity
<p>Managing the Risks of Fatigue in General Practice - For GPs and GP Registrars (Australian Medical Association)</p> <p>> See ‘Fatigue Risk Checklist’ in Appendix</p>	<ul style="list-style-type: none"> • See ‘Fatigue Risk Checklist’ in Appendix – generic workhour checklist to determine the types of risk factors applicable to residents/physicians based on hours work • See also ‘AMA Fatigue Risk Assessment Tool’ – specific to Australian physicians in practice
<p>If a sleep disorder is suspected, a certified physician may recommend a Multiple Sleep Latency Test (MSLT) to rule out narcolepsy/idiopathic hypersomnia (Carskadon and Dement, 1982)</p>	<ul style="list-style-type: none"> • Diagnostic test, often utilized in workplace environments • Used to determine sleep disorders where excessive daytime sleepiness is the primary complaint (physiological sleep tendency)

¹ Calder-Sprackman, S., Kumar, T., Sampsel, K., & Gerin-Lajoie, C. (2017). LO42: Ice Cream Rounds: The adaptation and implementation of a peer-support wellness rounds in an emergency medicine residency training program. CJEM, 19(S1), S42-S42. doi:10.1017/cem.2017.104, <http://postgrad.med.ubc.ca/2017/01/17/ice-cream-rounds-what-it-is-and-how-to-bring-it-to-your-program/>, ALiEM and MEdIC <https://www.aliem.com/>, <https://www.aliem.com/>, <https://www.cma.ca/En/Pages/cma-physician-health-policy-addresses-wellness-in-the-medical-profession.aspx>, <http://policybase.cma.ca/dbtw-wpd/Policypdf/PD18-01.pdf>

Indicators of Fatigue: Common Symptoms

(Queensland Health, 2009; CCOHS, 2012; Sinha, Singh & Tewari, 2013)

PHYSICAL	MENTAL	EMOTIONAL/PSYCHOSOCIAL
Yawning	Reduced attention span	Irritability, poor temperament
Drooping eyelids	Decreased alertness	Quiet, withdrawn
Eye-rubbing	Poor judgement	Unmotivated
Involuntary nodding of head	Poor communication	Sluggish/lethargic
Involuntary naps/micro sleeps	Near misses/close calls	Giddiness
Poor/reduced motor skills		
Increased susceptibility to illness		

Case Studies

► SCENARIO 1

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DRIVING HOME/COMMUTING

Phil is 31, married and recently became a father. He is in his 3rd year of his residency training in internal medicine. He drives 45 minutes each way to the hospital and typically completes several 12-hours shifts in a 30 day period.

Recently, Phil drove off the road on his way home from work at 6 a.m. Although this was not the first time he had felt tired, it was the fourth time in the past six months he'd had a driven off the road post-call and this time it frightened him. He stopped his car, and walked around outside in the cold air before he continued home. Although he has been avoiding talking to his supervisor and junior staff about driving home exhausted,

this latest incident was the trigger for Phil to tell his wife. Now that he has a child, he feels more strongly that he has to make some sort of change, because his stories about nearly falling asleep on duty or on the way home from work scared her. Phil thought he could avoid an accident, but now realizes that he could hurt himself or others if he does not make a change.

- How could Phil improve his sleep?
- Who should Phil talk to/inform about these near misses?
- On average how many hours of sleep should you ideally get each night?
- What is the responsibility of Phil's program to help address this serious personal safety issue?

► SCENARIO 2

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TALKING WITH YOUR TEAM

Maggie is a clinical supervisor for ICU team at a large urban regional healthcare center, and is responsible for overseeing several residents at various stages of their training. She notices one of the senior residents, named Ben, has been routinely nodding off during briefs, and appears unfocused and groggy on the occasions when she does observe him in practice. Of particular concern is that Ben often forgets important patient update details when handing cases over to the oncoming attending. Maggie has observed

that Ben is an excellent physician when he's at the top of his game; however she also knows that the effectiveness of her team and the patient care they deliver becomes compromised when communication isn't clear. Maggie wants to address this with Ben, but knows the whole team is tired and even she herself feels worn out after several long and hectic shifts.

- How can Maggie bring up her concerns with Ben in a positive and constructive manner?
- How can Maggie ensure that she models good self-awareness and effectively manages her influence on her own personal well-being and professional performance?

► SCENARIO 3



FOOD/WATER AND CAFFEINE INTAKE

Zainab is a 23 year old resident in her first year, and is finding the transition from medical school to residency challenging. Her demanding schedule and on call hours often leave her feeling drowsy and low-energy, and she has difficulty concentrating when new procedures are being demonstrated. To cope, Zainab has started to drink a large coffee before her shift and will often consume a caffeinated energy drink and a muffin or pastry from the cafe during her break, while attempting to squeeze in a bit of studying. Although she's getting the short-lived energy boost she needs to get through her call

shift, Zainab is finding that she feels increasingly irritated and anxious, and has difficulty falling asleep when her shifts are over. Further, she's finding it increasingly difficult to recall details from regular study sessions and during patient handovers.

- What might the impact of sugary energy drinks and foods have on Zainab?
- What effect does caffeine have on water in the body?
- How can Zainab adjust the timing of her caffeine intake to maximize its effectiveness?
- On average, what is the minimum amount of water you should drink every day?

► SCENARIO 4



WORKING IN ISOLATION

Jordan is a GP in a remote northern community, providing service for approximately 700 residents, many with complex conditions and with limited access to support and healthcare services. Jordan trained in an urban center but wanted to practice in the north as he comes from a smaller town. He is typically the lone practitioner providing 24 hour on-call care, and often experiences tough working conditions with limited resources and now works with a much smaller team than he'd grown used to during residency. As such, he now has less time to recoup lost hours of sleep and minimal time available for leave. Often, he's responsible for providing emergency care in the early

morning hours. The clinic has had high turnover lately and the morale is quite low, owing to the working conditions and long winter months. When he's off duty, Jordan tends to catch up on sleep and reading or watch TV, and not much else. Although he is committed to making his community healthier, Jordan is aware he's an increased risk of stress and extreme fatigue given the intense burden and limited support available to his practice.

- What individual level strategies can Jordan use to manage his fatigue while on-call?
- Are there changes Jordan can make to his habits outside of work that might help him feel more balanced?
- What changes could be made to the overall system that may improve the situation?

Risk Mitigation Tools and Strategies

Managing the risks associated with fatigue.

Once fatigue-related risks within the training and practice environment are identified, effective control mechanisms can be implemented. There is no single solution suitable for all environments, and individuals and teams may already be employing a broad range of informal habits to manage fatigue. Beginning to document these practices promotes their use such that the strategies can become more effective, improved and implemented broadly. Alongside any identified fatigue-related risks, existing mitigation strategies should also be recorded in a fatigue risk log book or register.

Upon identifying the fatigue-related risks and mitigation strategies in the local context, it will be beneficial to continue to assess the level and impact of fatigue. Regular team discussions about how fatigue impacts your practice will help to ensure that new risks are identified as they emerge. It will also promote a proactive culture in which talking about fatigue is the norm.



Examples of Training Strategies

- 1 Scheduling less complex or less safety-critical tasks at times of highest fatigue risk.
 - For example, employ a model for critical care task allocation and planning for overnight operational hours, such as the [H@N](#).
- 2 Training employees on sleep hygiene and strategies to increase alertness.
- 3 Establishing & communicating clear handover protocols.
- 4 Advising colleagues (including allied healthcare professionals, such as nursing colleagues) when you are experiencing fatigue that may impair practice so that they can increase their vigilance.
 - For example, colleagues are better enabled to catch near-hits, (or near misses) when they are aware their counterpart(s) may be experiencing a fatigue-related impairment (*Transport Canada, 2008*).
- 5 Initiating a conversation with the team to determine what fatigue 'looks like' in a particular context, and how it may differ under the following circumstances:
 - Overnight vs. daytime shifts
 - Junior vs senior residents/staff - (who is on the floor/ on call)
 - Rural/remote vs. urban clinical setting
 - Repetitive task fatigue, task complexity
 - Actions expected from the supervisor or program if a resident is experiencing fatigue-related impairment
 - Expectations on what to do if you personally are fatigued and suspect it may be affecting practice or personal safety

Caffeine

Caffeine is a well-known addictive stimulant, and can negatively impact the quality of sleep if not used judiciously. For example, sleep can be affected if enough caffeine is consumed just prior to a planned time of prolonged sleep or if consumed excessively over several hours such that restorative or brief napping cannot be achieved (Royal College of Physicians of London, 2006). Caffeine, **when used strategically and with an understanding of its subjective effects**, can be effective in maintaining or enhancing wakefulness and ensuring alertness when fatigued (Royal College of Physicians of London, 2006).

Commonly Consumed Forms of Caffeine include:

- brewed coffee/iced coffee drinks
- tea
- soft drinks & energy drinks
- chocolate
- caffeine tablets (capsule or pill form)
- some medications intended to relieve headaches

Using Caffeine Strategically (Transport Canada, 2011)

- Try to avoid caffeine use when you are not tired, as this will increase caffeine tolerance without maximizing the caffeine effects
- Avoid caffeine intake several hours prior to planned bedtime; as a stimulant, it can be disruptive or prevent sound sleep and interfere with proper sleep recovery
- As caffeine consumption produces a diuretic effect, ensure that water intake is increased when consuming caffeine
- Although individual responses and tolerances to caffeine intake can vary, effects in adults typically begin 20-30 mins after ingestion, and are noticeable for between 4 and 6 hours

Awareness of your individual response and tolerance to the effects of caffeine can help you implement strategic caffeine use.

Caffeine, Napping & Sleep Inertia

Sleep inertia is commonly experienced shortly after waking, and presents as generalized grogginess/ tendency to fall back asleep, with impaired cognition and motor performance that typically lasts 10-15 minutes. With intense call schedules and long working hours,

physician training invariably exposes learners to being awakened suddenly, and then expected to make critical decisions. Caffeine can be implemented as a countermeasure to sleep inertia when consumed in small doses (Hilditch, Dorrian and Banks, 2016) and can increase alertness overall when used in combination with short/brief napping (Queensland Health, 2009); **for example, consuming 1 cup (250ml) of brewed coffee (~135mg of caffeine) just prior to a 25-30 min. nap** (Royal College of Physicians of London, 2006).

Sleep Hygiene Tips (adapted from CCOHS, 2018)

- Go to bed and get up at the same time every day
- Exercise regularly
- Eat at regular intervals; consume a balanced diet of fruits, vegetables, whole grains, healthy fats & protein
- Use your bed primarily just for sleeping (e.g., do not watch television, read or do work in bed)
- If you are not sleepy, do not try to go to bed. Get up and read or do something quiet instead
- Avoid caffeine, tobacco or alcohol – especially before bed time
- With the exception of an on-call pager, silence all other electronic devices/phones
- Ask family members to be respectful if one person is sleeping
- Make the room as dark and quiet as possible. Use heavy, dark curtains, blinds, or a sleeping eye mask. Soundproof the room where possible or use ear plugs
- Most people sleep better when the room is cool. Consider using an air conditioner or fan in the summer months

Fatigue Mitigation Strategies

SAMPLE INDIVIDUAL FATIGUE MITIGATION STRATEGIES
Performance of self-assessment prior to and during a work shift to ensure fitness for duty
Ensure adequate recovery time prior to each shift
Attend and be engaged during fatigue risk management education and training sessions
Judicious use of caffeine
Work break/work break with no pager/phone
Quiet rest
Napping/Sleep
Increased physical activity/light exercise
Ensure adequate hydration and nutrition
Task rotation
Double-checking calculations and instructions
Defer non-urgent cases
Limit overtime hours
Avoid repetitive or monotonous tasks during periods of higher fatigue risk
When possible avoid highly complex tasks during periods of higher fatigue risk
Work in pairs or teams
Declaration of fatigue risk to team
Employ self-assessment checklists for signs and symptoms of fatigue
When necessary, stand down

SAMPLE TEAM-BASED FATIGUE MITIGATION STRATEGIES
Communicate fatigue risk declaration to team
Communicate/document fatigue status in 'fatigue diary' or logbook
Communicate fatigue status on daily team notice board
Work in pairs or teams
Reallocate tasks
Increase team cross-checking
Increase supervision
Use of video conferencing/telemedicine
Base shift schedules on sleep science
Seek second opinion on critical clinical decisions
Ensure fatigued individual avoids acting as primary operator in procedural work whenever feasible
Scheduling less complex or less safety-critical tasks at times of highest fatigue risk, when possible
Ensure fatigued individual has priority access to on-call room/napping facility where available
Access to taxi vouchers or transportation for safe commute
All clinicians, educators, and learners take responsibility for identifying and reporting unsafe conditions, in accordance with professional standards and hospital policy, without fear of reprisal
All clinicians, educators, and learners take responsibility for maintaining optimal personal health and well-being outside of work, including maintaining physical fitness, nutrition, and sleep

Key Elements of a Fatigue Risk Register

A Fatigue Risk Register is a catalogue of available assessment methodologies, fatigue related risks particular to a practice setting, and control measures previously or currently employed. A register may also include an incident log comprised of fatigue-leave reports and incident assessments or accident investigations.

This process of documentation should be confidential and is not intended to be punitive, but rather aims to uphold a shared commitment to the health, safety and overall wellbeing of learners, staff and patients, in addition to ongoing quality improvement. Documentation is therefore an important aspect of assessing the existing risk level particular to a given context, and permits a review of practices and procedures as part of continuous improvement of the local FRM strategy. In order to support the development of a local Fatigue Risk Register, an example of how to document these events is provided below, drawn from an existing resource within the FRM Procedure for the South Australia Ambulance Service.



▶▶ [Download Sample Fatigue Risk Register](#)

System Recommendations

Risk Assessment

Fatigue is a risk for every organization that provides services 24-hour a day. It is a risk for every individual providing care, including learners and faculty.

Assessing Fatigue in the Local Context

Fatigue-related risk can be mitigated and managed by conducting a Fatigue Risk Assessment, a scan of each individual team, unit, and facility to determine fatigue-related risks and identify strategies that can be employed to reduce the hazards posed by fatigue. A fatigue risk scan will help identify fatigue-related risks for individuals and teams, as well as existing and innovative mitigation strategies. Conducting a Fatigue Risk Assessment will also help raise awareness of the hazards posed by fatigue by involving the individual and team.



Who Should Conduct the Fatigue Risk Assessment?

To identify the unique risks for each local context, a Fatigue Risk Assessment should be conducted by a group of people who are most familiar with the local working environment¹, including, but not limited to:

- ▶ Clinical educators and supervisors
- ▶ Learners
- ▶ Faculty physicians and supervisors
- ▶ Hospital employees
- ▶ Program Directors
- ▶ Decanal team, including PGME
- ▶ The FRM Local Working Group or Officer (LWG)
- ▶ Risk management experts
- ▶ Other Key stakeholders

¹ For more information on the group involved in conducting a Fatigue Risk Assessment, please see Section 2: *Governance, Responsibility & Accountability*.

What is Involved in Conducting a Fatigue Risk Assessment?

Conducting a Fatigue Risk Assessment will better enable fatigue-related risks to be recognized and minimized. It will help outline the necessary steps involved in intervening in circumstances when fatigue-related risk is present.

The information that is collected through the Fatigue Risk Assessment should be documented in a **Fatigue Risk Register**, a catalogue of the assessment methodologies, fatigue related risks, and control measures.

To ensure that new risks and subsequent mitigation strategies are identified, a working group or designated individual can review and record fatigue-related risks and mitigation strategies at regular intervals. This iterative process promotes iterative selection of strategies that are suitable to the training environment.

▶ The goal of any fatigue risk assessment is to identify:

- Which, where, and how many staff are likely to be at risk of becoming fatigued
- When fatigue-related risk is highest
- How often fatigue is likely to occur
- The efficacy of existing strategies, policies and procedures
- Additional steps required to further mitigate risks

To conduct an effective assessment, it is necessary to identify the risks posed to both individuals and teams.

► The following questions can help:

- How do we currently manage fatigue-related risk?
- When is our fatigue-related risk greatest (time, day, week, time of year)?
- What steps can we take to mitigate the risks of fatigue? What practices can we feasibly implement?
- When fatigue-related risk is increased, who does it impact first (patients, physicians, both)? How do these impacts manifest (what does it 'look like')?
- What tasks are especially susceptible to fatigue? How does performance change?
- What can we change now to reduce our fatigue-related risks?
- What barriers currently prevent us from adjusting our practices?

Fatigue-related risks will differ for each individual, team, and environment.

► The following sources of information may assist in the identification of all current and potential fatigue-related risks:

- Consultation with staff and their representatives
- Shift arrangements, rosters and hours worked, including overtime
- Occupational Health and Safety incident notifications/reports
- Investigation reports citing fatigue
- Industrial issues, complaints or grievances citing fatigue
- Staff and/or patient complaints
- Workplace injury records
- Self-reporting, without punitive consequences

Assessing the Level of Fatigue

There is no distinct one-size-fits-all fatigue management strategy that will accommodate the considerable variation in learner training environments and experiences. FRM strategies must therefore remain adaptive and flexible to ensure that learner and patient safety are optimized. Auditing the level of learner fatigue is one component of the FRM strategy that will enable the identification of work-related fatigue and subsequent risk within a specific context. The regular and systematic audit of workforce fatigue is crucial to the effective functioning of accountability systems and overall quality assurance measures.

Assessment Methods

The first step in risk assessment is to determine a suitable method for identifying the magnitude of the risk that fatigue presents, or the degree that fatigue impacts the local work environment. Local context and available resources will influence the methods selected, however these can be more easily implemented if one individual within a team is trained to conduct assessments. Learners can be involved in this process and champion the use of suitable assessment methods for their team.

Best practices will vary from setting to setting. When developing effective mitigation strategies for the local context, the first step is to consider whether working time arrangements provide adequate opportunities for sleep and recovery.

► Tools currently in use to audit fatigue in 24-hour shiftwork environments:

- Manual calculations/paper and pencil methods
 - [Manual Fatigue Audit System](#) (Fatigue Risk Management System for the Canadian Aviation Industry, 2011)
- Bio mathematical modelling software/ automated audit systems²
 - [FAST](#) (Fatigue Avoidance Scheduling Tool)
 - [SAFTE](#) (Sleep, Activity, Fatigue & Task Effectiveness for Aviation)
- Learners may wish to keep individual sleep-wake diaries – manually or using a digital application
 - [Sleep for Science Sleep-Wake Diary](#)
 - [The Better Sleep Project Sleep Diary](#)
- A well-established psychometric scale (See section on page 37, *Recommendations for Education and Training*)
 - Karolinska Sleepiness Scale/Questionnaire (KSS or KSQ) (See *Appendix*)
 - [Fatigue Severity Scale](#) (FSS)
 - [Fatigue Questionnaire \(Neuberger, 2003\)](#)
- Risk Assessment checklists
 - Risk Assessment Checklist and Guide (See *Appendix*)

² note that the listed shift scheduling and assessment software have been developed and used primarily within the fields of transportation and aviation. Further details can be found in Chapter 3 of the FRMS for the Canadian Aviation Industry.

“ We have a culture of long working hours, and the impact of fatigue has not been part of our consciousness. ”

Christopher P. Landrigan, MD, MPH Professor of Pediatrics, Harvard Medical School. Research Director, Boston Children's Hospital Inpatient Pediatrics Service Director, Sleep and Patient Safety Program, Brigham and Women's Hospital