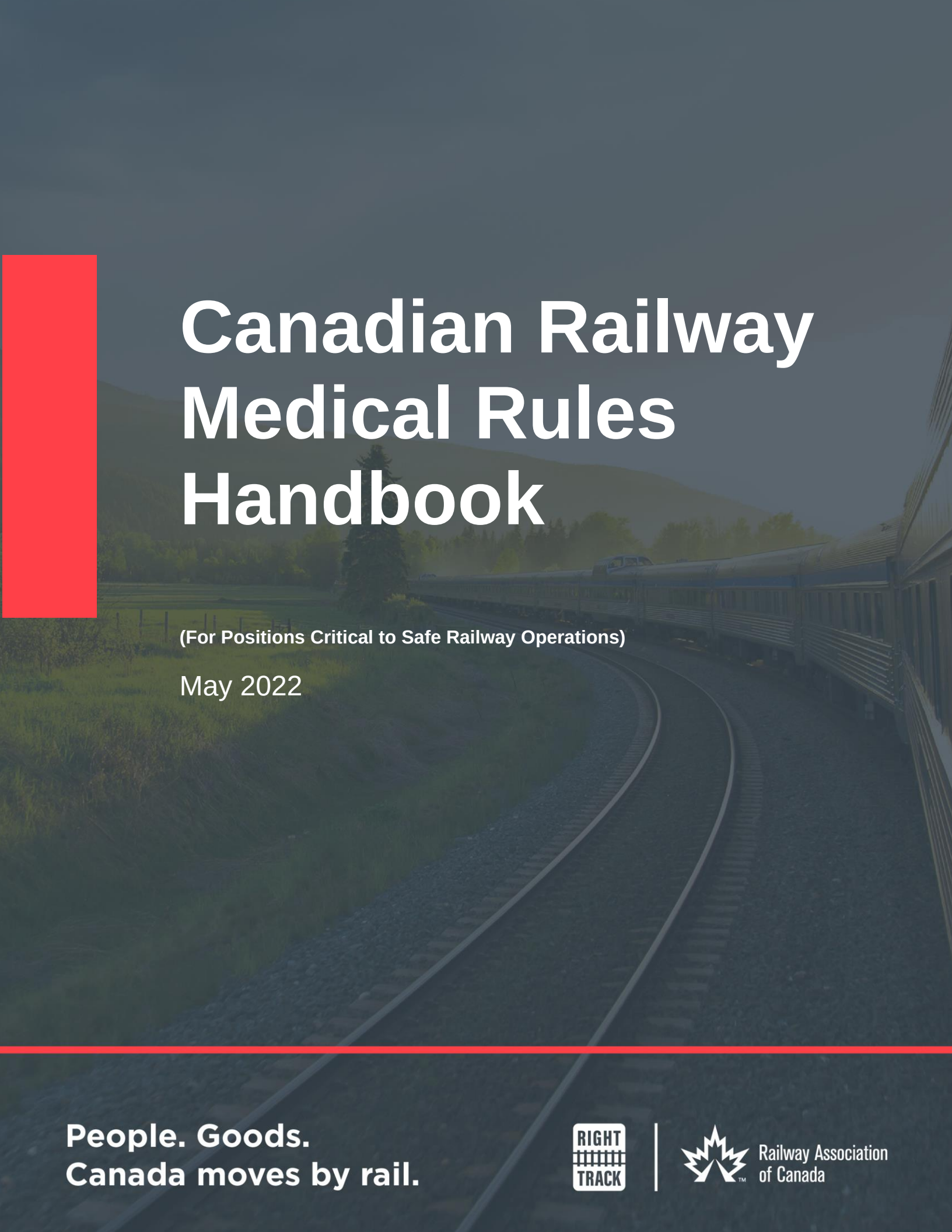

Canadian Railway Medical Rules Handbook

(For Positions Critical to Safe Railway Operations)

May 2022

People. Goods.
Canada moves by rail.

RIGHT TRACK

Railway Association of Canada

Table of Contents

UPDATES **6**

ACKNOWLEDGEMENTS **16**

INTRODUCTION **17**

SECTION 1 – BACKGROUND AND HISTORY **20**

SECTION 2 – SAFETY CRITICAL POSITION RULES **23**

2.1 – Overview **23**

2.2 – Rules Governing Safety Critical Positions **26**

2.3 – Approval by Minister of Transport **27**

SECTION 3 – RAILWAY MEDICAL RULES **28**

3.1 – Overview **28**

3.2 – Rules **30**

3.3 – Approval by Minister of Transport **34**

3.4 – Current List of Railways Signatory to the Rules (Appendix "A") **35**

SECTION 4 – RAILWAY MEDICAL GUIDELINES **36**

4.1 – Overview **36**

4.2 – Hearing **37**
1. Introduction 37
2. Fitness for Duty Criteria 37
3. Assessment Requirements 37
4. Individual Assessment 38

4.3 – Vision **40**
1. Introduction 40
2. Fitness for duty criteria 40
3. Monitoring requirements 44
4. Individual assessment 44
5. Guidelines for some exceptional cases 45

Appendix I - Background Information on Vision **49**

Appendix II - Visual Assessment Methods **55**

Appendix III - Vision Reporting Form Example **60**

4.4 – Epileptic Seizures 69
1. Introduction 69
2. Basic considerations 69
3. Definitions 70
4. Medical Fitness for Duty Criteria 71
5. Monitoring requirements before and after returning to work in a SCP 74
6. Individual assessment 74

Appendix I - Background Information on Epileptic Seizures 75

Appendix II - Medical Fitness for Duty Criteria 77

Appendix III - Neurologist Medical Report Form for Individuals with Epileptic Seizures 79

4.5 – Mental Disorders 82
1. Introduction 82
2. Medical Fitness for Duty Considerations 83
3. Definition(s) 83
4. Medical Fitness for Duty Guidelines for Specific Mental Disorders 83
5. Contraindications to Employment in a Safety Critical Position 106

4.6 – Cardiovascular Disorders 107
1. Introduction 107
2. Basic Considerations 107
3. Risk Threshold 108
4. Ischemic Heart Disease 109
5. Non-Ischemic Heart Disease 118
6. Congenital Heart Disease 123
7. Dysrhythmias 125
8. Vascular Disorders 129
9. Syncope 130

Appendix I - Bibliography 131

4.7 – Diabetes 141
1. Introduction 141
2. Medical Fitness for Duty Considerations 141
3. Definitions 142
4. Medical Fitness for Duty Guidelines 144

Appendix I - Diabetes Medications 151

Appendix II - Medical Fitness for Duty Summary Table 153

Appendix III - Diabetes Medical Report 154

4.8 – Substance Use Disorders 158
1. Introduction 158
2. Medical Fitness for Duty Considerations 158
3. Definitions 159

4. Medical Fitness for Duty Guidelines 160

Appendix I - Rationale for using DSM-IV-TR and DSM-5 Diagnostic Criteria 166

Appendix II - Summary of DSM-IV-TR and DSM-5 Diagnostic Criteria for Substance Use Disorders 167

Appendix III - Substance Use Disorders Relapse Prevention Agreement* 168

Appendix IV - Comprehensive Substance Use Disorders Medical Assessment . 170

4.9 – Sleep Disorders 173
1. Introduction 173
2. Medical Fitness for Duty Considerations 173
3. Definitions 174
4. Medical Fitness for Duty Guidelines for Specific Sleep Disorders 175

Appendix I – STOP - Bang Questionnaire 181

Appendix II - Bibliography 183

4.10 – Therapeutic Opioids 188
1. Introduction 188
2. Scope 189
3. Definitions 189
4. Medical Fitness for Duty 190

SECTION 5 - RAILWAY MEDICAL REPORT FORMS 193

5.1 - Overview 193

5.2 - Employment Medical Report Form 194

5.3 - Periodic Medical Report Form 200

Updates

Version 1.1 – November 2004

Subsection	Guidelines	Page	Article	Subject
4.2	**Hearing**	4.2-1	Introduction	
		4.2-1	2	Hearing Aids
		4.2-1	3	Assessment Requirements
4.3	**Vision**	4.3-4	3.1	Frequency of Assessment
		4.3-5	5.1	Refractive Surgery
		4.3-9	Appendix I	Refractive Surgery
		4.3-11	Appendix I	Extra-ocular Muscle Balance
		4.3-11	Appendix I	Colour Vision
		4.3-14	Appendix II	Distant Acuity
		4.3-14	Appendix II	Near Acuity
		4.3-16	Appendix II	Colour Vision
		4.3-17	Appendix II	Extra-ocular Muscle Balance
			Appendix III	Previously called Appendix IV
			Appendix IV	Previously called Appendix III
4.5	**Mental Disorders**	4.5-5	3.2.2	Bipolar Disorders
4.6	**CV Disorders**	4.6-2	4.1	BP Measurements
4.7	**Diabetes**	4.7-2	3.7	Fitness for Duty
		4.7-4	5.5	Monitoring Requirements
		4.7-4	6.3-6.4	Monitoring Requirements
		4.7-5	7.1-7.4	Monitoring Requirements
		4.7-8	Appendix I	Treatment of Type I Diabetes
		4.7-9	Appendix I	Treatment of Type II Diabetes
		4.7-18	Appendix IV - Part 2	Other Requirements
4.8	**Substance Use Disorders (New)**			
4.9	**Severe Sleep Apnea (New)**			

Updates

Version 1.2 – February 2006

Subsection	Guidelines	Page	Article	Subject
4.3	**Vision**	4.3-8	5.4	Glaucoma
		4.3-14	Appendix II	Near Acuity
4.5	**Mental Disorders**	4.5-2	3.1.1	Generalized Anxiety Disorder
		4.5-2	3.1.2	Acute Stress Disorder
		4.5-3	3.1.3	PTSD
		4.5-5	3.1.5	OCD
		4.5-5	3.2.1	Dysthymic Disorder
		4.5-6	3.2.2	Major Depressive Disorder
		4.5-7	3.3.1	Schizophrenia and Delusional Disorders
		4.5-8	3.3.2	Brief Psychotic Disorder
		4.5-8	3.5	Adjustment Disorders
		4.5-10	5	Monitoring and Follow-up
		4.5-11	Appendix I	Major Disorders
		4.5-13		Substance Related Disorders
4.7	**Diabetes**	4.7-2	3.7	Fitness for Duty Criteria
		4.7-3	5.1	Monitoring Requirements
		4.7-3	5.2	Annual Review
		4.7-5	7.2	Monitoring Requirements
		4.7-6	Appendix I	Background Information
		4.7-13	Appendix III	Hypoglycemia - Prevention
		4.7-15	Appendix IV	Medical Report
5.1	**Forms**	5.1-1		Overview
5.2	**Forms**	5.2-1		Employment Medical Report Form
5.3	**Forms**	5.3-1		Periodic Medical Report Form

Updates

Version 1.3 – May 2007

Subsection	Guidelines	Page	Article	Subject
4.4	**Epileptic Seizures (New)**	59		
4.6	**Cardiovascular Disorders (New)**	91		

Updates

Version 1.4 – February 2010

Subsection	Guidelines	Article	Subject
4.2	**Hearing**	3.2	Procedure of Assessment
4.3	**Vision**	5.1	Refractive Surgery
		Appendix IV	Lantern Test
4.5	**Mental Disorders**	3.3.1	Schizophrenia and Delusional Disorders
4.6	**Cardiovascular Disorders**	4.5 b)	Acute Ischemic Syndrome
		5.2 c)	Valve Surgery
		7.8	Pacemakers
4.7	**Diabetes**	5	Monitoring Requirements
		6	"
		7	"
		Appendix I	Fitness for duties Issues
			Hypoglycemia – Prevention Strategies
		Appendix II	Medical Report
4.10	**Therapeutic Opioids (New)**		
5.2	**Employment Medical Report**	Parts 3 and 5	Medical Report

Updates

Version 1.5 – December 2011

Subsection	Guidelines	Article	Subject
4.4	**Epileptic Seizures**	4.2.3	Epileptic Seizures sleep only
		Appendix II 2 c)	Epileptic Seizures sleep only
4.8	**Substance Use Disorders**	4.0	Definitions
		6.2	Exclusions from SCP
		7.4	New
		Appendix I	Medical Marijuana
		Appendix III	New
4.9	**Severe Sleep Apnea**	3.2 & 3.3	Basic Considerations
		4.0	Definitions
		6.1	Screening
		7.1	Assessment
		7.2	Treatment
		7.3	Monitoring
		Appendix 1	Reference #1

Updates

Version 1.6 – April 2013

Subsection	Guidelines	Article	Subject
5.1	**Railway Medical Report Forms**	5.1	Overview

Updates

Version 1.7 – September 2013

Subsection	Guidelines	Article	Subject
4.9	**Severe Sleep Apnea**	7.2	Treatment
		7.3	Monitoring

Updates

Version 1.8 – February 2016

Subsection	Guidelines	Article	Subject
Acknowledgements			
4.10	**Therapeutic Opioids (New)**		

Updates

Version 1.9 – May 2018

Subsection	Guidelines	Article	Subject
Acknowledgements			
4.1	**Overview**		
4.5	**Mental Disorders Guideline**		

Updates

Version 2.0 – April 2019

Subsection	Guidelines	Article	Subject
Acknowledgements			
4.8	**Substance Use Disorders**		

Version 2.1 – February 2020

Subsection	Guidelines	Article	Subject
4.9	**Sleep Disorders**		

Version 2.2 – May 2022

Subsection	Guidelines	Article	Subject
Acknowledgements			
4.7	**Diabetes**		

Acknowledgements

This document was prepared by the Medical Steering Committee and Medical Advisory Group of the Railway Association of Canada (RAC).

MEDICAL STEERING COMMITTEE MEMBERS

Mr. Michael Barfoot, Director Regulatory Affairs, RAC
Ms. Kim Buffone – Senior Administrative Assistant, RAC
Ms. Ana Derkson - Director, Occupational Health, Safety & Environment, Metrolinx
Mr. André Houde – Vice President Human Resources & Administration, GWCI
Ms. Marie-Claude Laporte – Advisor-Disability Management, VIA Rail Canada Inc.
Mr. Marc Lavallée – Chief Operations, exo
Ms. Gina Stirpe – Senior Manager - Occupational Health Services & Wellness, CN
Ms. Lisa Trueman – Director, Global Health Services, CP

MEDICAL ADVISORY GROUP

CHAIR
Dr. G. Lambros

MEMBERS
Dr. N. Adams
Dr. A. Adebayo
Dr. J. Cutbill
Dr. M. Laprade
Dr. O. Oyekanmi
Dr. M-D. Pitchen

GUIDELINE DEVELOPMENT (By Contributing Author)

Cardiovascular Disorders – Dr. A. Wielgosz, Dr. J. Cutbill, Dr. C. Lapierre
Diabetes – Dr. G. Lambros, Dr. M. Laprade, Dr. L. Garand, Dr. A. Adebayo, Dr. M-D. Pitchen, Dr. O. Oyekanmi, Dr. J. Cutbill, Dr. N. Adams, G. Stirpe, L. Trueman
Epileptic Seizures – Dr. G. Remillard, Dr. J. Cutbill, Dr. C. Lapierre
Hearing – Dr. D. Leger, Dr. G. Lambros
Mental Disorders – Dr. O. Robinow, Dr. G. Lambros, Dr. J. Cutbill, Dr. S. Dubuc, Dr. N. Adams
Sleep Disorders – Dr. O. Oyekanmi, Dr. A. Adebayo, Dr. G. Lambros, Dr. J. Cutbill, Dr. L. Garand, Dr. N. Adams, G. Stirpe, L. Trueman
Substance Use Disorders – Dr. J. Cutbill, Dr. G. Lambros, Dr. C. Els, Dr. L. Garand, Dr. N. Adams, G. Stirpe, L. Trueman
Therapeutic Opioids – Dr. C. Els, Dr. D. Leger, Dr. G. Lambros
Vision – Dr. J. Hovis, Dr. J. Cutbill, Dr. C. Lapierre

Introduction

This handbook was designed to provide Canadian railway companies and medical service providers with the information necessary to implement the *Railway Medical Rules for Positions Critical to Safe Railway Operations* (*Railway Medical Rules* and *Railway Rules Governing Safety Critical Positions*).

The *Safety Critical Positions Rules* and the *Railway Medical Rules* were developed pursuant to Section 18(1) (b), Section 20(1) and Section 35 of the *Railway Safety Act* (RSA), as amended on June 1, 1999. This Act requires persons working in positions that are deemed critical to safe railway operations to undergo periodic medical examinations. These sections of the RSA are included in the Introduction for reference.

The Act requires that all persons employed in railway Safety Critical Positions must advise their medical professional of that fact prior to any examination.

The Act further requires medical examiners who believe that a person employed in a safety critical position has any condition that may reasonably pose a threat to railway safety must immediately notify both the patient and the railway company. Medical information provided to railway companies in accordance with this section of the Act is privileged and cannot be used in any legal or disciplinary proceedings except as otherwise provided.

The *Safety Critical Position Rules* and the *Railway Medical Rules* were developed by the Railway Association of Canada (RAC) and approved by the Minister of Transport on June 16, 2000. The *Railway Medical Rules* became effective on November 29, 2001 simultaneously with the revocation of General Order 0-9, *Regulations Respecting the Examination of Vision and Hearing of Railway Employees*, as amended by CTC 1985-3. Any questions regarding either the Act or the Rules should be addressed to the RAC or to the Department of Transport.

The RAC has a standing Medical Steering Committee and a Medical Advisory Group (MAG) that is composed of railway member Companies representatives with responsibilities in the functions of medical fitness for duty, occupational health and medical professionals who represent several member railways and other interested parties. This Committee and Group address questions and issues of a technical nature, and monitors medical conditions which may affect safe rail operations. From time to time, the RAC may recommend new or revised medical guidelines. Persons who have received a copy of this handbook may obtain updates from the RAC when they become available.

The intent of these Rules is to provide for individual medical assessments by personal physicians for persons performing work in Safety Critical Positions in the railway industry.

Included in this handbook is background information on how and why the Rules were developed, a copy of section 35 of the Act, a copy of the Rules, guidelines for assessment of medical conditions required by the Rules, and contacts for additional information.

Section 18(1) of the *Railway Safety Act* reads as follows:

> **18(1)** The Governor in Council may make regulations
>
> (b) declaring positions in railway companies to be critical to safe railway operations.

Section 20 of the *Railway Safety Act* reads as follows:

> **20(1)** A railway company shall file with the Minister for approval any rules in respect of any matter referred to in subsection 18(1) or (2.1) that it proposes to formulate or revise on its own initiative.

Section 35 of the *Railway Safety Act* reads as follows:

Medical examination

> **35(1)** A person who holds a position that is declared by regulations made under paragraph 18(1)(b) or by any rule in force under section 19 or 20 to be a position critical to safe railway operations, referred to in this section as a 'designated position', shall undergo a medical examination organized by the railway company concerned, including audio-metric and optometric examination, at intervals determined by the regulations made under paragraph 18(1)(c)(iii) or by any rule in force under section 19 or 20.

Physician or optometrist to disclose potentially hazardous conditions

> **(2)** If a physician or an optometrist believes, on reasonable grounds, that a patient is a person described in subsection (1), the physician or optometrist shall, if in their opinion the patient has a condition that is likely to pose a threat to safe railway operations,

(a) by notice sent without delay to a physician or optometrist specified by the railway company, inform the specified physician or optometrist of that opinion and the reasons for it, after the physician or optometrist has taken reasonable steps to first inform the patient, and

(b) without delay send a copy of that notice to the patient,

and the patient is deemed to have consented to the disclosure required by paragraph (a)

Holder of designated position to inform physician or optometrist

(3) A person who holds a designated position in a railway company shall, prior to any examination by a physician or optometrist, advise the physician or optometrist that the person is the holder of such a position.

Railway Company may act in interests of safe railway operations

(4) A railway company may make such use of information provided pursuant to subsection (2) as it considers necessary in the interests of safe railway operations.

Proceedings not to lie against physician or optometrist

(5) No legal, disciplinary or other proceedings lie against a physician or optometrist for anything done by that physician or optometrist in good faith in compliance with this section.

Information privileged

(6) Information provided pursuant to subsection (2) is privileged and

(a) no person shall be required to disclose it or give evidence relating to it in any legal, disciplinary or other proceedings; and

(b) it is not admissible in any such proceedings, except

(i) as provided by subsection (4), or
(ii) where the patient consents.

Section 1 – BACKGROUND AND HISTORY

1. Introduction

This section describes the background and history behind the development of the *Railway Medical Rules* and the *Safety Critical Position Rules*.

2. Legislative History

Medical requirements for certain railway positions were most recently contained in General Order O-9, *Regulations Respecting the Examination of Vision and Hearing of Railway Employees*, as amended by CTC 1985-3. This legislation contained standards for vision and hearing only. Medical requirements beyond these had been left up to the individual railways as a matter of company policy.

General Order O-9 had been in place since 1978. Minor revisions had been made to the order on several occasions, most recently as part of CTC 1985-3 (April 23, 1985). In 1998, CN and CPR also obtained exemptions from some of the requirements of the General Order to address Canadian Human Rights Commission (CHRC) issues relating to the difference in initial certification and recertification standards.

The move towards legislated medical standards beyond those for hearing and vision arose primarily from the Foisy Commission review of the 1986 Hinton train collision.

Recommendation 10 of the Commission stated "that the CTC review its regulations concerning medical fitness with a view to including standards with respect to matters of physical health in addition to vision and hearing acuity and that regulations establishing such standards be promulgated as soon as possible".

As a result of this recommendation, the RTC set out in 1987 to review the issue of expanded medical examinations. Draft regulations were developed by the RTC (*Regulations Respecting the Medical Examination of Railway Employees*) and included the requirement for a physical examination including "a review of the nervous, cardiovascular, respiratory, gastro-intestinal, genitourinary and musculoskeletal systems, a clinical history and special investigations if clinically indicated having regard for the examinee's age and work duties". The proposed regulation also included the specific need for chest x-rays, electrocardiogram tests, urinalysis and tuberculin tests. The draft regulation also required railway companies to file standards for medical fitness in each of the aforementioned areas.

The need for expanded medical examinations was carried over into the *Railway Safety Act* when it was enacted in 1989. Section 35(1) of the RSA requires that railway employees in positions deemed critical to safe railway operations undergo annual medical examinations including audiometric and optometric assessment. Section 35(2) of the Act addressed another of the Foisy commission recommendations by requiring any physician or optometrist treating a person in a Safety Critical Position to report to the railway's Chief Medical Officer any medical condition that they believe could constitute a threat to safe railway operations. Section 35(3) of the *Railway Safety Act* requires that persons in Safety Critical Positions inform the physician or optometrist of their position.

Although included in the *Railway Safety Act* since its inception in 1989, these sections have never been fully enacted due to their reliance on regulation identifying a list of Safety Critical Positions. This regulation has been delayed several times due to various issues and concerns. Also hindering the enactment of this section of the *Railway Safety Act* was its initial specified requirement for an annual medical examination, a frequency deemed to be excessive by railway industry medical experts. Revisions to the *Railway Safety Act*, which came into force on June 1, 1999, eliminated the annual requirement.

A new initiative aimed at drafting a new medical rule for Safety Critical Positions commenced in December 1996. The Railway Association of Canada's Safety and Operations Management General Committee authorized a formal Medical Steering Committee to oversee the development of *Rules Identifying Safety Critical Positions and Rules Governing Medical Standards* for SCPs.

The Steering Committee was comprised of railway industry multi-functional stakeholders including representatives from the Regulatory Affairs, Medical, Employee Relations, Labour Relations and Law departments of various RAC member railways. A Medical Working Group consisting of the Chief Medical Officers from CN, CPR and VIA Rail was also formed to work with medical specialists in the development of specific medical requirements and the guidelines required to support the medical rules. As part of this process field research was carried out in the railway environment.

The Steering Committee's mandate was to develop rules which would provide a contemporary list of Safety Critical Positions based on potential risk to public safety as well as modern and consistent medical requirements which address those diseases or disorders that have the potential to impact railway safety.

In accordance with the requirements of the *Railway Safety Act*, the Steering Committee consulted with railway labour organizations throughout the development process. In addition the CHRC and Transport Canada were kept up to date on the rules' progress.

Railway Association of Canada / RIGHT TRACK	**Section: 1**	**Version: 2.2**
	Title: BACKGROUND AND HISTORY	

The *Safety Critical Position Rules* and the *Railway Medical Rules* were developed by the Railway Association of Canada (RAC) and approved by the Minister of Transport on June 16, 2000. The *Railway Medical Rules* became effective on November 29, 2001, simultaneously with the revocation of General Order 0-9, *Regulations Respecting the Examination of Vision and Hearing of Railway Employees*, as amended by CTC 1985-3. Any questions regarding either the Act or the Rules should be addressed to the RAC or to the Department of Transport.

Section 2 – SAFETY CRITICAL POSITION RULES

2.1 – Overview

1. Background

Section 35(1) of the *Railway Safety Act* refers to the requirement for regulation or rule specifying positions deemed critical to safe railway operations. In 1997 the RAC Medical Steering Committee undertook to develop such a rule along with a related Medical rule for Safety Critical Positions.

The Committee's goal was to develop a straightforward rule which would identify the occupational requirements deemed to be safety critical while allowing individual railways to determine the specific list of occupations that meet these requirements on their particular railway.

As required by the *Railway Safety Act*, consultation with railway labour organizations took place throughout the development process. In addition, the Canadian Human Rights Commission and Transport Canada were kept up-to-date on the rule's development.

The *Rule Governing Safety Critical Positions* was developed by the Railway Association of Canada and approved by the Minister of Transport on June 16, 2000 (copy of approval notice can be found in section 2.3). It became effective on September 30, 2000.

2. Development Process

A vital part of the development of the *Railway Rules Governing Safety Critical Positions* was ensuring that an objective means was in place to identify those occupations deemed to be critical to safe railway operations.

It was important that the list of Safety Critical Positions include only those positions with the highest risk to public safety.

For this purpose, the Railway Association of Canada's Medical Rules Steering Committee developed a "risk matrix" which would allow an assessment of railway occupations based on five key risk components.

These were:

- General risk component of occupation
- Public interface
- Frequency of risk activities
- Presence of safety back-up systems
- Degree of risk environment

Based on this assessment, it was determined that Safety Critical Positions should be comprised of running trades positions directly engaged in train or yard service and positions engaged in rail traffic control. In addition, other occupations would be considered as Safety Critical when performing any of these duties.

Due to variances in actual occupational titles, the list of specific SCP occupations was to be developed and filed with Transport Canada by individual railways. A typical list of occupations would include:

- Locomotive Engineer
- Conductor
- Brakeperson
- Yard Foreman
- Rail Traffic Controller
- Operators of Specialized Equipment operating as trains
- Trainmaster
- Superintendent

Railways must reassess their SCP occupational list at regular intervals and file updated lists as required.

3. Disclosure Requirements

In addition to being subject to the requirements of the Medical Rules, the *Railway Safety Act* contains another important obligation for persons employed in a Safety Critical Position. This is the requirement that persons in Safety Critical Positions must, prior to any examination by a physician or optometrist, advise the physician or optometrist that they occupy a Safety Critical Position under the *Railway Safety Act*. (Note this includes all examinations and not just fitness for duty assessments under the *Medical Rules*).

Physicians and optometrists also have an obligation under the *Railway Safety Act* to report to the railway any condition in a person occupying a Safety Critical Position which they feel may pose a threat to safe railway operations. A copy of the report must also be provided to the employee.

Individual railways should ensure that they inform those employees in Safety Critical Positions of these requirements. Although information will be provided by the Railway Association of Canada to the medical community at large regarding their obligations under the *Railway Safety Act*, where possible, individual railways may also wish to provide such information to those physicians who will be dealing with employees in Safety Critical Positions.

2.2 – Rules Governing Safety Critical Positions

1. Short Title

For ease of reference, this rule may be referred to as the "Safety Critical Position Rules".

2. Scope

These rules have been developed pursuant to Section 20 of the *Railway Safety Act*.

3. Definitions

A "Safety Critical Position" is herein defined as:

a) any railway position directly engaged in operation of trains in main track or yard service; and

b) any railway position engaged in rail traffic control.

Any person performing any of the duties normally performed by a person holding a Safety Critical Position, as set out in section 3 above, is deemed to be holding a Safety Critical Position while performing those duties.

4. Records to be Kept by the Company

Each railway company shall:

a) maintain a list of all occupational names or titles which are governed by this rule;

b) maintain a list of the names of all employees qualified to serve in Safety Critical Positions; and

c) make all such records related to this rule available to Transport Canada inspectors upon reasonable request.

2.3 – Approval by Minister of Transport

Approval of Rule – Pursuant to Section 20 of the *Railway Safety Act*, Chapter R-4.2, [R.S., 1985, C. 32 (4th SUPP.)]

The Railway Association of Canada (RAC), on behalf of its constituent railway companies, has requested approval of the *Railway Rules Governing Safety Critical Positions* and *Railway Medical Rules for Positions Critical to Safe Railway Operations.*

Paragraph 19.(4)(a) of the *Railway Safety Act* gives the Minister the authority to approve Rules filed by a railway company, on their own initiative, under Section 20 of the *Act,* if he is of the opinion that the Rules are conducive to safe railway operations. Having regard to current railway practice, to the views of the railway companies and the views of the relevant associations and organizations and to other factors that I consider relevant, I am of the opinion that the Rules so filed are conducive to safe railway operations.

Pursuant to the *Railway Safety Act,* paragraph 19.(4)(a), I hereby approve the *Railway Rules Governing Safety Critical Positions* and *Railway Medical Rules for Positions Critical to Safe Railway Operations,* filed by the RAC on behalf of its constituent railway companies as set out in Appendices “B” and “C” attached hereto.

The *Railway Rules Governing Safety Critical Positions* shall apply to the railway companies listed in Appendix “A”. This Rule shall come into effect 90 days from the date of approval during which time railway companies must submit their list of safety critical positions to the Department.

The *Railway Medical Rules for Positions Critical to Safe Railway Operations* shall also apply to the railway companies listed in Appendix “A” and will come into effect once the remaining federally regulated companies become signatory to the new Rule and the subsequent revocation by the Governor in Council of General Order 0-9, *Regulations Respecting the Examination of Vision and Hearing of Railway Employees,* amended by CTC 1985-3 RAIL.

Signed by T. Burtch

_____

Director General, Rail Safety
for Minister of Transport

June 16, 2000

_____

Date

Section 3 – RAILWAY MEDICAL RULES

3.1 – Overview

1. Introduction

The *Railway Medical Rules* were developed over the course of 1998/99 by a Medical Steering Committee formed by the Railway Association of Canada. This committee was comprised of railway industry multi-functional stakeholders including representatives from the Regulatory Affairs, Medical, Employee Relations, Labour Relations and Law departments of various RAC member railways.

A Medical Working Group consisting of the Chief Medical Officers from CN, CPR and VIA Rail worked with medical specialists in the development of specific medical requirements and the guidelines required to support the medical rules. As part of this process field research was carried out in the railway environment.

The Steering Committee's goal was to develop a basic enabling rule which would be supported by recommended medical practices guidelines. This would allow medical assessments to remain current through updates to the guidelines without having to regularly modify the actual rule.

The *Medical Rules* allow medical assessments for Safety Critical Positions to be directed and managed by a railway's Chief Medical Officer. It requires that an employee must meet medical fitness for duty assessment requirements so as to work in a Safety Critical Position.

The Rules set an assessment frequency of 5 years to age 40 and 3 years beyond age 40 with the Chief Medical Officer having the ability to reduce the interval for specific situations.

Assessments are based on those diseases or disorders that have potential to impact railway safety including sudden impairment, impairment of judgement or alertness, impairment of senses or significant musculoskeletal impairment. The Rules provide the basis for assessments to be conducted by personal physicians at the discretion of individual railways.

As required by the *Railway Safety Act*, consultation with railway labour organizations took place throughout the development process. In addition, the Canadian Human Rights Commission and Transport Canada were kept up-to-date on the rule's development.

The *Railway Medical Rules* were developed by the Railway Association of Canada (RAC) and approved by the Minister of Transport on June 16, 2000. They became effective on November 29, 2001, simultaneously with the revocation of General Order 0-9, Regulations Respecting the Examination of Vision and Hearing of Railway Employees, as amended by CTC 1985-3. Any questions regarding either the Act or the Rules should be addressed to the RAC or to the Department of Transport.

3.2 – Rules

1. Short Title

1.1 For ease of reference, these rules may be referred to as the "Railway Medical Rules".

2. Scope

2.1 These rules, which have been developed pursuant to Section 20 (1) (a) of the *Railway Safety Act*, define the Medical Fitness for Duty requirements for Safety Critical Positions within railway companies subject to the jurisdiction of the Department.

2.2 In the case of international train movements, a railway company may allow persons to perform limited service in Safety Critical Positions while using medical requirements stipulated by U.S. Federal Railroad Administration regulations.

3. Definitions

3.1 “Chief Medical Officer” means a physician licensed to practice medicine in Canada and who is employed or contracted by a railway company for the purpose of, among other things, directing and managing the area of Medical Fitness for Duty requirements and guidelines.

3.2 “Department” means the Department of Transport, Rail Safety Group.

3.3 “Medical Fitness for Duty” means that a determination was made by the Chief Medical Officer, subject to any restrictions or requirements imposed under Section 6 hereof, that a person has taken the medical assessments required by these rules, and that the person meets all of the Medical Fitness for Duty requirements provided herein.

3.4 “Safety Critical Position” has the same meaning as provided in the Railway Rules Governing Safety Critical Positions.

3.5 “Person” means a person in a Safety Critical Position.

4. Frequency of medical assessments

4.1 Subject to sub-section 4.2, a person shall undergo a company organized Medical Fitness for Duty assessment:

a) prior to commencement of employment in a Safety Critical Position;

b) upon promotion or transfer to a Safety Critical Position; and

c) every five years until the age of forty and every three years thereafter until retirement, or until that person is no longer employed in a Safety Critical Position.

4.2 Without varying the requirement of sub-section 4.1(c), no assessment shall be required under sub-section 4.1(b) if the person had previously occupied a Safety Critical Position which, in the opinion of the Chief Medical Officer, had similar mental and physical demands as the Safety Critical Position into which the person is entering.

4.3 The Chief Medical Officer may require additional assessments to those set out in Section 4.1 if:

a) the person has or may have a medical condition that requires assessment or more frequent monitoring; or

b) the person is returning to work in a Safety Critical Position after a leave due to illness or injury.

5. Assessment for medical fitness for duty

5.1 The Medical Fitness for Duty for a person shall be assessed on an individual basis, taking into consideration medical conditions, both past and current, that could result in:

a) sudden impairment;

b) impairment of cognitive function including alertness, judgement, insight, memory and concentration;

c) impairment of senses;

d) significant impairment of musculoskeletal function; or

e) other impairment that is likely to constitute a threat to safe railway operations.

5.2 The medical conditions referred to in Section 5.1 shall include:

a) diseases of the nervous system, including seizure disorders, narcolepsy, sleep apnea and other disturbances of consciousness, vestibular disorders, disorders of coordination and muscle control, head injury, post traumatic conditions and intracranial tumours;

b) cardiovascular diseases, including high blood pressure, coronary artery disease, myocardial infarction, cerebrovascular disease, aortic aneurysm, congestive heart failure, cardiac arrhythmia, valvular heart disease and cardiomyopathy;

c) metabolic diseases, including diabetes mellitus, thyroid disease, Cushing's Disease, Addison's Disease and pheochromocytoma;

d) musculoskeletal disabilities, including amputation of a limb, arthritis, significant joint dysfunction, disease of the spine, obesity or other significant musculoskeletal conditions;

e) respiratory diseases, including obstructive or restrictive conditions resulting in functional impairment;

f) mental disorders, including the following types of mental disorders:

i) cognitive, including dementias, delirium and amnesia;
ii) psychotic, including schizophrenia;
iii) mood, including depression, manic, bipolar;
iv) anxiety, including panic attacks and phobias; and
v) personality, resulting in anti-social, erratic or aggressive behaviour;

g) substance abuse, including abuse or dependence on alcohol, prescription medications, or illicit drugs;

h) hearing impairment, including hearing acuity;

i) visual impairment, including distant visual acuity, field of vision, colour vision; and

j) any other organic, functional or structural disease, defect or limitation that is likely to constitute a threat to safe railway operations.

6. Medical restrictions

6.1 If the Chief Medical Officer, in making an individual assessment of a person's Medical Fitness for Duty, is of the opinion that there exists a threat to safe railway operations, the Chief Medical Officer may:

a) restrict a person from occupying a Safety Critical Position;

b) require the use of corrective devices or other medical aids; or

c) otherwise restrict a person's ability to work or perform certain tasks in a Safety Critical Position.

6.2 Upon completion of a Medical Fitness for Duty assessment, the Chief Medical Officer shall advise each person and the person's supervisor of that person's Medical Fitness for Duty and of any restrictions or requirements imposed pursuant to sub-section 6.1.

7. Records to be kept by the chief medical officer

7.1 The Chief Medical Officer of the railway company shall maintain records of all persons' medical assessments required hereunder and any restrictions required pursuant to sub-section 6.1.

7.2 The Chief Medical Officer shall maintain copies of all medical policies and guidelines used by a railway company for the examination or assessment of persons employed in Safety Critical Positions.

7.3 The Chief Medical Officer shall make records, policies, and guidelines related to these rules available to the Department upon reasonable request.

3.3 – Approval by Minister of Transport

Approval of Rule – Pursuant to Section 20 of the *Railway Safety Act*, Chapter R-4.2, [R.S., 1985, C. 32 (4th SUPP.)]

The Railway Association of Canada (RAC), on behalf of its constituent railway companies, has requested approval of the *Railway Rules Governing Safety Critical Positions* and *Railway Medical Rules for Positions Critical to Safe Railway Operations.*

Paragraph 19.(4)(a) of the *Railway Safety Act* gives the Minister the authority to approve Rules filed by a railway company, on their own initiative, under Section 20 of the *Act,* if he is of the opinion that the Rules are conducive to safe railway operations. Having regard to current railway practice, to the views of the railway companies and the views of the relevant associations and organizations and to other factors that I consider relevant, I am of the opinion that the Rules so filed are conducive to safe railway operations.

Pursuant to the *Railway Safety Act,* paragraph 19.(4)(a), I hereby approve the *Railway Rules Governing Safety Critical Positions* and *Railway Medical Rules for Positions Critical to Safe Railway Operations,* filed by the RAC on behalf of its constituent railway companies as set out in Appendices “B” and “C” attached hereto.

The *Railway Rules Governing Safety Critical Positions* shall apply to the railway companies listed in Appendix “A”. This Rule shall come into effect 90 days from the date of approval during which time railway companies must submit their list of safety critical positions to the Department.

The *Railway Medical Rules for Positions Critical to Safe Railway Operations* shall also apply to the railway companies listed in Appendix “A” and will come into effect once the remaining federally regulated companies become signatory to the new Rule and the subsequent revocation by the Governor in Council of General Order 0-9, *Regulations Respecting the Examination of Vision and Hearing of Railway Employees,* amended by CTC 1985-3 RAIL.

Signed by T. Burtch

_____

Director General, Rail Safety
for Minister of Transport
June 16, 2000
Date

3.4 – Current List of Railways Signatory to the Rules (Appendix "A")

Railways Rules Governing Safety Critical Positions
and *Railway Medical Rules for Positions Critical to Safe Railway Operations*

Amtrak
BNSF Railway Company
Central Maine & Québec Railway Canada Inc.
CN
CP
CSX Transportation Inc.
Eastern Main Railway Company
Essex Terminal Railway Company
Exo
Goderich-Exeter Railway Company Limited
Go Transit
Great Canadian Railtour Company Ltd.
Hudson Bay Railway
Kettle Falls International Railway, LLC
Knob Lake and Timmins Railway
Nipissing Central Railway Company
Norfolk Southern Railway
* Ottawa Valley Railway
Québec North Shore and Labrador Railway Company Inc.
* Southern Ontario Railway
St. Lawrence & Atlantic Railroad (Québec) Inc.
Sydney Coal Railway
Toronto Terminals Railway Company Limited, The
Tshiuetin Rail Transportation Inc.
Union Pacific Railroad Company
VIA Rail Canada Inc.
West Coast Express Limited
White Pass & Yukon Railroad

_____

**** NOTE*** *RailLink Canada Ltd. Power of Attorney covers two (2) railways: the Ottawa Valley Railway, and the Southern Ontario Railway.*

Section 4 – RAILWAY MEDICAL GUIDELINES

4.1 – Overview

Medical Fitness for Duty Guidelines for the Employment of Individuals in Safety Critical Positions in the Canadian Railway Industry

Canadian railway employees working in a Safety Critical Position operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

Medical fitness for duty guidelines have been developed for a number of medical conditions that are both prevalent in the population and represent a significant potential risk to safe railway operations. These medical fitness for duty guidelines take into consideration the occupational requirements of Safety Critical Positions in the Canadian railway industry. They are a resource for a Railway's Chief Medical Officer and Health Services Department, Physicians, Nurses, Specialists and Medical Consultants and other treatment providers when considering the medical fitness for duty of an individual occupying a Safety Critical Position.

The medical fitness for duty of an individual with a medical condition not covered by these guidelines will be determined by the Railway's Chief Medical Officer and guided by the "medical fitness for duty considerations" listed in each guideline, accepted medical practice and by related industry medical standards. The requirement for medical monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

The term "Railway's Chief Medical Officer" is used throughout these medical fitness for duty guidelines. At the discretion of each Railway's Chief Medical Officer some of the roles and responsibilities of the Railway's Chief Medical Officer may be assigned to an alternate or a designate.

The Medical Advisory Group of the Railway Association of Canada, with input from Medical Consultants and with support provided by the Medical Steering Committee of the Railway Association of Canada, will review and update these medical fitness for duty guidelines as required.

4.2 – Hearing

Fitness for Duty Medical Guidelines for the Employment of Individuals with Impaired Hearing in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees working in a Safety Critical Position (SCP) operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

Employees working in a SCP are required to have sufficient hearing to meet the demands of these positions. Individuals who are occupying these positions must, even in noisy environments, be able to receive direct verbal communication and communicate through telephone and radio systems. They must also be able to detect and recognize the type and source location of any sound signal, particularly warning sounds.

2. Fitness for Duty Criteria

An average hearing loss in either ear of less than 40 dB in the frequencies of 500, 1000 and 2000 Hz with or without hearing aids.

3. Assessment Requirements

3.1 Frequency of Assessment

a) Assessment of hearing is done at pre-employment/pre-placement and at every periodic medical assessment.

b) The Chief Medical Officer (CMO) of a railway company may determine different periodicity when there is medical evidence that more frequent assessment is required.

3.2 Procedure of Assessment

a) A screening audiogram[1] is required at pre-employment/pre-placement, at the first periodic medical assessment and at the first periodic medical assessment after age 40.

b) The content of the hearing assessment is determined by each railway company.

c) An individual with an average hearing loss of 40 dB or more at 500 Hz, 1,000 Hz and 2,000 Hz in both ears on a screening audiogram requires a confirmatory[2] audiogram. If the hearing loss is confirmed, a comprehensive medical assessment by an otolaryngologist (ENT) is required. The medical assessment must include, at minimum:

- A comprehensive medical history
- A physical examination
- A medical report including a medical diagnosis and recommendations regarding the treatment, the use of hearing aids and the impact of the hearing disorder on their ability to occupy a safety critical position. This report must be sent to the CMO of the railway company for review.

4. Individual Assessment

The CMO may authorize an individual who does not meet the above criteria to occupy a SCP if the CMO has reasons to believe that the individual can perform his/her duties in a safe manner. In doing so, the CMO must take into consideration the following:

- the specific requirements of the SCP

[1] Hearing test using an audiometer calibrated in accordance with the requirements of the National Standard Institute (ANSI S3.6 – 1996).

[2] Audiogram performed by a certified audiologist in accordance with best practice. A confirmatory audiogram must be performed in an audiometric test booth in accordance with the background noise requirement of ANSI S3.1 – 1991.

- the opinion of an otolaryngologist who has assessed the individual and who is of the opinion that the hearing disorder is unlikely to interfere with safe performance of duties and,
- any relevant ability, skill or experience of the individual.

The CMO may also require that a practical test be performed before allowing an individual to occupy a SCP.

4.3 – Vision

Medical Guidelines for the Employment of Individuals with Impaired Vision in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees working in a Safety Critical Position (SCP) operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

Employees working in a SCP are required to have sufficient vision to meet the demands of these positions. Working on, or around, moving equipment, identifying track and yard signals, and controlling rail traffic are duties where adequate visual acuity, colour perception, visual fields and extra-ocular muscle balance are mandatory.

Background information on visual requirements and fitness for duty issues is provided in Appendix I.

INDIVIDUALS WHO FAIL TO MEET THE CRITERIA FOR DISTANT OR NEAR VISION, VISUAL FIELDS OR EXTRA-OCULAR MUSCLE BALANCE ARE TO BE ASSESSED BY AN OPHTHALMOLOGIST OR AN OPTOMETRIST BEFORE THEY ARE DECLARED UNFIT TO OCCUPY A SCP.

2. Fitness for duty criteria

2.1 Visual Acuity

2.1.1 Distant Snellen acuity

- not less than 6/9 (20/30) in the better eye with or without correction
- not less than 6/15 (20/50) in the worse eye with or without correction

2.1.2 Near acuity

Notation	***Both Eyes Open (Corrected or Uncorrected)***
Reduced Snellen (American)	20/30
Reduced Snellen (Metric)	6/9
Snellen (Metric)	40/60
M notation @ 40 cm	0.63 M
N notation @ 35 cm @ 40 cm	N5 N6
Jaeger notation @ 35 cm @ 40 cm	J2 J4

2.2 Visual fields

The minimum extent of the uninterrupted monocular visual field in each eye without correction should be:

Horizontal meridian: 120°
Vertical meridian: 90°
Oblique meridians: 90°

The monocular visual field must be continuous within these limits.

2.3 Colour vision

2.3.1 Normal unaided* colour vision as determined by the Ishihara Colour Vision Test.

Version of the Ishihara errors	***Plates to be administered***	***Maximum number of allowable***
14 plate edition:	1 through 10 inclusively	2
16 plate edition:	1 through 11 inclusively	2
24 plate edition:	1 through 15 inclusively	3
36 plate edition:	1 through 21 inclusively	5

_____

** Unaided means that no visual aids other than clear spectacles, clear contact lenses, or contact lenses with light handling tints may be worn while performing the test. If there is any question as to the lightness of the tint, then clear spectacles or clear contact lenses should be worn while performing the test.*

2.3.2 Failure of Ishihara Test

a) Railway Lantern Test (CNLAN)*

A specific colour Lantern Test (CNLAN) has been developed by the railway industry. The CNLAN is designed to determine an individual's ability to identify colours used in rail wayside signals. The intensity and size of the lights are equivalent to a viewing distance between 0.2 and 0.4 miles. The colours fall within the American Association of Railroads standards for wayside signals. The testing protocol for the CNLAN is described in Appendix IV.

Individuals who fail the Ishihara Colour Vision Test are required to undergo further assessment, which may include a CNLAN. CN and Canadian Pacific Railway (CPR) currently administer the CNLAN. Testing can be arranged through the Occupational Health Services Department of either CN or CPR.

b) Rail Traffic Control (RTC)* Practical Test

Rail traffic controllers who fail the Ishihara Colour Vision Test will be assessed using a practical test developed by each railway company.

_____

** NOTE:* *Both the CNLAN and the RTC tests must be conducted unaided as defined in section 2.3.1.*

2.4 Extra-ocular muscle balance

Individuals who experience diplopia at different eye positions within a 30º radius of their habitual straight-ahead gaze or have a restriction of eye movements within 30º of straight-ahead cannot occupy a SCP.

3. Monitoring requirements

3.1 Frequency

Assessment of distant and near acuity, visual fields, colour vision and ocular muscle balance is done every 5 years until the age of 40 and every 3 years thereafter as part of the periodic medical examination.

Assessment of colour vision at pre-employment/pre-placement is done using the Ishihara Colour Vision Test. Individuals with colour vision defects who pass the CNLAN or RTC colour vision test are to be retested at the time of every second periodic medical examination (i.e. every 6 years) only for individuals over age 40. Those who do not pass the CNLAN or RTC colour vision test on retesting are required to undergo further assessment including a practical test developed by each railway company.

The Chief Medical Officer (CMO) may determine different periodicity for those individuals who have symptoms or signs of visual disorders or who are at risk of developing such disorders.

3.2 Testing methods:

Distant and near acuity, visual fields, colour vision and extra-ocular muscle balance assessments may be done by a physician, an optometrist, a nurse or a trained technician duly authorized by the CMO in accordance with current testing protocols (as described in Appendix II).

4. Individual assessment

The CMO may authorize an individual who does not meet the criteria to occupy a SCP if the CMO has reasons to believe that the individual can perform their duties in a safe manner despite their visual disorder.

In doing so, the CMO will take into consideration the following:

- the specific requirements of the position;
- the opinion of an ophthalmologist or an optometrist who has examined the individual; and
- any relevant ability, skill or experience of the individual.

The CMO may also require that a practical test be performed before allowing an individual to occupy a SCP.

5. Guidelines for some exceptional cases

5.1 Refractive surgery

5.1.1 LASIK[1], LASEK[2] and PRK[3] procedures

Individuals who had LASIK, LASEK or PRK procedures cannot be considered fit to work in a SCP until they are documented to have:

- a visual acuity (corrected or uncorrected) that meets the standard by at least day 7 post-op
- developed no complications, and a report from an eye care specialist that considers them fit to return to work

Additional reports are required by at least one month and three months post-op verifying that the individual continues to meet the visual acuity requirements and no complications have developed.

5.1.2 RK[4], CK[5] and LTK[6] procedures

Individuals who had RK, CK or LTK procedures cannot be considered fit to work in a SCP until they are documented to have:

- a visual acuity (corrected or uncorrected) that meets the standard by at least day 7 post-op*
- developed no complications, and

[1] Laser Assisted In-Situ Keratomileusis

[2] Laser Subepithelial Keratomileusis

[3] Photorefractive Keratectomy

[4] Radial Keratotomy

[5] Conductive Keratoplasty

[6] Laser Thermokeratoplasty

- a report from an eye care specialist that considers them fit to return to work

Additional reports are required by at least one month, three months, and 6 months post-op verifying that the individual continues to meet the visual acuity requirements and no complications have developed.

_____

**If the refractive surgery was RK, then the reports should contain the results from two measurements made at different times of day to verify that the diurnal variations are not significant. One assessment should be in the early morning and the other in the late afternoon.*

5.1.3 Implantable Contact Lenses (ICLs)

Individuals who had ICLs cannot be considered fit to work in a SCP until they are documented to have:

- a visual acuity (corrected or uncorrected) that meets the standard by at least day 7 post-op
- developed no complications, and
- a report from an eye care specialist that considers them fit to return to work.

Additional reports are required by at least one month and three months post-op verifying that the individual continues to meet the visual acuity requirements and no complications have developed.

5.2 Monocular Vision

For the present purposes, a monocular individual is a person who has lost the use of one eye or has a visual field in one eye that is less than 40 degrees in any direction. A monocular individual may be deemed as acceptable for a SCP provided that the following conditions are met:

5.2.1 A report by an eye care professional indicates that, with respect to the worse eye, the condition is stable and unlikely to affect the better eye;

5.2.2 With respect to the better eye:

- the vision is corrected to 6/9 or better;

- the visual field is within acceptable limits. The minimal acceptable visual field limits are defined as:

  - horizontal meridian of 120º
  - vertical meridian of 90º
  - oblique meridians of 90º
  - a continuous visual field within the above limits.

- colour vision is adequate under binocular viewing conditions;

- the eye's adnexa are normal in all other respects.

5.2.3 The individual, following an adequate period of adaptation, has satisfactorily completed a practical test (*) conducted by a person designated by the CMO demonstrating his/her ability to perform his/her duties in a safe manner while maintaining an adequate look-out for other traffic and obstructions

---

(*) *A practical test or adaptation may not be necessary in all cases. Demonstrated ability to perform tasks similar to those in a SCP that were gained through past work experience may be sufficient.*

5.3 Substandard Vision in One Eye

These are individuals whose worse eye has a corrected central vision of less than 6/15 and a normal peripheral visual field in that eye. Individuals who have a scotoma within the central 10º visual field, but the remaining visual field is normal would also fall into this category. These individuals can be deemed fit for a SCP provided that the following conditions are met:

5.3.1 A report by an eye care professional indicates that with respect to the worse eye:

- the condition is stable and unlikely to affect the better eye;
- the visual field is normal outside the central 10º; and
- the eye's adnexa are normal in all other respects.

5.3.2 With respect to the better eye:

- the vision is corrected to 6/9 or better;

- the visual field is normal; and
- the eye's adnexa are normal in all other respects.

5.3.3 With respect to binocular viewing conditions:

- colour vision is adequate; and
- diplopia is absent.

5.3.4 An accredited professional concludes that the visual defect is unlikely to interfere with safe performance of duties, and the CMO is satisfied that any relevant ability, skill or experience of the individual has been given due consideration. In certain cases, a practical test may be advised.

5.4 Glaucoma

Glaucoma is an ocular disease where the intraocular pressure is too high for the structures of the optic nerve head to withstand. Glaucoma damages the ganglion cell axons as they are leaving the eye resulting in a subsequent vision loss. The loss usually begins in the peripheral visual field and eventually progresses to include the entire visual field if the condition is not treated. Glaucoma can affect one eye or both eyes. In the case that both eyes are affected, the visual field loss is usually worse in one eye. Patients usually do not report symptoms until the later stages of the disease when their visual acuity is affected. The most common treatment is to use ophthalmic drops to lower the pressure in the eye. The primary concern for a person in a safety critical position is that any reduction in their visual field, visual acuity, or colour vision does not impair their job-related performance.

A report from the eye care professional is required within the first year of the diagnosis. This report must include corrected visual acuities, color vision and visual fields results. A second report is required one year later to document that the condition has remained stable. If the visual fields, visual acuity and colour vision have remained stable, then subsequent reports would only be required on an individual basis depending on any visual changes noted on the periodic medical assessments and/or as reported by the eye care professional. Monitoring for other cases will be determined on an individual basis in consultation with the treating eye care professional.

Appendix I - Background Information on Vision

For decades, safety of railway operations has been a concern. This is acknowledged in the Railway Safety Act which has been enacted further to the National Transportation Act. The Railway Safety Act incorporated a prior General Order on the Railway Vision and Hearing Examination Regulations known as the General Order O-9.

Amended the last time in 1985, General Order O-9 has been revoked and is now replaced by the Railway Medical Rules. These rules allow health professionals to assess accurately and equitably the capacity of individuals with impaired vision to occupy a Safety Critical Position (SCP).

Visual Acuity

In general, the recommended standards are similar to those used for commercial drivers in Canada. Most Canadian provinces require a minimum distance acuity of 6/9 (20/30) corrected or uncorrected for the better eye and 6/15 (20/50) corrected or uncorrected for the worse eye. It is anticipated that the majority of individuals between the ages of 18 and 60 years old should be able to meet the proposed distance acuity standards.

A near vision standard is maintained to ensure that individuals over age 40 have the proper spectacle correction in order to read and carry out tasks within arm's length efficiently. It may also identify a small number of moderate hyperopic individuals under age 40 who may benefit from a correction in order to reduce eyestrain.

Refractive Surgery

The primary concern with refractive surgery procedures and individuals who occupy a SCP is that their vision may fluctuate so that they no longer meet the standard due to the regression of the refractive error, changes in the corneal transparency, or both. The main safety concern is whether the individual’s acuity would decrease below the standard without them being aware of the change.

The degree of the fluctuation and the time required for vision to stabilize depend on many factors. These factors include the type of surgery, the amount of the surgical correction, and the individual’s healing characteristics. In certain cases, individuals may require longer than 6 months for the vision to stabilize.

Others, particularly those with small myopic refractive errors, may be fit to return to work by 7 days post-op, providing their visual acuity is stable. (Acuities are considered to be stable when the values are within ±3 letters on separate visits) A review of the literature indicates that the majority of patients who meet this criterion for stability at one week after laser surgery also meet the criteria at 6 months although there is a slight change in the mean refraction towards myopia between one and three months. The tendency to regress towards myopia is the reason for the reports verifying that the individual still meets the visual requirements.

Although some procedures offer the possibility of stable vision relatively quickly, there are other techniques which may require more time for stabilization and healing. This is the reason for requiring reports at more frequent intervals for those individuals who have had radial keratotomy (RK) conductive keratoplasty (CK) and laser thermal keratoplasty (LTK). RK has the additional complication that diurnal fluctuations of the refractive error and visual acuity are still possible long after surgery. For this reason, individuals who have had RK surgery will have to document that their vision still meets the required standard for different times of the day. The times for assessment would be early in the morning and late in the afternoon or early evening. For those individuals on shift work, the different times would be shortly after waking and after being awake for at least 8 hours. It may be necessary for these individuals to have separate pairs of spectacles for day and night in order to meet the visual acuity standards.

Implantable contact lenses (ICL's) are a relatively new option for individuals with moderate to high refractive errors. It is anticipated that these devices will become more common in correcting myopia and hyperopia in the upcoming years. The ICL's are implanted in either the anterior or the posterior chamber of the eye through small incisions. Visual recovery is usually within a day and most individuals have stable refraction and visual acuity after one week. However, because the device requires more evasive surgery, the risk of infection is higher and there is also the risk that the incisions could reopen if they haven't healed properly. Until more experience is obtained with the devices, the decision on when the individual can return to work should be made in consultation with the surgeon.

Visual Fields

Visual fields are usually assessed using the "confrontation" method, which is user-friendly, practical and sufficient to detect quadrantanopias and hemianopias. These visual field losses are large enough to have a detrimental effect on individual's performance resulting in an unacceptable risk to the safety of the individual and others. The simplicity of the confrontation concept has led to a multitude of techniques for performing the test. Some techniques are better than others. The recommended procedure is "finger counting".

The finger-counting procedure is primarily intended as a screening test. If a defect is found, then further testing will be necessary to diagnose the cause and quantify the functional impact of the field loss. The recommended test conditions are designed to quantify an absolute loss.

The size and contrast of the targets (which have approximately equal detectability) are designed to measure the maximum extent of the visual field. Each eye should be tested. Different testing conditions may be required for diagnostic purposes.

It is possible that a person with a visual field loss might be able to compensate by making additional eye and head movements. Nevertheless, these individuals may not be suitable for certain SCP's. Operating equipment on the main track may not be a problem because the necessary scanning movements are mostly along the near horizontal meridian and at the instrument panel. However, someone working in a large yard or along multiple sections of track may be at greater risk because equipment could be moving on any of the closely spaced sections of track; the loss of peripheral vision may impair his/her ability to detect moving objects in sufficient time. For these reasons, individuals with a visual field impairment should be considered on an individual basis with a practical evaluation if necessary.

Extra-ocular Muscle Balance

Screening for extra-ocular muscle disorders that could result in double vision is accomplished, in part, through the medical history. A history of double vision, strabismus, turned eye, eye exercises, or a lazy eye require further assessment. There are also a number of systemic conditions where there is an increased likelihood of diplopia. Examples of these conditions include Grave's disease (i.e., hyperthyroidism), diabetes, stroke, multiple sclerosis, and myasthenia gravis.

The visual acuity standard is the other part of the screening process. Failure to meet the acuity standard in the worse eye may be a result of a strabismus or long-standing ocular muscle problem, particularly in the younger individuals.

Individuals who have been identified as being at risk for developing diplopia either by their medical history or visual acuity should be assessed further by an eye care professional.

Colour Vision

Assessment of colour vision is particularly important in railway operations as colour signals are extensively used to control the movements of trains. The use of the Ishihara plate method remains the best screening tool as it is inexpensive, sensitive and specific.

The recent development of an improved Lantern Test makes the confirmation process more accurate as it identifies those individuals who are at risk because of their colour identification deficiency.

Coloured spectacle or contact lenses worn before one or both eyes, or other devices purported to aid colour discrimination or correct colour vision deficiencies, are not permitted. It is safe to make the general statement that these devices are primarily designed so that the individual passes the Ishihara (or equivalent) test. On most practical tests, performance usually does not improve unless the practical test is very similar to the colour vision demands of the Ishihara. The reason for the discrepancy is that in aiding discrimination for certain specific colours, the filters usually worsen discrimination for other colours, resulting in no overall improvement in their general colour discrimination capabilities. For example, a red coloured lens which blocks green light from reaching the eye would allow a person to pass the Ishihara test because the orange numbers would appear brighter than the green background while wearing the red lens. However, when the person is required to identify signal lights while wearing the lens, the green light would appear to be as very dim yellow or white light if they are detected at all and the yellow light would appear as an orange or red light.

One question that is often raised concerns the frequency for retesting colour vision. The reason for the question is that for the vast majority of individuals with normal colour vision, their colour vision remains unchanged throughout their career. This reflects the general trend in the population that colour discrimination remains relatively stable until age 40. Even though colour discrimination begins to worsen at this age, the discrimination loss is along the blue-yellow axis and not the red-green axis so that one's ability to identify railway signals should not be impaired. Data from the CNLAN study support this hypothesis. Individuals over age 40 with normal colour vision did not do worse in identifying simulated wayside signal lights. In fact, the general trend in the data was that the older subjects had fewer errors than the younger subjects.

Given that there is little risk of a healthy individual's red-green colour vision deteriorating during their career, individuals who pass the Ishihara test at their initial assessment are not required to redo the test UNLESS there is a change in their general health or the health of their visual system. Conditions that would warrant retesting and frequent monitoring of their colour vision include diabetes, demyelinating diseases, chorioretinal diseases, optic nerve disorders, or prescribed medications that are known to affect colour vision.

Although the age-related changes in colour vision are well established for individuals with normal colour vision, the age-related affects on the colour vision of individuals with congenital colour vision defects is not as certain. In these cases, the issue is whether the normal age-related changes affect their colour discrimination to a greater extent since their discrimination is already compromised. Results on the Ishihara test are inconclusive since the majority of the individuals with colour vision defects miss nearly all the plates on the test even when they are young adults, so it is impossible to measure

any age-related changes with the Ishihara test. Because of this uncertainty, individuals with a colour vision defect who pass the CNLAN, or the RTC colour vision test are to be retested at every second periodic medical examination after age 40 (every 6 years) regardless as to whether their visual or general health has changed.

Monocular Vision

There is little question that an individual's performance on a number of laboratory tests will be impaired when there is either a sufficient reduction in the visual acuity in one eye or the individual is monocular. However, these degradations in laboratory measures do not usually translate into appreciable losses in on-the-job performance. Performance in terms of driving either a truck or automobile has not been shown to be significantly affected when the driver is monocular. Although some studies have reported higher accident rates for drivers with impaired vision in one eye only, more recent studies have not been able to confirm these findings. In fact, one study reported that the accident rates were lower for monocular truck drivers. One possible explanation for the differences is that the older studies did not always control for age and driving experience. Despite the more recent performance data indicating that monocular drivers do not pose an increased risk, many agencies still remain reluctant to relax the visual field standard for commercial drivers to allow monocular drivers. It is important to remember that, although individuals with monocular visual fields losses may not be a safety risk, there is a general consensus in the data that individuals with an appreciable field loss in both eyes are a significant risk to safety.

Although monocular individuals may not pose an increased risk to safety on the roadways, driving a vehicle is not necessarily equivalent to performing duties in the rail industry. For this reason, a more conservative approach is taken in assessing individuals who are monocular or have substandard vision in one eye to ensure that the vision defect will not pose an increased risk to safety. One of the primary safety concerns for the rail industry is the impact of the visual field loss on the person's ability to detect hazards. A person who has lost total vision in one eye has lost approximately 40 ° of his/her peripheral visual field on the same side of the body as the blind eye.

This loss could be problematic in detecting objects coming from the side if the person has not developed coping strategies such as scanning eye movements, head turning, or both. The development of these strategies often requires time, and this is one reason why Civil Aviation Authority typically uses an adaptation period of 6 months before they will re-license a pilot who has lost vision in one eye and restrict a monocular commercial pilot to a 2-person crew.

Even with the additional eye and head movements, a person with only one eye (or a bilateral loss of upper or lower visual fields) may not be suitable for a SCP. Operating equipment on the main track may not be a problem because the necessary scanning movements are mostly along the near horizontal meridian and at the instrument panel. However, someone working in a large yard or along multiple sections of track may be at greater risk because equipment could be moving on any of the closely spaced sections of track and the loss of peripheral vision may impair his/her ability to detect moving

objects in sufficient time. For these reasons, individuals with visual field impairment should be considered on an individual basis with a practical evaluation if necessary.

Visual Assessment Form

In order to assist the examining practitioner and the CMO, an example of a visual assessment form is provided in Appendix III. This form could serve as either the actual document or a template for developing an equivalent form.

Appendix II - Visual Assessment Methods

1. Visual Acuity

1.1 Distant acuity

Distant acuity is assessed with the individual wearing his/her habitual distance visual correction (if any), using a Snellen chart or an equivalent.

When acuity charts printed on white surface are used, the light falling on the chart should be uniform and the amount should be greater than 250 lux. Most offices with overhead fluorescent light fixtures will meet this requirement. If the chart is placed at the end of a long hallway, then adequate illumination should be confirmed with a light meter. Long hallways tend to be dimmer than the work areas. Glare sources such as windows are to be away from the chart. The individual being assessed should not sit or stand directly below a light.

If a projected chart or computer screen is used, the room lights should be turned off prior to the assessment.

The individual is allowed only one mistake on a line in order to receive credit for that line. The proposed scoring criterion of allowing only one mistake on a line is explained by the fact that different charts are used in testing distant acuity. These charts vary in the number of letters per line and the types of letters in the line. All letters are not equally difficult to identify. These variations have an influence on the probability that the assessed individual would correctly identify the letters based on guessing and prior experience. For example, it would be easier to obtain 75% correct on a chart with 4 letters per line that are relatively easy to identify than it would be for a chart which had 6 letters per line and the letters vary in their difficulty. Because this factor is difficult to control when using multiple chart designs, there is a necessity to adopt a strict scoring criterion to minimize the interaction.

1.2 Near acuity

Near vision is assessed with the individual wearing his/her habitual visual correction for reading (if any), using one of the following scales:

Reduced Snellen (American)	Reduced Snellen (Metric)
Snellen (Metric)	M Notation @ 40 cm
N Notation @ 35 cm or 40 cm	Jaeger Notation @ 35 cm or 40 cm

Examiners must use the appropriate test distance specified for the given scale. Testing is done with individuals wearing their current visual correction for reading. Normal office lighting is sufficient. There should be no shadows falling on the near acuity card.

An adequate screening test for near acuity is the recognition of text printed in regular Times New Roman Font at an 8-point letter size held at 40 cm. (Refer to Part 3-A of the Periodic Medical Report Form under Subsection 5.3).

2. Visual fields

Visual fields are assessed using the confrontation method. If a defect is found, then a more quantitative method should be used.

2.1 Recommended procedure (confrontation method)

- The individual is positioned 0.66 to 1.0 metre away from the examiner. The examiner should be positioned at approximately the same height as the individual. Individuals do not need to wear their corrective lenses but those with higher prescriptions may find the test easier to perform when wearing their habitual prescription. Normal office lighting is sufficient.

- The individual is instructed to occlude his/her left eye using the palm of his/her hand. The examiner occludes or closes his/her right eye.

- The individual is instructed to fixate the examiner's open eye with his/her open eye. The examiner informs the individual that he/she will be holding his/her hand in different locations to test the individual's side vision. The individual is to report how many fingers are held up. The examiner informs the individual that he/she will be holding up 1, 2, or 4 fingers. (3 fingers are difficult to distinguish from 2 or 4.) The

- examiner reminds the individual to maintain fixation on the open eye and not to glance at the hand.

- The examiner holds his/her hand about halfway between him/herself and the individual. The examiner starts with his/her hand in one of the four quadrants approximately 50 degrees from the common line of sight. The hand should be placed in the middle sector of the quadrant. (Other areas of the quadrant can also be tested.) The examiner holds up 1, 2, or 4 fingers and asks the individual to tell how many fingers are present. Fingers should be kept in a plane parallel to the individual's facial plane and rotated so that the fingertips are directed toward the individual's line of sight.

- The examiner repeats this procedure for the other 3 quadrants.

- The examiner may have to switch hands to test the other half of the visual field.

- If the individual responds incorrectly, the examiner moves his/her fingers closer to the individual's line of sight until the number of fingers is identified correctly. The examiner compares the difference in position between when he/she was first able to identify the number of fingers correctly and the position of his/her hand when the individual identified the number of fingers correctly.

- The procedure is repeated for the other eye.

2.2 Quantification of field loss.

In order to assess the functional extent of field loss, any of the following test methods could be used. Other test conditions may be necessary for diagnostic purposes.

<u>LIST OF EQUIVALENT TEST METHODS</u>

- 3 mm white target at 33 cm viewing distance (black or grey background).
- Goldmann Perimeter: Target III 3/e.
- Humphrey Perimeter: Size III at 15 decibels.
- Octopus 1-2-3 Perimeter: Size III at 10 decibels.
- Dicon Perimeter: 10 decibel target.

3. Colour vision

Colour vision is screened using the Ishihara Colour Vision Test. This test is designed to be used under natural daylight. If natural daylight is unavailable, "natural daylight" fluorescent lamps may be used. In practice, normal "cool white" fluorescent lamps are sufficient for the vast majority of individuals. A few individuals with very mild defects may pass using this light source. Although they do pass, they usually make more errors than an individual with normal colour vision. This means that, if an individual makes the maximum number of allowable errors when cool white fluorescent lamps are used, this individual should be re-tested using natural daylight or light source that is rated as comparable a suitable substitute for natural daylight.

Incandescent bulbs, halogen or warm white fluorescent lamps should not be used to illuminate the Ishihara test.

When scoring the test, the individual has to read the complete number correctly in order for the response to be counted as correct. Missing one digit of a two-digit number is an error.

4. Extra-ocular muscle balance

The medical history can be used to identify individuals who are at risk of developing double vision while at work. These risk factors include a past history of double vision, strabismus, turned eye, lazy eye, eye training exercises, or extra-ocular muscle surgery. There are also a number of systemic conditions that are associated with an increased risk of diplopia. Examples include Grave's disease (i.e. hyperthyroidism), diabetes, stroke, multiple sclerosis, and myasthenia gravis. Individuals who have any of these risk factors should be assessed further by an optometrist or ophthalmologist to determine the likelihood of developing double vision.

Failure to meet the acuity standard in the worse eye may be a result of a strabismus or long-standing ocular muscle problem, particularly in the younger individuals. Individuals who fail to meet the worse eye acuity should also be referred to determine the cause of the reduced visual acuity and whether diplopia is likely.

Diplopia within 30 degrees of fixations can be tested by the Broad H test. The Broad H test is common screening procedure to test the integrity of cranial nerves III, IV, and VI. The examiner asks the individual to follow his pen (or similar object) without moving their head as the examiner traces out an "H" pattern in front of the individual. The examiner starts with the pen directly in front of the individual and moves it slowly to the right approximately 30 degrees straight along a horizontal line.

From this location, the examiner then moves the pen up 30 degrees, back down to the horizontal line and then down another 30 degrees in the inferior gaze. The pen is returned back to the horizontal line and then moved back through the straight-ahead position to a point 30 degrees to the left of straight ahead. The upper left and lower left gaze positions are then tested by moving the pen up and down 30 degrees.

The examiner looks at the individual's eyes to make sure that they are both fixating on the target and asks the individual to report whether the pen appears double in any position. A report of diplopia or a misalignment of the eyes in any position would warrant further assessment by an eye care professional.

Appendix III - Vision Reporting Form Example

Employee Information (Employee to complete all areas) Last Name First Name Initial		Employee No. Date of Birth:	Male Female ə ə
Position	Department	Work Location Telephone: (Home) (Office)	
Supervisor's Name	Employee's Signature		

Information to the Examining Eye Care Specialist

Canadian railway employees working in a Safety Critical Position (SCP) operate or control the movement of trains. Physical or mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

Railway employees working in a SCP are required to have periodic screening assessments. This employee failed to meet the visual screening standard established for the Canadian railway industry by Government Legislation in the area(s) checked below. Your assessment of these areas is required. The established standard for each area is described.

SECTION A

☐ **Visual Acuity**

Standards:

Corrected or uncorrected distance visual acuity not less than 6/9 (20/30) in the better eye.
Corrected or uncorrected visual acuity not less than 6/15 (20/50) in the worst eye.
Corrected or uncorrected near visual acuity of 6/9 (20/30) with both eyes open.

	Distance Vision		Near Vision	
	Uncorrected	Best Corrected	Uncorrected	Best Corrected
Right Eye				
Left Eye				
Both Eyes				
Test Method				

1. If new glasses or contact lenses are required to meet the vision standards, have they been prescribed?

   ☐ Yes. Anticipated date of dispensing _____
   ☐ No. Explain: _____

2. Even though the acuity standards are met with an updated prescription, are there other conditions contributing to the reduction in visual acuity other than uncorrected refractive errors?

   ☐ Yes. Indicate diagnosis and management.

   _____
   _____
   _____
   _____

   ☐ No

3. If the best corrected visual acuities do not meet the required standard, indicate your diagnosis and management of this patient's condition.

   _____
   _____
   _____
   _____

4. If the better eye does meet the acuity requirement, but the worse eye does not meet the acuity requirement, then we require an extra-ocular muscle assessment as outlined in Section B and visual field assessment of each eye as outlined below in Section C.

SECTION B

☐ **Extra-Ocular Muscle Balance**

Standard: No diplopia at different eye positions within a 30 degree radius of their straight-ahead gaze or a restriction of eye movements within 30 degrees of straight-ahead.

a. Is diplopia present within a 30 degree radius of straight-ahead gaze under daytime or night time viewing conditions?

☐ Yes ☐ No

b. Are there any restrictions of eye movements within 30 degrees of straight-ahead?

☐ Yes ☐ No

If "Yes" to either question, please indicate your diagnosis and management of the extra-ocular muscle or binocular vision problem.

_____
_____
_____
_____
_____
_____

SECTION C

☐ **Visual Fields/Peripheral Vision**

1. Does this employee meet the following limits of uninterrupted monocular visual field for each eye tested separately without correction?

Standard	Right Eye		Left Eye	
	Yes	No	Yes	No
Horizontal meridian: 120° Continuous				
Vertical meridian: 90° Continuous				
Oblique meridians: 90° Continuous in both the 135º and 45º meridians				

2. If "No" is answered to any of the above limits, please attach the results and indicate your diagnosis and management of the visual field problem.

_____
_____
_____
_____

3. Indicate test method used:

- ☐ 5 mm white target at 33 cm viewing distance (black or grey background)
- ☐ Goldmann: Target III 3/e
- ☐ Humphrey: Size III at 15 decibels
- ☐ Octopus 1-2-3 Size III at 10 decibels
- ☐ Dicon Perimeter: 10 decibel target
- ☐ Equivalent Condition (Specify) _____

EYE CARE SPECIALIST STATEMENT, INFORMATION AND REPORTING GUIDELINES:

An answer to the following is required:

Are there other visual conditions or disorders that could affect this employee's performance in a Safety Critical Position in the Canadian railway industry?

☐ Yes. Indicate diagnosis and management.

_____

_____

_____

_____

☐ No

This report will be used to make an assessment on this employee's fitness for duty and constitutes a third-party service. In completing this report, please be thorough and write legibly. If you have any questions regarding any component of this report, call the toll-free number listed below.

I certify that the information documented in this report is, to the best of my knowledge, correct.

Date of examination: _____

Signature: _____ ☐ Optometrist
☐ Ophthalmologist

Name (Print): _____ Telephone: ( ) _____

Address: _____ Fax: ( ) _____

City/Province: _____ Postal Code: _____

Report and Invoice may be sent to:

Appendix IV - CNLAN - Lantern Colour Vision Test

Introduction

The Lantern Colour Vision test is designed to determine one's ability to identify colours used in rail wayside signals. The intensity and size of the lights are equivalent to a viewing distance between 0.2 and 0.4 mile (0.3 to 0.64 km). The colours fall within the American Association of Railroads standards for wayside signals.

Test Description

The test should be conducted under normal office illumination. Normal room illumination assumes a windowless office. If there are windows, then any drapes or blinds should be closed to avoid glare from the sunlight. If you cannot block the sunlight, then you will have to use a different room for testing.

There are three parts to the Lantern: the lantern itself, the control unit and a remote-control unit. There is a slot on the back of the lantern for carrying the control unit. The unit should be placed in the slot with the top facing away from the lantern and the connectors facing up. The remote control is attached to the control unit.

A computer cable connects the control unit to the lantern. On the left front of the lantern, is a connector for the control unit. (Just above the plug for the power cord). The control unit also has an RS232 connection so that a computer can control the lantern if desired.

Test Set-up

Place the lantern 4.6 metres from the applicant. Remove the control unit from the back. If necessary, connect the control unit to the lantern using the computer cable. The control unit can be placed anywhere convenient. We recommend placing it so that you view both the applicant and the lantern. The power switch is on the right side of the lantern. This switch controls power for both the lantern and control unit. As the power comes on, the control unit will set the lantern to the first example set. The colour of the lights will be listed on the control unit display.

Pressing the arrow buttons on the control panel changes the test lights. The arrow pointing to the left displays the previous set of lights and the arrow pointing to the right advances to the next set of lights. The lights will be extinguished between presentations by pressing the button labelled with the "X". This button turns off the lantern's light, but the control unit remains on. To turn the lantern on, press one of the arrow buttons.

The test lights can also be changed by the remote control. The asterisk on the remote control presents the previous set of lights and the pound button (#) advances to the next set of lights. The number buttons can be used to move to a specific set of test lights. To present a specific set, you must always press two buttons. For example, to display set 5, you must press 0 and 5.

Aim the remote control at the dark rectangular window on the control unit. If the control unit received information from the remote, a little red light will flash. A light on the remote will also flash if the information was transmitted. Pressing 0 twice will turn off the test's lights.

We recommend that you turn off the lantern test lights, if not the entire lantern, between tests. The reason is that there is a thermostat which will turn off the light if the lantern gets too hot. It takes about 45 minutes before it cools down enough to use.

Testing Procedure

Before starting the test, make sure that the individual meets the current distance visual acuity standards.

The individual's normal clear spectacle lenses or clear contact lenses can be worn while performing the test. However, coloured spectacle lenses or coloured contact lenses worn before one or both eyes or other devices purported to aid colour discrimination or correct colour vision deficiencies are not permitted. Contact lenses, which are tinted with a light blue handling tint, are permitted. Light handling tints have essentially no effect on the test results. However, if there is any question as to how light the tint is, then testing must be done with either clear spectacle lenses or clear contacts lenses.

The candidate should be seated comfortably at a distance of 4.6 metres (15 feet) from the lantern and have a straight-on view of the front of the lantern. The room lights should be turned on, but the drapes or blinds should be closed to block out the sunlight. Avoid positioning the patient directly underneath an overhead light to minimize glare from the lights.

Set the lantern to the first presentation, Example 1, if necessary. This is one of the two examples.

Inform the candidate that:

- "This is a test to determine your ability to identify rail signal light colours."

- "There will always be three lights presented. The colours of the lights will be any combination of red, green and yellow. Only the names of red, green and yellow should be used to identify the lights."
- "Identify the colour of the lights starting at the top, followed the middle, and then the bottom."
- "This set of test lights (EXAMPLE 1) has an example of each of the three colors. The top one is green, the middle one is yellow, and bottom is red."

Advance to the next presentation, EXAMPLE 2 and state.

- "This is another example of the colours. The top is red, the middle is yellow, and the bottom is green."
- "Are there any questions or would you like to see the examples again".

After answering any questions or showing the examples again, advance to the third set of lights. This is the first test set. Record the responses on the score sheet by circling the correct answer or writing in the incorrect response.

Allow approximately 5 seconds for a response. If the candidate takes longer than 5 seconds to respond, extinguish the lights, by pushing the "X" button or entering 00 on the remote. In order to avoid confusion in recording, do not advance to the next set until the candidate has responded.

If the candidate uses a colour name other than red, green or yellow, remind her/him that only red, green and yellow responses are allowed. The exception to this rule is that amber can be used to identify yellow lights.

A passing performance at the 4.6 metre distance is no more than one error, and that error cannot be identifying a red light as green or a green light as red.

If the person fails at the 4.6 metre viewing distance, then repeat the test at progressively shorter viewing distances listed in Table 1 until they either pass the lantern or fail at all distances. Make sure that you start at a different number on each trial, but do not present the two Examples as part of the test series. A perfect score is required at each of the shorter distances in order to pass the lantern.

TABLE 1

Test Distance	Pass/Fail Criterion	Equivalent Viewing Distance
4.6 metres (15 feet)	One error is allowed providing that the error is not a red response for a green test light or a green response for a red test light.	320 to 640 m (350 to 700 yds)
2.3 metres (7 feet 6 inches)	Any error is a failure	160 to 320 m (175 to 350 yds)
1.15 metres (3 feet 9 inches)	Any error is a failure	80 to 160 m (90 to 175 yds)
0.575 metres (1 foot 11 inches)	Any error is a failure	40 to 80 m (45 to 85 yds)

4.4 – Epileptic Seizures

Medical Guidelines for the Employment of Individuals with Epileptic Seizures in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees who work in a Safety Critical Position (SCP) operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment. Sudden impairment of their alertness, judgement, or sensory or motor function can pose a serious safety threat.

Although the overall prognosis for seizure control is excellent, with about 70% of patients having a 5-year remission of seizures, epilepsy is a condition that can cause sudden and unpredictable impairments of the functions noted above. Each person with epilepsy has different disabilities. Complete evaluation of each case is therefore needed to assess the risk of seizure recurrence and the risk to safety caused by a seizure. The notion of "significant risk" cannot be precisely defined. A risk-free environment is unattainable and undoubtedly some employees with no history of epilepsy will have their first and unpreventable seizure on the job.

Background information on epilepsy and other epileptic seizures is provided in Appendix I.

2. Basic considerations

Employment of individuals with epilepsy or other epileptic seizures in a SCP shall be guided by the following considerations:

2.1 Medical history and findings

- nature of seizure disorder
- results of investigations
- adherence to treatment protocols
- results of treatment

2.2 Treatment

- antiepileptic drugs (AEDs)
- surgery
- medication withdrawal

2.3 Nature of the job

3. Definitions

In this document, the following definitions are used in accordance with a 1997 report of the International League Against Epilepsy:[1]

- **Epileptic seizure** is defined as a clinical manifestation presumed to result from an abnormal and excessive discharge of a set of neurons in the brain. The clinical manifestation consists of sudden and transitory abnormal phenomena that may include alteration of consciousness, motor, sensory, autonomic, or psychic events perceived by the patient or an observer.

- **Epilepsy** is a disorder of the brain characterized by an enduring (but not necessarily permanent, as in some childhood epilepsies) predisposition to generate epileptic seizures and by neurobiological, cognitive, psychological and social consequences of this condition. The definition of epilepsy requires the occurrence of at least one epileptic seizure.[2] Often, seizure recurrence is required to diagnose epilepsy. However, investigation may show that there is good reason to believe that another seizure is likely to occur, such as the finding of epileptiform activity in the EEG. Many authorities will diagnose epilepsy in such cases.

- **Single (isolated) seizure** is defined as one or more epileptic seizure(s) occurring within a 24-hour period, without later recurrence.

[1] Epilepsia, 38 (5): 614-618, 1997

[2] Epilepsia, 46 (4): 470-472, 2005

- **Unprovoked seizures** are defined as seizures that occur likely in relation to antecedent conditions that have affected the central nervous system (CNS) substantially increasing the risk for epileptic seizures. These conditions include non-progressive (static) lesions such as sequelae of infections, cerebral trauma, or cerebrovascular disease, and progressive CNS disorders.

- **Acute symptomatic seizures** are defined as seizures occurring in close temporal association with an acute systemic, metabolic, or toxic insult or in association with an acute CNS insult (such as infection, stroke, cranial trauma, intracerebral haemorrhage, or acute alcohol or drug intoxication or withdrawal). Such seizures are often isolated epileptic events associated with acute conditions but may also be recurrent seizures or even status epilepticus when the acute conditions recur. (e.g., in alcohol withdrawal seizures).

- **Simple partial seizures** are seizures with evidence of a clinical partial onset, in which alertness and ability to interact appropriately with the environment are maintained.

- **Complex partial seizures** are seizures of partial onset in which altered consciousness, amnesia, or confusion during or after a seizure is reported.

- **Auras** are a type of subtle simple partial seizure that may herald the onset of a clinically evident attack.

4. Medical Fitness for Duty Criteria

4.1 Single (isolated) or unprovoked seizures before a diagnosis is made

- Remove from any safety critical activity
- Get neurological assessment including EEG with awake and sleep recordings and appropriate imaging
- If no epilepsy diagnosis following medical assessment, resume safety critical activity if seizure-free for 12 months
- If epilepsy diagnosis following medical assessment: see 4.2.1.

4.2 Epilepsy:

4.2.1 Epilepsy diagnosis

- 5 years seizure-free with or without medication
- No epileptiform activity in an EEG performed within 6 months before returning to work.
- After returning to work, no overtime and no rotating shifts resulting in sleep deprivation or the likelihood of disturbed sleep patterns.

4.2.2 After surgery to treat intractable epileptic seizures

- 5 years seizure-free on medication or 3 years seizure-free off medication
- No epileptiform activity in an EEG performed within 6 months before returning to work

4.2.3 With epileptic seizures occurring in relation to sleep only

- Absence of post-ictal impairment during wakefulness
- Treatment with AEDs
- 5 years seizure-free with or without medication

4.2.4 With strictly simple partial seizures (including auras)

- No significant impairment of cognitive, sensory, or motor function.
- Treatment with AEDs
- Stable clinical pattern for 3 years

4.2.5 Antiepileptic drugs withdrawal

- Remove from any safety critical activity from the beginning of the withdrawal
- Return to work no less than 6 months seizure-free after complete withdrawal
- No epileptiform activity in an EEG performed a minimum of 6 months after complete withdrawal
- If seizures recur, return to work no less than 6 months seizure-free after resuming the previous effective medication

Medication change (new medication)

- Remove from any safety critical activity
- Return to work no less than 6 months after equilibration of the new medication at therapeutic doses, or drug levels, if available
- No seizure recurrence under the new medication
- The new medication is well tolerated
- No epileptiform activity in an EEG obtained on therapeutic doses of the new medication
- If seizures recur, return to work no less than 6 months seizure-free after resuming and equilibration of the effective medication.

4.3 In the case of epileptic seizures other than epilepsy

4.3.1 Acute symptomatic seizures

- 12 months seizure-free
- Seizure trigger clearly identified, eliminated, or unlikely to recur
- No epileptiform activity in an EEG performed within 6 months before returning to work

4.4 Other criteria of temporary exclusion from a SCP of individuals with epilepsy

- Noncompliance with treatment
- Inadequate blood AED levels unless specifically addressed in the neurologist's report.
- Side effects from AEDs that could significantly impair job performance

4.5 Criteria of permanent exclusion

- Unprovoked seizures owing to progressive CNS disorders.

- Repeated non-compliance with treatment, including cases of recurring acute symptomatic seizures due to identifiable causes such as alcohol withdrawal or non-medical drug use.

(See Appendix II for Medical Fitness for Duty Criteria)

5. Monitoring requirements before and after returning to work in a SCP

- Within 3 months before returning to work:
  - Review by a neurologist with submission of a written report.
- After returning to work:
  - Annual review by a neurologist with submission of a written report. The duration of the monitoring is to be assessed on a case-by-case basis at the discretion of the treating neurologist.

6. Individual assessment

Individuals with epilepsy or other epileptic seizures must be assessed with regard to their suitability for a particular position. The nature of the duties and responsibilities associated with their specific Safety Critical Position must be closely evaluated before any final determination of their fitness for duty. In a specific case, the CMO may determine different fitness for duty criteria if, after consultation with a neurologist, there is medical evidence that the present fitness for duty criteria should not be applied.

Appendix I - Background Information on Epileptic Seizures

It is internationally admitted that the seizure-free interval is the main concern in assessing risks of recurrence in individuals with epileptic seizures.

The risk posed by seizure recurrence for individuals in a safety critical position in the Canadian railway industry has not been studied but it should not be greater than for professional motor vehicle drivers in Canada.

In the case of epilepsy, the Canadian Medical Association recommends a seizure-free interval of 5 years for commercial driving.[3]

The participants at a 1996 workshop representing all members of the European Union declared that people with epilepsy would be fit when the risk of a seizure recurrence in the next year was not greater than 2%. A driving ban of 5-10 years was considered acceptable for a seizure-free subject off medication and with no epileptiform abnormality. In the case of an individual with a single isolated seizure without any known cause, a normal neurological examination and a normal EEG and, on no medication, a seizure-free period of 2-5 years was considered acceptable.

The European studies of Chadwick and van Donselaar on professional drivers[4] also showed that a 5-year seizure-free period was necessary to obtain a low risk for seizure recurrence (2% or less). This requirement was maintained in the April 3, 2005, report from the Second European Working Group on Epilepsy and Driving.[5]

In this last report, it is also suggested that for provoked seizures, the recurrence risk is not known. In some situations, like seizures provoked by medication or some metabolic diseases that might be cured and will not recur, driving ability might be considered sooner. In others, like sleep deprivation or alcohol, an individual assessment is necessary. Certain brain diseases, like serious cerebral trauma and bacterial or viral brain infections, give a high chance of developing epilepsy. In these situations, a prophylactic ban is to be considered on a case-by-case basis.

In these medical guidelines, given the progressive liberalization of international regulations over the past 50 years on epileptic seizures and working activities, the

---

[3] Determining Medical Fitness to Operate Motor Vehicles, CMA Driver's Guide, 7th Edition

[4] Epilepsy and Driving, a European View, Arthur E.H. Sonnen, June 1997 p. 85-99

[5] Epilepsy and Driving in Europe : A Report of The Second European Working Group on Epilepsy and Driving, April 3, 2005

requirements for the seizure-free interval of some types of epileptic seizures have been reduced accordingly.

Appendix II - Medical Fitness for Duty Criteria

Diagnosis		Criteria
1.	Single (isolated) or unprovoked seizures before a diagnosis is made.	• Remove from any safety critical activity • Get neurological assessment including EEG with awake and sleep recordings and appropriate imaging. • If no epilepsy diagnosis following medical assessment: resume safety critical activity if seizure-free for 12 months. • If epilepsy diagnosis following medical assessment: see 4.2.1.
2.	a) Epilepsy diagnosis	• 5 years seizure-free with or without medication. • No epileptiform activity in an EEG performed within 6 months before returning to work. • After returning to work: no overtime and no rotating shifts resulting in sleep deprivation or the likelihood of disturbed sleep patterns.
	b) After surgery to treat intractable epileptic seizure	• 5 years seizure-free on medication or 3 years seizure-free off medication. • No epileptiform activity in an EEG performed within 6 months before returning to work.
	c) With epileptic seizures occurring in relation to sleep only	• Absence of post-ictal impairment during wakefulness. • Treatment with AEDs. • 5 years seizure-free with or without medication
	d) With strictly simple partial seizures (including auras)	• No significant impairment of cognitive, sensory or motor function. • Treatment with AEDs. • Stable clinical pattern for 3 years.

	e) AED's withdrawal:	• Remove from any safety critical activity from the beginning of the withdrawal • Return to work no less than 6 months seizure-free after complete withdrawal. • No epileptiform activity in an EEG performed a minimum of 6 months after complete withdrawal. • If seizures recur, return to work no less than 6 months seizure-free after resuming the previous effective medication.
	f) Medication change (new medication):	• Remove from any safety critical activity. • Return to work no less than 6 months seizure-free after resuming and equilibration of the effective medication. • No seizure recurrence under the new medication. • The new medication is well tolerated. • No epileptiform activity in an EEG obtained on therapeutic doses of the new medication. • If seizures recur, return to work no less than 6 months seizure-free after resuming and equilibration of the effective medication.
3.	Acute symptomatic seizures:	• 12 months seizure-free. • Seizure trigger clearly identified, eliminated or unlikely to recur. • No epileptiform activity in an EEG performed within 6 months before returning to work.

Appendix III - Neurologist Medical Report Form for Individuals with Epileptic Seizures

PART 1 – EMPLOYEE INFORMATION (TO BE COMPLETED BY EMPLOYEE)

Employee Number (if applicable): _____

Name: _____ Date of Birth: _____

Address: _____

_____ Telephone: Home ( ) _____

_____ Postal Code: _____ Work ( ) _____

Supervisor name: _____

Employee's Declaration and Consent for the Release of Medical Information

I, the undersigned, acknowledge that I occupy a Safety Critical Position.

I declare that the information that I have provided or will be providing to the examining neurologist is truthful and complete. I understand that if I knowingly have provided false information I might be subject to action by the railway company up to and including dismissal.

I consent for the examining neurologist to release to the Office of the Chief Medical Officer of the railway company any information concerning my neurological status, past or current. I also consent for representatives from the Office of the Chief Medical Officer to discuss any details of this assessment. I understand that this information will be reviewed for the purpose of making a fitness to work determination. This consent is valid for six months from the date of signature.

_____	_____	_____
Witness	**Signature of Candidate/Employee**	**Date**

PART 2 - PHYSICIAN STATEMENT, INFORMATION AND REPORTING GUIDELINES

This individual is suffering from epilepsy or from another seizure disorder. This report will be used to make an assessment of his fitness to work and constitutes a third party service. In completing this report, please be thorough and write legibly. If you have any questions regarding any component of this form, call the toll free number listed below for assistance.

Applicant's/Employee's Name _____ I certify that the information which I have documented in this report is, to the best of my knowledge, correct.

Date of examination on which this report is based _____ _____

Physician's Signature

Physician's Name (Print): _____ [ ] Family Physician/General Practitioner

[ ] Certified Specialist in_____

Address: _____

Telephone: ( ) _____

City/Province: _____ Postal Code: _____ Fax : ( ) _____

The contents of this report are the property of the Railway Company.
Reports may be sent by regular mail or courier to:

FOR ASSISTANCE REGARDING ANY COMPONENT
OF THIS REPORT, CALL TOLL FREE 1-xxx-xxx-xxxx

PART 3 – TO BE COMPLETED BY THE NEUROLOGIST

A: Diagnosis

How long has the examined individual been your patient? _____

Date of first seizure: Y: _____ M: _____ D: _____

Date of last seizure: Y: _____ M: _____ D: _____

Describe prodrome, pre-ictal and post-ictal symptomatology and duration: _____

_____

_____

Diagnosis (According to the International Classification): _____

Describe all precipitating factors: _____

_____

Aside from seizures, does the examined individual's health condition include other neurological symptoms or signs?
Yes: _____ No: _____
If yes, please provide details: _____

_____

Is there any other medical condition that could impact the safety of the railway operations: Yes: _____ No: _____
If yes, please provide details: _____

_____

B: Treatment

Current treatment: _____

Does the examined individual adhere to his/her treatment? Yes: _____ No: _____

Is the examined individual free from side effects from treatment? Yes: _____ No: _____
If no, please provide details: _____

_____

Has the examined individual been adequately educated on his/her condition? Yes: _____ No: _____
If no, what will be your recommendation to the individual?
_____

_____

_____

Did the examined individual ever have surgery for his condition? Yes: _____
No: _____

If yes, please give date and describe procedure:
_____
_____

C: Neurological Examination

Is the examined individual currently free from abnormal neurological findings? Yes: _____ No: _____
If no, please provide details:
_____
_____
_____
_____

D: Additional reports

IMPORTANT

1 -The results of an EEG performed during the past 6 months **must** be attached to this medical report. (This is not required as part of the monitoring after return to work).

2 - Please, attach copies of all Antiepileptic Drugs blood levels performed during the last year.

E: Fitness to work

The Chief Medical Officer would appreciate your professional opinion on the examined individual's fitness to work in a position that is critical to the safety of the public, other employees and himself/herself.

Comments:
_____
_____
_____

In order to assess the examined individual's capacity for occupying a Safety Critical Position in the Canadian Railway Industry, would you recommend that the individual be medically assessed by a physician appointed by the railway company? Yes: _____ No: _____

F: Physician's identification

Name: _____ Date of examination: Y; _____ M: _____ D: _____

Address (in full): Street: _____

City: _____ Province: _____ Postal Code: _____

Telephone: _____ FAX: _____

_____
Signature

Date: Y: _____ M: _____ D: _____

4.5 – Mental Disorders

Medical Fitness for Duty Guidelines for the Employment of Individuals with Mental Disorders in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees working in a Safety Critical Position operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

These medical fitness for duty guidelines provides an overview of various mental disorders utilizing the terminology contained in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) of the American Psychiatric Association. Diagnostic criteria for specific mental disorders are included in the DSM-5. In addition to diagnostic criteria, the DSM-5 also provides valuable information under the following sub-headings:

- Diagnostic Features
- Associated Features Supporting Diagnosis
- Prevalence
- Development and Course
- Risk and Prognostic Factors
- Culture-Related Diagnostic Issues
- Gender-Related Diagnostic Issues
- Suicide Risk
- Functional Consequences
- Differential Diagnosis
- Co-morbidity

If an individual has a mental disorder not covered by these guidelines, medical fitness for duty will be determined by the Railway's Chief Medical Officer and guided, in part, by the considerations listed in section 2.

2. Medical Fitness for Duty Considerations

The following should be taken into consideration when assessing the medical fitness for duty of an individual occupying a Safety Critical Position:

- The presence of a mental disorder as defined in the DSM-5.
- The length, course and severity of the mental disorder.
- The length, course and severity of any previous mental disorder.
- The degree of current behavioral dysfunction or mood dysfunction.
- The degree of impairment of alertness, attention, cognitive function, concentration, insight, judgement and memory related to the mental disorder or to medications used to treat the mental disorder.
- The individual's compliance with treatment recommendations.
- The likelihood of recurrence or relapse of the mental disorder or a related mental disorder.
- The potential for acute or gradual functional impairment.
- The predictability and reliability of the individual.
- Co-morbidity that could precipitate a recurrence of a mental disorder**.**

3. Definition(s)

- **In remission** refers to an absence of significant signs or symptoms associated with a particular mental disorder. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner.

4. Medical Fitness for Duty Guidelines for Specific Mental Disorders

The following medical fitness for duty guidelines includes a description, medical fitness for duty and assessment considerations and medical monitoring guidelines for specific mental disorders. For ease of reference, the DSM-5-chapter headings and sub-headings are used. The previous version of these medical fitness for duty guidelines was based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) of the American Psychiatric Association, the predecessor of the DSM-5. Thus,

it should be taken into consideration that individuals presenting with a mental disorder may have been previously diagnosed using DSM-IV criteria.

4.1 Neurodevelopmental Disorders

4.1.1 Attention-Deficit/Hyperactivity Disorder

Description

Attention-deficit/hyperactivity disorder presents in childhood and may persist into the adult years. In the absence of new organic damage, it does not present de novo in the adult. Criteria include inattention characterized by impatience, careless mistakes, difficulty sustaining attention, not seeming to listen when spoken to directly, not following through on instructions or tasks, difficulty organizing tasks, avoidance or reluctance to engage in tasks that require sustained mental effort, a tendency to lose or misplace things necessary for the task, and a tendency to be easily distracted by extraneous stimuli and finally forgetfulness.

In adulthood other symptoms may also be seen including fidgeting and restlessness, a tendency to be constantly in motion, expresses difficulty sitting still, excessive talking and blurting out of answers, interrupting or completing other people's statements, a tendency not to wait for their turn at an activity and a tendency to interrupt speech or activity of others.

Medical Fitness for Duty

Individuals with a diagnosis of attention-deficit/hyperactivity disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's attention-deficit/hyperactivity disorder is in remission. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a current or previous diagnosis of attention-deficit/hyperactivity disorder should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report which is to include an opinion on the individual's fitness for work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring, follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.2 Schizophrenia Spectrum and Other Psychotic Disorders

4.2.1 Delusional Disorder

Description

A delusion is a false belief that the individual holds onto. In delusional disorder, the individual's thinking and interactions with people are appropriate except where distorted by the delusion. There may also be evidence for hallucinations, sensations either on the skin or of voices that also are not reality based. The delusions can be of many types. In the *erotomanic type* the individual believes that another person is in love with them, and acts accordingly. In the *grandiose type* they believe that they have some great (but unrecognized) talent or insight. In the *persecutory type* the individual believes that he or she is being conspired against, cheated, spied on, followed, or in other ways maliciously interfered with. Other types exist also. The disorder is significant in that the power of the delusion can make the individual act in ways that are inappropriate and unpredictable. The disorder most frequently comes on in midlife and is then chronic, tending to continue throughout the individual's lifetime.

Medical Fitness for Duty

In general, individuals with a current or previous diagnosis of delusional disorder cannot work in a Safety Critical Position due to concerns over predictability. In extraordinary circumstances individuals with a diagnosis of delusional disorder may be considered fit to work in a Safety Critical Position if the following conditions are met:

a) The individual's delusional disorder has been in remission for a continuous period of three years. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this three-year period if there is supporting medical evidence that a longer period is indicated.

b) The individual has been observed performing Non-Safety Critical Position duties in an acceptable manner for a continuous period of at least one year.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of delusional disorder should be assessed by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report which is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.2.2 Brief Psychotic Disorder

Description

In brief psychotic disorder, a number of symptoms and signs must be present including delusions, hallucinations, disorganized speech and grossly disorganized behaviour. The episode must last at least one day but less than one month and the individual must be seen to have returned to their premorbid level of functioning for the definition of Brief Psychotic Disorder to apply. The disorder should not be caused by some major trauma in the individual's life such as a motor vehicle accident or earthquake, which could temporarily destabilize/disorganize any normal person.

Medical Fitness for Duty

Individuals with a diagnosis of brief psychotic disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's brief psychotic disorder has been in remission for a continuous period of six months. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this six-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of brief psychotic disorder should be assessed by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report that is to include an opinion on the individual's fitness to work in a Safety Critical Position and any

functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.3 Bipolar and Related Disorders

4.3.1 Bipolar I Disorder

Description

The defining characteristic of bipolar I disorder is an episode of mania. Mania is characterized by an abnormally elevated, expansive and/or irritable mood and more than usual energy lasting at least one week and present almost all the time during that week. This period must also be characterized by excessive energy, diminished need for sleep, erratic or disinhibited behaviour, low frustration tolerance combined with lack of insight and judgement. The individual experiences racing thoughts, easy distractibility and an increase in disinhibited but goal directed activity (for instance increased sexual activity or spending large amounts of money). The mood disturbance must cause marked impairment in the individual's social and occupational functioning and may require hospitalization. Typically, bipolar I disorder includes major depressive episodes as well as episodes of mania. Psychotic symptoms (delusions, hallucinations) may be present in the context of either depression or mania.

Medical Fitness for Duty

Individuals with a diagnosis of bipolar I disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's bipolar I disorder has been in remission for a continuous period of one year during which the individual has been maintained on a stable dose of medication. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this one-year period if there is supporting medical evidence that a longer period is indicated.

b) If it is recommended that an individual with bipolar, I disorder discontinue their medication, they cannot work in a Safety Critical Position until it has been documented that the individual's bipolar I disorder has remained in remission for a continuous period of one year from the time of discontinuation. The Railway's Chief Medical Officer may extend this one-year period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of bipolar I disorder should be assessed by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report that is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer. Medical fitness for duty monitoring should include, at a minimum, semi-annual checks of blood levels of medications when appropriate.

4.3.2 Bipolar II Disorder

Description

Bipolar II disorder is characterized by a history of both a major depressive episode and at least one hypomanic episode. Symptoms of hypomania are similar to those of mania but generally less severe and do not cause a marked impairment in functioning or include psychotic features. The individual will appear more energetic and talkative than usual, more distractible, and may show poor judgement, pursuing activities that have painful consequences (e.g. engaging in unrestrained buying, sexual indiscretions or foolish business investments). The episode must be clearly different from the individual's pre-morbid norm. There must be a history of at least one major depressive episode. Such an episode is characterized by a depressed mood most of the day nearly every day for two weeks or more as well as the following: diminished interest or pleasure, distortion of appetite with weight loss or weight gain, insomnia or hypersomnia most days, psychomotor agitation or retardation most days, fatigue or loss of energy most days, diminished ability to think or concentrate characterized by indecision and feelings of worthlessness as well as thoughts of death, sometimes of suicide.

Medical Fitness for Duty

Individuals with a diagnosis of bipolar II disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's bipolar II disorder has been in remission for a continuous period of one year during which the individual has been maintained on a stable dose of medication. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this one-year period if there is supporting medical evidence that a longer period is indicated.

b) If it is recommended that an individual with bipolar II disorder discontinue their medication, they cannot work in a Safety Critical Position until it has been documented that the individual's bipolar II disorder has remained in remission for a continuous period of one year from the time of discontinuation. The Railway's Chief Medical Officer may extend this one-year period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of bipolar II disorder should be assessed by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report that is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer. Medical fitness for duty monitoring should include, at a minimum, semi-annual checks of blood levels of medications when appropriate.

4.4 Depressive Disorders

4.4.1 Major Depressive Disorder

Description

Major depressive disorder is characterized by an episode of depressed mood or loss of interest or pleasure lasting for more than two weeks and representing a significant change from the individual's previous level of function. At least one of the symptoms is either depressed mood or loss of interest or pleasure.

Accompanying features include changes in sleep, particularly early morning wakening, and appetite, weight, agitation or slowing in movements, pervasive fatigue, negative thoughts and thoughts of death or suicide. The more problematic symptoms include social withdrawal, lack of motivation, low frustration tolerance, easy fatigability, poor concentration and sleep disorder. Insight and judgement are impaired because of distortions of self-perception. Major depressive disorder may present as a single episode in isolation or may be recurrent. Markers of particular severity include psychotic symptoms and high anxiety. Major depressive disorder should be differentiated from any type of grief reaction such as might occur after the loss of a loved one.

Medical Fitness for Duty

Individuals with a diagnosis of major depressive disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's major depressive disorder has been in remission for a continuous period of three months. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The intensity, duration and response to treatment of an episode of major depressive disorder or recurrent episodes of major depressive disorder should be taken into consideration. The Railway's Chief Medical Officer may extend this three-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their fitness for duty assessment individuals with a diagnosis of major depressive disorder should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report which is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.4.2 Persistent Depressive Disorder (Dysthymia)

Description

The DSM-5 has consolidated chronic major depressive disorder and dysthymic disorder, both of which are listed as separate disorders in the DSM-IV, into persistent depressive disorder (dysthymia). In adults, the essential feature of persistent depressive disorder is a depressed mood that is present more days than not, for a period of at least two years. Persistent depressive disorder can range in severity and the impact on function can vary widely, from the significant impairment seen in major depressive disorder, to almost normal function as may be seen in mild dysthymia.

Medical Fitness for Duty

Individuals with a diagnosis of persistent depressive disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's persistent depressive disorder (dysthymia) is in remission. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of persistent depressive disorder should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication.

A written report which is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.5 Anxiety Disorders

4.5.1 Specific Phobia

Description

A specific phobia is characterized by persistent anxiety or fear elicited in response to a specific stimulus. The fear or anxiety is disproportionate to the actual danger and is long lasting. The fear or the avoidance of the phobic stimulus cause significant distress or functional impairment. The phobic object is actively avoided or endured with intense fear that is out of proportion to the actual danger posed. An individual with a specific phobia may be medically fit for duty, provided their phobic stimulus is not associated with their Safety Critical Position.

Medical Fitness for Duty

Individuals with a diagnosis of a specific phobia may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's specific phobia is in remission. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner.

b) The phobic object or situation is not associated with, related to, or encountered in their Safety Critical Position.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a specific phobia should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report that is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.5.2 Panic Disorder

Description

Panic disorder is characterized by the sudden, unexpected onset of overwhelming anxiety with intense fear or extreme discomfort, associated with strong physical evidence of adrenergic output including features such as rapid heartbeat, pounding heart, sweating, trembling, shortness of breath, feelings of choking, chest pain, nausea or abdominal distress, dizziness, feelings of unreality or being detached from oneself, feeling fear of imminent catastrophe or doom, chills or hot flashes. The individual may also fear that they are losing control or "going crazy" or dying. The attacks are brief, usually lasting only a few minutes, but are incapacitating. The frequency can be highly variable from once every few months to many times per day. They are often accompanied by worry about experiencing further attacks or the consequences of attacks, with maladaptive behavioural changes occurring in an attempt to cope with these fears. For instance, the individual may go to great lengths to avoid the situation or place where they experienced an attack.

Panic attacks may occur as a feature of a number of other mental disorders, including generalized anxiety disorder, major depressive disorder, substance use disorder, posttraumatic stress disorder, etc. In this context, they can be considered as a marker of increased severity of the primary disorder.

Medical Fitness for Duty

Individuals with a diagnosis of panic disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's panic disorder has been in remission for a continuous period of six months. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this six-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of panic disorder should be assessed by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report that is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.5.3 Generalized Anxiety Disorder

Description

This disorder is characterized by excessive anxiety and worry occurring on most days for at least six months and relating to a number of events or activities. The worry is difficult to control and is accompanied by at least three additional features that may include feeling restless or on edge, having difficulty concentrating, experiencing easy fatigue, irritability, muscle tension or insomnia.

Medical Fitness for Duty

Individuals with a diagnosis of generalized anxiety disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's generalized anxiety disorder has been in remission for a continuous period of three months. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this three-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of generalized anxiety disorder should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report that is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.6 Obsessive-Compulsive and Related Disorders

4.6.1 Obsessive-Compulsive Disorder

Description

Obsessive-compulsive disorder is characterized by the presence of obsessions and/or compulsions. Obsessions are experienced as intrusive and unwanted thoughts, images or urges that are typically anxiety provoking and distressing. They are suppressed or neutralized either by another obsessional thought or by compulsive action. Compulsions are repetitive actions or thoughts that the individual feels compelled to perform in response to an obsession or according to ritualistic rules that the individual has created. Compulsions may include ordinary behaviors taken to extremes such as handwashing, ordering, checking, counting or repeating words aloud or silently. The compulsions are either excessive or an unrealistic response to the anxiety or fear. To satisfy the diagnosis, the obsessions and compulsions must be time consuming (taking up more than one hour per day) and result in marked distress or functional impairment. Such symptoms must be differentiated from excessive worrying about real life problems.

Medical Fitness for Duty

Individuals with a diagnosis of obsessive-compulsive disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's obsessive-compulsive disorder has been in remission for a continuous period of three months. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this three-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of obsessive-compulsive disorder should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report which is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.7 Trauma- or Stressor-Related Disorders

4.7.1 Posttraumatic Stress Disorder

Description

Posttraumatic stress disorder is the expression of a response to trauma where there is actual or threatened death, serious injury or sexual violence. The individual need not have directly experienced such an event but may have witnessed it or learned of the traumatic event experienced by somebody with whom they have an emotional bond. It also occurs in people who have experienced repeated or extreme exposure to aversive details of traumatic events.

The diagnosis of posttraumatic stress disorder cannot be made unless the disturbance lasts for more than one month. The symptom presentation includes features from each of the following categories: intrusion phenomena, avoidance of reminders of the trauma, negative changes in thinking and mood and changes in arousal and reactivity. Panic attacks are a common feature of this disorder and are a marker of severity. The intrusions are commonly distressing memories of the event. The individual may experience a dissociative reaction (flashback) in which they feel or act as if the event was recurring. They may also experience intense or prolonged psychological distress at exposure to cues that symbolize or resemble an aspect of the traumatic event (e.g., driving past the scene of a previously witnessed violent accident). The individual will go to considerable lengths to avoid stimuli associated with the traumatic event, whether thoughts, feeling, people, places or objects.

Negative alterations in cognition may be evidenced by difficulties remembering important aspects of the event (traumatic amnesia) or persistent inappropriate negative beliefs about themselves, others or the world (e.g., I am bad, or, I cannot trust anyone). Also, likely to be present are persistent self-blame and guilt about the event and a persistent negative emotional state consisting of fear, horror, anger, guilt or shame. The individual may withdraw from their usual activities and feel detached or estranged from others. Arousal patterns are also altered. These individuals tend to be more irritable with angry outbursts. They could be reckless or self-destructive, they experience hypervigilance, watching all around for signs of danger and they have an exaggerated startle response. They have difficulty concentrating and their sleep is disturbed with difficulty either falling or staying asleep. They experience nightmares. Thus, the condition is an important one that pervasively degrades attention, judgement and predictability of response. The diagnosis of posttraumatic stress disorder cannot be made unless the disturbance lasts for more than one month.

Medical Fitness for Duty

Individuals with a diagnosis of posttraumatic stress disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's posttraumatic stress disorder has been in remission for a continuous period of three months. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this three-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of posttraumatic stress disorder should be assessed by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report that is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.7.2 Acute Stress Disorder

Description

An acute stress disorder is very similar to a posttraumatic stress disorder, sharing the same class of precipitants and the same reaction patterns. The difference is that an acute stress disorder is brief, lasting at least three days but it does not persist for more than a month after exposure to one or more traumatic events.

Medical Fitness for Duty

Individuals with a diagnosis of acute stress disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's acute stress disorder has been in remission for a continuous period of one month. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this one-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of acute stress disorder should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report which is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.7.3 Adjustment Disorders

Description

An adjustment disorder is a severe emotional or behavioural response to a stressor. The symptoms are clinically significant, being categorized by either distress out of proportion to the intensity of the stressor or causing significant impairment in functioning. The onset of symptoms is within three months of the stressor and the disorder does not persist for more than six months beyond the termination of the stressor. Symptoms may include depressed mood, anxiety or a mixture of the two. Sometimes the individual's behaviour is disturbed.

Medical Fitness for Duty

Individuals with a diagnosis of adjustment disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's adjustment disorder has been in remission for a continuous period of one month. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner. The Railway's Chief Medical Officer may extend this one-month period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of adjustment disorder should be assessed by a Physician and at the discretion of the Railway's Chief Medical Officer, by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as any adverse effects of medication. A written report which is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional

limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

4.8 Substance Related and Addictive Disorders

4.8.1 Substance Use Disorders

Refer to the Railway Medical Guidelines for Substance Use Disorders.

4.9 Personality Disorders

Description

These disorders are characterized by pervasive and persistent maladaptive patterns of behaviour that are deeply ingrained. They are disorders of trait rather than state. The maladaptive traits can be behavioural, emotional, cognitive, perceptual or psychodynamic. They may be internal, mental, or expressed as patterns of behaviour. They cause difficulty by diminishing an individual's ability to react flexibly and adaptively in social or occupational situations. The problems must be manifested in at least two of the following areas:

- Cognition (ways of perceiving and interpreting the self and others).
- Affectivity (the range intensity and appropriateness of emotional response).
- Interpersonal functioning.
- Impulse control.

The pattern must be inflexible and pervasive across a broad range of personal and social situations. Personality disorders usually become known because of conflict with others. Personality disorders exhibit a very large range of symptoms from mild to severe.

In the majority of cases, individuals with a diagnosis of personality disorder are considered responsible for their own behaviour and can be expected to perform or behave in an acceptable manner at work.

Medical Fitness for Duty

Individuals with a diagnosis of personality disorder may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual's personality disorder is in remission. Any signs or symptoms, if present, do not affect the individual's ability to perform their duties in a safe and predictable manner.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment individuals with a diagnosis of personality disorder should be assessed by a Psychiatrist. This assessment should include an evaluation of the individual's alertness, attention, concentration, insight, judgement, memory, mood and psychomotor function as well as adverse effects of medication. A written report, which is to include an opinion on the individual's fitness to work in a Safety Critical Position and any functional limitations and/or work restrictions should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

The requirement for medical monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

5. Contraindications to Employment in a Safety Critical Position

Any medical condition that can result in acute or chronic functional impairment constitutes a contraindication to employment in a Safety Critical Position. The following mental disorders are considered contraindications:

5.1 Schizophrenia Spectrum and Other Psychotic Disorders other than brief psychotic disorder and delusional disorder

5.2 Personality disorder severe enough to have repeatedly manifested itself by overt acts.

5.3 Neurodevelopmental disorders resulting in subnormal intelligence.

5.4 Organic (physical) brain damage with resulting impairment.

5.5 Treatment resistant depressive disorders.

4.6 – Cardiovascular Disorders

Medical Guidelines for the Employment of Individuals with Cardiovascular Disorders in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees who work in a Safety Critical Position (SCP) operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

Cardiovascular disorders (CVD) can cause gradual or sudden impairment. Due to the nature of their work, the latter is of particular importance for employees working in a SCP. Special attention should be paid to individuals whose medical condition puts them at risk of syncope, of significant physical incapacitation, or of sudden cardiac death.

Medical guidelines have been developed in order to evaluate and monitor the fitness for duty of individuals with cardiovascular disorders employed in a SCP in the Canadian railway industry.

CVD are common in North America. Accordingly, there are numerous physicians who have an interest in the diagnosis and treatment of these illnesses. In this document, the term specialist refers to a cardiologist or an internist.

When available, references are provided in Appendix I - Bibliography

2. Basic Considerations

The employment of individuals with a CVD in a SCP shall be guided by their medical history and physical examination, the results of functional testing, the nature of treatment, and their job description.

3. Risk Threshold

As the leading cause of death, cardiovascular diseases also underlie the greatest medical risk of sudden incapacitation in the Canadian workforce including railway workers. Such incapacitation can be due to a fatal or nonfatal cardiovascular event. While the goal may be to eliminate such a risk completely, this is not feasible. Nevertheless, through screening and preventative measures, such a risk can be reduced to acceptable levels.

The notion of an acceptable level of risk is inherent in all safety reliant systems, whether an untoward event is due to human error, mechanical failure or illness. The goal then should be to reduce risk to an acceptable level or threshold. There is no absolute threshold of risk and different levels of acceptable risk may apply to various components of a safety reliant system e.g., mechanical failure or human error. Ultimately any risk threshold is arbitrary and depends on what is feasible as well as what is tolerated by providers, consumers, the general public, etc. A consensus exists for an acceptable level of risk of sudden incapacitation due to a medical condition in the airline industry. Applying calculations and reasoning related in part to an acceptable and feasible risk threshold due to mechanical failure, an acceptable risk threshold for sudden incapacitation, either fatal or nonfatal, due to a medical condition, is considered to be 2% per year. Much of the literature on aviation risk refers to a 1% risk threshold. This was developed based on the risk of a fatality. However, most cardiac conditions that bear a risk of a fatal event can also result in a nonfatal incapacitating event. This is estimated to be equal to the risk of a fatal event, i.e. an additional 1%, hence the overall 2% risk threshold. With certain assumptions, this threshold of medical risk is estimated to imply an overall accident risk of one in one million.

Although developed initially for cardiovascular causes, the concept and use of a risk threshold has been applied, at least in the airline industry, to other medical conditions as well. Similar analyses have proposed the same acceptable risk of new cardiac incapacitation for commercial drivers, after taking into consideration the specific circumstances of exposure, possibility of collateral injury etc. Interestingly the 1% risk of sudden death considered acceptable for commercial drivers results in an overall risk of 1 in 20,000 of an accident that could result in death or injury to others. Considering a risk of 0.00005 acceptable, then the acceptable annual risk of sudden incapacitation from a cardiovascular cause in a private automobile driver becomes 22%, given the lesser amount of time (than a commercial driver) spent behind the wheel, lesser potential impact from an accident etc.

A 2% threshold of medical risk in aviation envisions a maximal acceptable risk resulting in a catastrophic event (one in a million) with a solo operator and no backup. In fact, this level of acceptable medical risk rarely results in an accident, in large part because of co-operators i.e., co-pilots in the case of commercial airlines, and back-up safety measures including incapacitation training and routines. Therefore, the risk is less than one in a million. When appropriate safety measures are in place, an accident risk of one in a million allows a cardiovascular risk of between 2 and 5%. For such pilots this means a restriction on their flying to include a safety pilot i.e., an incapacitation-trained co-pilot.

It could be argued that the acceptable level of risk of an accident in the railway industry is closer to that involving commercial driving than flying a plane. The Guidelines described below apply the same medical risk threshold of 2% per year for a Safety Critical Position (SCP), where the risk of a sudden cardiac death is 1% per year and the risk of an incapacitating nonfatal event for the same condition is assumed to be an additional 1% per year.

This document addresses medical risk only. Overall risk of an accident involves additional factors including risk exposure, i.e., the time spent performing a task. While this affects the overall risk of an accident, the exposure time whether minutes, hours or days does not alter the medical risk threshold, which remains 2%. While management may be concerned about the overall risk of an accident, factors other than the medical risk are operational considerations. If an untoward cardiovascular event bears consequences only for the individual employee such a risk may be considered differently than one that has the potential for a public disaster. For the former a higher threshold of medical risk may be considered acceptable.

4. Ischemic Heart Disease

4.1 Risk Factors

The following are major modifiable risk factors for ischemic heart disease. While many of them may have impressively large relative risks, their absolute risk, particularly for sudden incapacitation, is low. Concern about these risk factors is greater in individuals with known ischemic heart disease where the absolute risk is greater. The presence of major modifiable risk factors should be a concern in any individual and preventive measures are strongly advised.

a) Smoking:
Smokers should be advised and assisted to participate in a smoking cessation program. Anyone who continues to smoke following an acute myocardial infarction is at increased risk within a year of a recurrent infarction (7-fold increase) or death (3-fold increase). Following an ST elevation myocardial infarction, continued smoking doubles the one-year mortality risk. Such an individual should quit or be making an attempt to quit to maintain fitness to work in a SCP.

b) Increased serum cholesterol levels:
All SCP workers are encouraged to be aware of their lipid levels and to maintain normal levels. Target levels depend on the level of risk as outlined in the 2006 Canadian Working Group Guidelines (Table 1). All currently approved medications for lipid lowering are compatible with work in a SCP.

Table 1. Guidelines for the Diagnosis and Treatment of Dyslipidemia and Prevention of Cardiovascular Disease (McPherson R, Frohlich J, Genest J. Canadian Journal of Cardiology 2006; 22(11):913-927.

Risk Categories

Risk Level	*10 y CAD Risk*	*Recommendations*
High[1]	≥ 20%	Treatment Targets 1 Target: LDL-C < 2.0 mmol/L 2 Target: TC/HDL-C < 4.0
Moderate	10-19%	Treat When: TC/HDL-C ≥ 5.0 or LDL-C ≥ 3.5 mmol/L
Low	< 10%	Treat When: TC/HDL-C ≥ 6.0 or LDL-C ≥ 5.0 mmol/L

[1] High risk includes CAD, PAD, CVD and most patients with diabetes. Younger (<40 y) individuals with recent onset diabetes, a normal lipid profile and no other risk factors for CVD are at lower short-term risk for CVD and may not require immediate lipid-lowering therapy.

Table 2 - 10–Year Absolute Risk of CVD Event (Framingham Calculation)

RISK FACTOR	MEN	WOMEN	SCORE	
Age (years)				
<34	-1	-9	}	—
35-39	0	-4		
40-44	1	0		
45-49	2	3		
50-54	3	6		
55-59	4	7		
60-64	5	8		
65-69	6	8		
70-74	7	8		
Total cholesterol (mmol/L)				
<4.14	-3	-2	}	—
4.15-5.17	0	0		
5.18-6.21	1	1		
6.22-7.24	2	2		
>7.25	3	3		
HDL cholesterol (mmol/L)				
<0.90	2	5	}	—
0.91-1.16	1	2		
1.17-1.29	0	1		
1.30-1.55	0	0		
>1.56	-2	-3		
Systolic blood pressure (mmHg)				
<120	0	-3	}	—
120-129	0	0		
130-139	1	1		
140-159	2	2		
>1.60	3	3		
Smoker				
No	0	0	}	—
Yes	2	2		

Total Risk Points _____

Risk Points		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Chd	Men	3	4	5	7	8	10	13	16	20	25	31	37	45	53			
Risk	Women	2	3	3	4	4	5	6	7	8	10	11	13	15	18	20	24	>27

- in individuals who have not had a prior CVD event.

c) High Blood Pressure:

The approach to the diagnosis of hypertension follows that of the Canadian Hypertension Education Program (CHEP) Recommendations Working Group. The CHEP guidelines are revised annually so the comments below need to be updated regularly. As of 2006, in individuals with accurately measured blood pressure levels between 140 and 179 mmHg systolic and/or 90 and 109 mmHg diastolic, up to 3 more visits over 6 months are required to diagnose hypertension. Ambulatory or self/home measurements are acceptable alternatives. However, in the presence of target organ damage, including coronary artery disease, LVH, LV systolic dysfunction, stroke, aortic and peripheral arterial disease, hypertensive nephropathy (creatinine clearance < 1 mL/s) or retinopathy or asymptomatic atherosclerosis, a diagnosis of hypertension can be made at the second visit. Likewise, the presence of diabetes or chronic renal disease validates a diagnosis being made at the second visit. The search for target organ damage can begin as early as the second visit. For patients with readings of 160-179 mmHg systolic and 100-109 mmHg diastolic, the diagnosis can be expedited and made at the third visit.

For diagnosed hypertension with a systolic/diastolic blood pressure of ≥140/90 mmHg in the majority of patients or ≥130/80 mmHg in all patients with diabetes or chronic kidney disease, pharmacologic treatment should be initiated. In low-risk patients with stage 1 hypertension (140-159/90-99 mmHg) lifestyle modification can be the sole therapy. Patients with known atherosclerotic disease should be treated pharmacologically even if the blood pressure is normal. The goal of blood pressure control is less than 140/90 mmHg in most individuals and to less than 130/80 mmHg in those with diabetes or renal dysfunction. On any visit, a blood pressure level of 180 mmHg or more systolic or 110 mmHg or more diastolic precludes working in a SCP.

Reference: http://hypertension.ca/chep/en/Recommendations.asp

4.2 Multiple Risk Factors

Coronary atherosclerosis is a multifactorial disease, the risk of early onset increasing with the number of risk factors present. Therefore, the assessment of risk must weigh appropriately the contribution of the various factors present. The cumulative risk conferred by the presence of more than one risk factor, even at levels only moderately above normal, can exceed that conferred by the presence of one elevated major risk factor alone. The presence of only moderately elevated levels of risk when any risk factor is assessed alone should not lead to a false sense of security on the part of the physician or the individual.

Total risk can be assessed on the basis of risk points for age, total and HDL cholesterol, systolic blood pressure and smoking status in the absence of existing coronary heart disease or diabetes (Table 2).

If the 10-year risk score is 20% or greater (9 risk points for men and 15 risk points for women, Table 2) or if diabetes or left ventricular hypertrophy are present, then a cardiovascular assessment should be carried out. The choice of diagnostic tests such as a treadmill exercise test or a radionuclide exercise scan will depend on the risk factor profile. If abnormalities are found, resulting in an average annual mortality risk of 1% or more, assuming an additional 1% risk of an incapacitating nonfatal event, then the individual may be considered unfit. Even if the response to exercise testing is normal, appropriate therapy to modify risk factors should be initiated.

4.3 Metabolic Syndrome

The metabolic syndrome is an increasingly prevalent condition associated with a higher risk of coronary heart disease, stroke, and diabetes even after controlling for other commonly recognized CVD risk factors. It is estimated that 20 to 25% of the adult population can be classified as having the metabolic syndrome, with 44% in the 60–69-year age group. Several diagnostic criteria have been published. Two are presented in Table 3. This syndrome confers a two-fold increased risk of dying from a heart attack or stroke, a threefold increased risk of a heart attack or stroke and a fivefold increased risk of developing Type 2 diabetes. There is debate as to whether central obesity is an essential part of the diagnosis. The International Diabetes Federation requires it in addition to any two of hypertension, elevated fasting blood glucose, hypertriglyceridemia or low HDL-C. Central obesity is best assessed by measuring the waist circumference. Thresholds vary according to ethnicity (Table 4). Preventive measures include appropriate lifestyle changes with a

focus on diet and physical activity along with cardiac medications as needed.

Table 3 - Definition of Metabolic Syndrome

Risk Factor	Canadian Guidelines (modified from ATP III)	IDF Consensus (published in 2005)
Obesity	WC>102 cm (40 in) for men WC>88 cm (35 in) for women	WC> 94 cm (38 in) for men WC> 80 cm (32 in) for women & ethnic specific Must be present plus any 2 of the following factors:
BP	≥130/85 mmHg	≥130/85 mmHg
FPG	6.2-7.0 mmol/L	≥ 5.6 mmol/L
Triglycerides	≥1.7 mmol/L	≥ 1.7 mmol/L
HDL-C	<1.0 mmol/L for men <1.3 mmol/L for women	<1.03 mmol/L for men <1.29 mmol/L for women

Under Canadian Guidelines, an individual must exhibit any 3 of the risk factors to be diagnosed with the metabolic syndrome.

Table 4 - IDF Consensus: Ethnic Values for Waist Circumference

Country/Ethnic group	Waist circumference
Europids (USA, the ATP III values (102 cm for male, 88 cm for female)	Male ≥ 94 cm Female ≥ 80 cm
South Asians Based on a Chinese, Malay and Asian-Indian population	Male ≥ 90 cm Female ≥ 80 cm
Chinese	Male ≥ 90 cm Female ≥ 80 cm
Japanese	Male ≥ 85 cm Female ≥ 90 cm
Ethnic South and Central Americans	Use South Asian recommendations until more specific data are available
Sub-Saharan Africans	Use European recommendations until more specific data are available
Eastern Mediterranean and Middle East (Arab) populations	Use European recommendations until more specific data are available

4.4 Screening

Screening to identify cardiovascular disease before sudden incapacitation is a problematic and controversial undertaking. On the one hand, the employee may feel harassed and unfairly burdened by the inconvenience of screening tests; the employer may question the enormous expense involved. On the other hand, an accident involving sudden incapacitation that is suggestive of or attributed to a cardiovascular cause raises questions as to why more rigorous screening is not being carried out, especially if injury to the public occurs. It is beyond the scope of these guidelines to present the results of analyses that indicate the costs and problems of widespread routine screening. Nevertheless, a rational policy toward screening can be adopted to provide optimal, though never total, prevention of cardiac incapacitation.

The current routine medical examination is intended to ensure that only medically safe individuals work in a SCP. This is a shared responsibility with the onus on the employee to report any symptoms and on the physician to conduct a careful and thorough examination.

A resting electrocardiogram may show no abnormalities even in the presence of severe coronary artery disease; in fact, this may be true in as many as 50% of people with coronary artery disease. Since the prevalence of ischemic heart disease increases with age, the utility of routine electrocardiography improves after age 50 and with the presence of major risk factors for ischemic heart disease.

Compared with a resting electrocardiogram, one obtained during a treadmill exercise test increases the likelihood of detection of coronary artery disease. Widespread introduction of routine exercise testing is not advisable because of concerns about inaccuracies in the interpretation of test results as well as adverse economic and psychosocial consequences. The predictive value of a test result, i.e., whether a test result is truly positive or truly negative is influenced by the clinical characteristics of the person undergoing such testing. Routine screening of all applicants by a treadmill exercise test will yield false positive results more often than true-positive results. On the other hand, the number of true-positive results is increased significantly if such testing is applied only to those who are more likely to have coronary artery disease, such as those with symptoms of angina, those for whom major risk factors are present and those in older age groups. Such a targeted approach will avoid imposing a major burden on all employees and will encourage adoption and maintenance of a heart healthy lifestyle.

4.5 Acute Ischemic Syndromes

b) Chest Pain

Chest pain, whether typical or atypical for coronary ischemia, whether stable or unstable precludes working in a SCP insofar as it indicates an elevated probability of significant coronary artery disease and an increased risk of an incapacitating cardiac event.

Allowing work in a SCP can be considered if diagnostic testing demonstrates that the chest pain is not due to myocardial ischemia and symptoms are not incapacitating. The initial assessment including a review of the symptom history must be made without the effect of anti-ischemic medications that could possibly mask coronary insufficiency. If coronary angiography reveals normal coronary arteries, coronary vasospasm should be excluded. While the presence of recurring, stable symptoms of chest pain in the absence of ischemia e.g., whether from cardiac causes such as pericarditis, vasospasm or non-cardiac causes such as fibromyalgia, need not merit an unfit determination, such symptoms must not be incapacitating in any way.

c) Following an Acute Ischemic Syndrome

An acute ischemic syndrome (ST-elevation/non-ST elevation myocardial infarction, unstable angina) precludes work in a SCP.

Return to Work

Return to work may be considered 3 months after an ST elevation myocardial infarction (a decision at 3 months must be based on required assessments completed no sooner than 1 month after discharge from hospital) provided the following criteria are met:

- A clinically and electrically negative exercise test to a minimum effort of 8.5 METS using the Bruce protocol or equivalent places the individual at low (<2%) risk of a significant cardiovascular event over the following 12 months. Medications need not be stopped for the test.

- If a perfusion exercise test is used, a reversible defect may be acceptable if 10 METS are achieved and the area of hypoperfusion is described as small or insignificant. There should be no large, fixed deficit.

- The left ventricular ejection fraction as a measure of left ventricular function using resting echocardiography or gated radionuclide scintigraphy is 50% or better at rest (45% if SPECT[2] is used). If a stress echocardiography is undertaken as part of an exercise protocol, it does not show a decrease of more than 5% with satisfactory exertion (i.e., 85% predicted maximum heart rate or > 8 METS). If ventricular ejection fraction is between 40% and 50%, a 24-hour Holter monitoring should be considered as part of an individual assessment. Holter monitor should reveal no more than 3 ventricular ectopic beats per hour, with no runs of 3 or more ventricular beats in a row and no R wave and not T wave ventricular premature beats. An ejection fraction of less than 40% will usually preclude an individual from working in a SCP.

- Major modifiable risk factors (see below) for recurrence of infarction must be controlled, and the individual is a non-smoker or is participating in a smoking cessation program.

These criteria apply regardless whether the individual was treated with a thrombolytic drug, percutaneous coronary intervention (PCI) or bypass surgery. If no new wall motion abnormalities were diagnosed with a non-ST elevation infarction, return to work following PCI can be considered as early as 14 days following the procedure and 30 days after discharge from hospital if no PCI was undertaken.

Follow-up

A follow-up assessment by a physician, a year after the infarction and then annually, should include a thorough history, physical examination, rest and exercise electrocardiography and a review of modifiable risk factors. If there is no clinical deterioration after 2 years, the treadmill exercise test can be done every 2 years until 50 years of age and subsequently the possible need for yearly testing should be assessed.

d) Following revascularization in the absence of infarction

[2] Single proton emission computerized tomography.

Return to Work

An individual who has been treated for coronary artery disease (without recent infarction i.e., <30 days) by revascularization including PCI, directional atherectomy etc., can be considered for employment in a SCP after an interval of 2 weeks, provided the same criteria are met as for a non-ST elevation myocardial infarction without new wall motion abnormalities. Following bypass surgery, the waiting period is 3 months.

Follow-up

Same as for Acute Ischemic Syndrome.

5. Non-Ischemic Heart Disease

5.1 Heart Murmur

All diastolic murmurs are pathological hence require a workup. A soft i.e. grade 1/6 systolic murmur without symptoms is acceptable. Anything else will require an assessment to include an echocardiography.

5.2 Valvular Heart Disease

The significance of valvular heart disease depends primarily on the hemodynamic consequences, functional status and in some cases, the etiology. In the majority of cases, surgical correction will not reduce the risk of sudden incapacitation to acceptable levels; in some cases, it may even increase the risk.

a) Aortic Valve

Stenosis: Moderate or severe stenosis is unacceptable for work in a SCP. Individuals with asymptomatic mild stenosis of the aortic valve can be considered fit if the following conditions are met:

- The velocity flow across the valve is less than 4 m/sec (i.e., mild stenosis).
- The cross-sectional valve area is not less than 1.2 $cm^{2.}$
- Holter monitoring reveals no significant dysrhythmia such as atrial fibrillation or sustained ventricular tachycardia.

- A satisfactory treadmill exercise test, achieving at least 8.5 METS using the Bruce protocol indicates no ischemia, hypotensive blood pressure response, significant arrhythmia or disabling symptoms.

Regurgitation: Pure isolated regurgitation is uncommon; therefore, assessment of someone with aortic regurgitation will likely include consideration of any associated disorders. Individuals with asymptomatic mild regurgitation of the aortic valve can be considered fit if the following conditions are met:

- The pulse pressure is less than 70 mmHg and the diastolic pressure is greater than 65 mmHg.
- The left ventricular end-diastolic internal diameter is less than 57 mm as measured by echocardiography.
- A satisfactory treadmill exercise test, achieving at least 8.5 METS using the Bruce protocol indicates no ischemia, significant arrhythmia or disabling symptoms.

Follow-up: Because of the increased risk of endocarditis with aortic valve disease, prophylaxis with antibiotics must be strictly followed. Follow-up should include an assessment every year or longer at the discretion of the Chief Medical Officer with echocardiography to monitor any progression.

b) Mitral Valve

Stenosis: In view of its progressive nature and its propensity for thromboembolic complications, mitral stenosis is incompatible with work in a SCP in most cases. Only very mild mitral stenosis with a cross sectional mitral valve area > 2.0 cm^2 and stable normal sinus rhythm may be considered fit.

Regurgitation: The cause of mitral regurgitation can alter the prognosis; therefore, an assessment of this condition should include information about the likely underlying cause, in addition to an estimate of the severity of the lesion. Mild and asymptomatic mitral regurgitation may be acceptable if the following conditions are met:

- Mitral stenosis is absent.
- The diameter of the left atrium is less than 4.5 cm.

- Atrial dysrhythmia such as fibrillation or other supraventricular tachycardia is absent, as determined by Holter monitoring

- There is no history of embolism.

- A satisfactory treadmill exercise test, achieving at least 8.5 METS using the Bruce protocol indicates no ischemia, significant arrhythmia or disabling symptoms.

Prolapse: Mitral valve prolapse has a wide spectrum of severity. Most cases are mild and detectable either by the presence of a mid-systolic click and/or a soft murmur. The diagnosis is established by echocardiography. The individual may be considered fit if the following conditions are met:

- There is no history of embolism or transient cerebral ischemia.

- There is no relevant family history of sudden death.

- The left ventricular end diastolic dimension does not exceed 60 mm.

- If the left atrial size is increased, i.e., > 4.0 cm or if there is redundancy of the mitral valve leaflets, then a treadmill exercise test to screen for exercise-induced arrhythmia, and 24 hour Holter-monitoring will be required, as these findings can be markers of increased risk.

Follow-up: Annual follow-up for mitral valve stenosis and/or regurgitation should include, in addition to a thorough history and physical examination, echocardiography and 24-hour Holter monitoring done every year, or longer at the discretion of the CMO. The follow-up for mitral valve prolapse will be determined on a case-by-case basis depending on the degree of prolapse and any associated findings.

c) Valve Surgery

Valve replacement: Valve replacement involves either a bioprosthesis or a mechanical valve. In general, mechanical valves are more durable and are preferred for younger individuals. However, these valves are more prone to thromboembolism thus requiring long-term anticoagulation. Therefore, there is a need to consider two risks, one for thromboembolism and the other for bleeding as a consequence of anticoagulation. These risks are cumulative and must be less than 2% per year for a SCP.

Each case needs to be assessed individually, taking into consideration not only the technical aspects of valve function, left ventricular function and state of the coronary arteries, but also the overall exercise tolerance of the individual, the medications they are taking, age, other co-morbidities etc.

If bypass surgery was carried out at the same time as valve replacement, post-bypass criteria must be met as well.

Follow-up: The initial follow-up, no sooner than 3 months following uncomplicated surgery, must include an echocardiogram. The valve must be well-seated and with no major leaks either perivalvular or transvalvular. The transvalvular pressure gradient should be appropriate for the type of implanted valve. Ventricular function must be satisfactory, i.e. ≥ 50%. If ventricular ejection fraction is between 40 and 50%, 24-hour Holter monitoring should be considered as part of an individual assessment. The individual should be able to exercise to at least 8.5 METS with no evidence of ischemia or provocable malignant arrhythmias. Patients on full anticoagulation must demonstrate stable INRs at target for at least a month. Yearly follow-up, to include echocardiogram and a review of INR level if on anticoagulation, is required for all cases of valvular replacement for the first 3 years. Thereafter, if stable, follow-up every two years, to include an echocardiogram and INR level if on anticoagulation, should suffice.

Valve repair: Valve repair does not require anticoagulation and if successful, typically restores normal function. However, some repairs involve partial correction of a problem such as implantation of an annular ring to reduce the degree of regurgitation. Such cases are unlikely to be considered fit for a SCP as these valvular problems are typically associated with additional co-morbidities.

Follow-up: Follow-up, to include echocardiogram, should be done at years 1, 3 and 5 post repair.

5.3 Inflammatory Heart Disease

Individuals with active pericarditis and/or myocarditis are considered unfit to work in a SCP. Fitness may be considered after satisfactory recovery with no adverse sequelae.

5.4 Cardiomyopathy

Obstructive hypertrophic cardiomyopathy poses a significant risk for sudden incapacitation and generally renders an individual unfit regardless of whether there has been surgical treatment. Those with minor asymmetric hypertrophy can be considered individually based on the degree of outflow obstruction and the nature of any arrhythmias.

Non-hypertrophic cardiomyopathies, dilated or congestive, in their active phase are incompatible with work in a SCP. Likewise symptomatic congestive heart failure even with normal quantification of left ventricular function is incompatible with work in a SCP. Cardiac catheterization is usually required to rule out ischemia as the etiology of the cardiomyopathy. Return to work in a SCP may be considered after recovery if the following conditions are met:

- Symptoms are absent.
- A satisfactory exercise tolerance test achieving 8.5 METS using the Bruce protocol indicates no ischemia, significant arrhythmia or disabling symptoms.
- Left ventricular function as determined by echocardiography is satisfactory, i.e., EF $\geq$ 50%. An ejection fraction between 40% and 50% may be acceptable provided 24-hour Holter monitoring reveals no more than 3 ventricular ectopic beats per hour in the absence of antiarrhythmic medication, with no more than 3 consecutive beats and a cycle length of not less than 500 msec. Non-sustained ventricular tachycardia in someone with an ischemic cardiomyopathy is not acceptable.
- The risk of thromboembolism and (if applicable) the risk of hemorrhage secondary to anticoagulation is below the acceptable risk threshold.

5.5 Heart Transplant

Due to the cumulative high rate of morbidity including vascular complications and the increasing mortality rate over time, cardiac transplantation disqualifies an individual from work in a SCP.

6. Congenital Heart Disease

6.1 Atrial Septal Defect

Anyone with a patent foramen ovale or a small sinus venosus or secundum defect (pulmonary/ systemic flow ratio less than 2:1 and normal right heart pressures) as determined by echocardiography or cardiac catheterization and without recurrent atrial arrhythmias may be considered fit. Those with partial atrioventricular canal defects (primum type atrial septal defects) cannot have more than mild mitral regurgitation, and they must meet the same requirements for flow ratios and atrial arrhythmias.

Individuals who have undergone a transcutaneous correction or a surgical correction of a larger defect may be fit for a SCP if 3 months after the procedure they meet the same requirements, provided there has not been a significant event associated with their defect. A post-operative follow up echocardiographic evaluation is required to determine the extent of any residual leakage and shunting.

6.2 Ventricular Septal Defect

Fitness to work in a SCP will depend on the size of the ventricular septal defect as indicated by the hemodynamic consequences. In the absence of surgical correction, the following conditions have to be met:

- The heart size is normal.
- The pulmonary/systemic flow ratio is less than 2:1, as determined by echocardiography or cardiac catheterization.
- The pressures in the right heart are normal.

In the case of a surgically corrected ventricular septal defect, the same conditions have to be met as for no surgical intervention, and in addition:

- No dysrhythmias or high-grade conduction disturbances are detected by Holter monitoring.
- A satisfactory treadmill exercise test, achieving at least 8.5 METS using the Bruce protocol indicates no ischemia, hypotensive blood pressure response, significant arrhythmia or disabling symptoms.

6.3 Coarctation of Aorta

Individuals with surgically corrected coarctation of the aorta should be considered on a case-by-case basis. The age at the time of the surgical correction will be a major determinant in the decision about their medical status since the risk of sudden death and incapacitation due to cerebrovascular accidents is markedly increased in those who undergo surgery after the age of 12 years. In all cases the blood pressure at rest and in response to exercise must be normal as determined by a treadmill exercise test.

6.4 Pulmonary Stenosis

The major determinant of risk with this condition is the severity of the stenosis. Those with mild pulmonary stenosis and a normal cardiac output can be considered fit for a SCP provided the following criteria are met:

- The peak systolic pressure gradient across the pulmonary valve is less than 50 mmHg, and the peak systolic right ventricular pressure is less than 75 mmHg, as determined by echocardiography or cardiac catheterization.
- Incapacitating symptoms e.g., chest pain, dyspnea or dizziness are absent.
- A satisfactory treadmill exercise test, achieving at least 8.5 METS using the Bruce protocol indicates no ischemia, hypotensive blood pressure response, significant arrhythmia or disabling symptoms.

Those with pulmonary stenosis corrected by surgery or balloon valvuloplasty will be considered fit for a SCP if there is no dysrhythmia and if the hemodynamic parameters are not worse than those described above.

6.5 Tetralogy of Fallot

The unoperated condition with cyanosis is incompatible with a SCP. Individuals who undergo repair of Tetralogy of Fallot can be considered fit if the following conditions are met:

- Normal arterial oxygen saturation.
- Normal heart size.
- Right ventricular systolic pressure less than 75 mmHg and peak RV/PA gradient less than 50 mmHg.
- Residual interventricular shunt not more than 1.5:1.
- No dysrhythmias or high-grade conduction disturbances by Holter monitoring.
- A satisfactory treadmill exercise test, achieving at least 8.5 METS using the Bruce protocol indicates no ischemia, hypotensive blood pressure response, significant arrhythmia or disabling symptoms.

6.6 Transposition of Great Arteries

The unoperated condition is incompatible with work in a SCP with the sole exception of congenitally corrected transposition without any other associated cardiac abnormalities.

Individuals with atrial switch corrective procedures for transposition of the great arteries are unlikely to be considered fit because of the increasing propensity to atrial arrhythmias with passing years, even with technically excellent surgery. Those who have had arterial switch operations will need to be considered individually when this cohort begins to reach adulthood.

7. Dysrhythmias

Anyone with a dysrhythmia should be evaluated with two questions in mind: what is the nature of the disability produced by a given arrhythmia i.e., how incapacitating is the dysrhythmia when it occurs and what is the underlying condition of the heart i.e., is structural heart disease present? Both questions must be answered satisfactorily before a decision can be made about fitness to work in a SCP.

7.1 Supraventricular Dysrhythmias

Supraventricular tachydysrhythmias may accompany self-limited illnesses e.g., pneumonia or treatable conditions e.g. hyperthyroidism. In such cases, the need to declare an individual unfit to work in a SCP will be only temporary.

Those in whom treatment with an antiarrhythmic agent is successful need not be restricted from working in a SCP. Successful use of ablation therapy should be confirmed with repeat electrophysiologic study 3 months later in those individuals whose arrhythmia was previously incapacitating. Those who undergo AV nodal ablation of the slow pathway are more likely to be considered fit because of the lower risk of development of heart block.

7.2 Sinus Node Dysfunction

Isolated sinus node dysfunction including sinus bradycardia may occur in healthy people, particularly those involved in vigorous exercise programs. Such a finding (a consequence of high vagal tone) need not necessarily be considered an abnormality. Provided the dysfunction does not interfere with mental function, the individual need not be restricted from working in a SCP. Where there is concern e.g. extreme bradycardia, a thorough symptom history should be followed by Holter monitoring and a treadmill exercise test. Even in a healthy person, no R-R interval should exceed 4 sec during sleep or 3 sec while awake.

7.3 Atrial Fibrillation

There are 3 major concerns with atrial fibrillation. The first is the risk of incapacitation associated with a hemodynamic effect from the arrhythmia itself. The second is the risk of embolism and the third is the risk of bleeding as a consequence of anticoagulation. Since risk is additive, the aggregate risk must remain below the acceptable risk threshold. Therefore, it is possible to consider someone fit depending on their condition and the effect of treatment. The lowest risk is seen in those below 65 years of age who have intermittent or chronic, lone atrial fibrillation, i.e. no identifiable cause of the arrhythmia and no underlying structural heart disease. Annual follow-up in such cases should include 24 hr Holter monitoring. Individuals with atrial fibrillation who have 2 or more of the 5 major risk factors, including age > 65 years, structural heart disease, diabetes, high blood pressure and previous thromboembolism are considered to be above the threshold level of risk even when fully anticoagulated. Thus, older patients with structural heart disease generally have a cumulative risk of embolism and bleeding secondary to anticoagulation that exceeds the limit for medical fitness in a SCP. Except for those with lone atrial

fibrillation for whom prophylaxis with ASA suffices, all other individuals will require full anticoagulation.

7.4 Pre-Excitation Syndromes

Not all cases of Wolff-Parkinson-White (the most common type of pre-excitation) are associated with incapacitating dysrhythmias. The risk of incapacitating symptoms in people who have never had a tachycardia is low but is not known with any precision. Anyone with only an electrocardiographic indication, whether chronic or intermittent, and no history of palpitations may be fit if their response to a treadmill exercise test is normal in all respects, particularly if evidence of pre-excitation is lost at accelerated heart rates. Such individuals are unlikely to conduct at a dangerously high rate if in atrial fibrillation. Electrophysiologic studies are not required in such cases.

7.5 Ventricular Dysrhythmias

The main concern with ventricular dysrhythmias is the underlying condition of the myocardium. If the myocardium is normal, ventricular ectopy should be judged on the basis of the disability produced and, to a lesser extent, on the presence or absence of complex forms. Although the complexity of premature ventricular beats is poorly correlated with risk in the presence of normal myocardial tissue, the appearance of multiform or repetitive forms of ventricular ectopy i.e., couplets, runs, should indicate the need for a thorough cardiac examination since these and other high-grade forms of ectopy are more commonly seen in association with structural heart disease. If the ventricular ectopic beats have a LBBB pattern particularly with a vertical axis, right ventricular dysplasia should be ruled out by either invasive (ventriculography) or non-invasive (echo, MRI or radionuclide scintigraphy) tests.

The presence of more than 1 PVC on a resting 12- lead electrocardiogram warrants 24-hour Holter monitoring.

Exercise-induced ventricular tachycardia can occur in healthy people. These events are usually self terminating. Such cases can be considered fit unless there are recurrent episodes. Individuals with sustained tachycardias (lasting more than 30 seconds) are unfit.

7.6 Conduction Disorders

First-and-second degree (type 1) atrioventricular conduction delay can be seen during rest (particularly sleep) in healthy people with a structurally normal heart, who engage in vigorous exercise. High grade atrioventricular block should be investigated

to rule out heart disease and to determine the risk of progression to complete heart block. Likewise, first and second-degree block with structural heart disease should be investigated to determine the risk of progression to complete heart block.

7.7 Bundle Branch Block

Left bundle branch block and right bundle branch block of recent onset, indicate the need for a cardiovascular assessment by a specialist to rule out heart disease, especially ischemic heart disease. Isolated right bundle branch block and left hemiblocks that are longstanding are generally benign.

7.8 Cardiac Pacemakers

A pacemaker is designed to prevent the heartbeat from being too slow. When the heartbeat drops below 60 beats/min (or 50 beats per minute if hysteresis is programmed) most pacemakers are programmed to initiate an electrical impulse. The reliability of pacemakers is very high with failure rates being well below 1% per year. Furthermore, in most cases, the heart maintains its own beats. The risk of bilateral failure is rare. Pacemaker failure can result from electromagnetic interference, battery depletion or lead displacement.

Each case needs to be considered individually and not before 1 month after successful implantation. Follow up once or twice yearly requires a pacemaker clinic report including an indication of the underlying rhythm and escape rate.

Some individuals are dependent on their pacemaker for all or most of their heartbeats. A pacemaker failure in such cases would have disastrous results. Any individual who is pacemaker dependent is unfit for work in a SCP.

7.9 Implanted Cardiac Defibrillators

It is highly improbable that an individual with an implanted cardiac defibrillator can be considered fit for a SCP. However individual cases can be considered provided there is no structural heart disease and the risk of an arrhythmia requiring discharge of the defibrillator is below the risk threshold. Typically, an individual may need to wait through a trial period of at least 3 years. During this time defibrillator function and cardiac response must be carefully monitored to ensure that any dysrhythmias are properly identified, promptly corrected and that any such episodes are not incapacitating.

8. Vascular Disorders

8.1 Aneurysm

Untreated aneurysms, even if asymptomatic are unlikely to be compatible with employment in a SCP unless it can be demonstrated that the risk of rupture is less than 2% per year. The presence of an aneurysm e.g., in the abdomen of a middle-aged or older individual raises concerns about the presence of co-existing conditions, particularly coronary artery disease. Prosthetic graft replacement of diseased aortic aneurysms with no other evidence of risk can be considered on an individual basis.

8.2 Asymptomatic Carotid Bruit

Since the presence of a carotid bruit may indicate severe stenosis, it should lead to a carotid Doppler examination. Likewise, a cardiovascular assessment is required to rule out significant coronary artery disease. Significant carotid stenosis (>75%) even asymptomatic is associated with a >33% risk of coronary events over 4 years and therefore exceeds the acceptable risk threshold. Any stenosis that has been associated with a stroke will also result in an unfit assessment. Individuals with carotid stenosis less than 75% and with no evidence of significant coronary disease may be considered fit, provided they adhere to appropriate medical therapy and modifiable risk factors are under control.

8.3 Arterial Thrombosis

Those who have sustained an isolated, arterial thrombosis will be considered on an individual basis. Of particular concern are thromboses related to coagulopathies or other chronic predisposing conditions.

8.4 Venous Thrombosis

An isolated episode of deep venous thrombosis need not preclude working in a SCP provided there are no chronic predisposing conditions, Since the risk of recurrence decreases with time, a minimum of 3 months should elapse before returning to work. Those with recurring episodes or with known predisposing factors will be considered on an individual basis only after 12 months have elapsed since the last episode and their risk of recurrence is lowered by satisfactory anticoagulation. Such cases require demonstration of therapeutic INR levels over a recent 1-month period.

8.5 Pulmonary Embolism

Anyone with an isolated episode of pulmonary embolism, without predisposing conditions for recurrence can be considered fit to work in a SCP after an interval of 3 months, provided there is no disabling, residual pulmonary hypertension, right ventricular function is normal, and the risk of venous thrombosis and the risk of pulmonary embolism is decreased by appropriate treatment to an acceptable level.

9. Syncope

A single episode of typical vasovagal syncope is compatible with work in a SCP, provided there was a prodrome that allowed the individual to safely avoid danger and it did not occur while in a sitting position. If the cause was diagnosed and treated, e.g., with a pacemaker, return to work can occur after 1 month has elapsed following the treatment. All other cardiac causes including unexplained syncope must await 12 months of observation with no recurrence before returning to work.

Appendix I - Bibliography

Risk Assessment

Simpson C, Ross D, Dorian P, et al. Consensus Conference 2003; Assessment of the cardiac patient for fitness to drive and fly – Executive summary. Can J Cardiol 2004; 20(13):1313-1323.

Ischemic Heart Disease

Figuerdo VM. Risk stratification after acute myocardial infarction: which studies are best? Postgrad Med 1996; 99:207-214.

Kornowski R, Goldbourt U, Zion M et al. Predictors and long-term prognostic significance of recurrent infarction in the year after a first myocardial infarction. Am J Cardiol 1993; 72:883-888

Mark DB, Shaw L., Harrell FE et al. Prognostic value of a treadmill exercise score in outpatients with suspected coronary artery disease. N Engl J Med 1991; 325:849-853.

Miller DD, Verani MS. Current status of myocardial perfusion imaging after percutaneous transluminal coronary angioplasty. J Am Coll Cardiol 1994;24:260-266.

Morrow K, Morris CK, Froelicher VF et al. Prediction of cardiovascular death in men undergoing noninvasive evaluation for coronary artery disease. Ann Intern Med 1993; 118: 689- 695.

Supino PG, Wallis JB, et al. Risk stratification in the elderly patient after coronary artery bypass grafting: the prognostic value of radionuclide cineangiography. J Nucl Cardiol 1994; 1: 159- 170.

Narins CR, Zareba W, Moss A, Goldstein RE, Hall WJ. Clinical implications of silent versus symptomatic exercise-induced myocardial ischemia in patients with stable coronary disease. J Am Coll Cardiol 1997; 29:756-763.

Hendler AL, Greyson ND, Robinson MG, Freeman MR. Patients with symptomatic ischemia have larger thallium perfusion abnormalities and more adverse prognosis than patients with silent ischemia. Can J Cardiol 1992 Oct; 8(8):814-818.

Poornima etal. Utility of myocardial perfusion imaging in patients with low-risk Treadmill scores. J Am Coll Cardiol 2004; 43: 194-199.

Chatziioannou SN et al. Prognostic value of myocardial perfusion imaging in patients with high exercise tolerance. Circulation 1999; 99: 867-872.

Chiamvimonvat V, Goodman SG, Langer A, Barr A, Freeman MR. Prognostic value of dipyridamole SPECT imaging in low-risk patients after myocardial infarction. J Nucl Cardiol 2001 Mar-Apr; 8(2):136-43

Ammann P, Naegeli B, Rickli H, Buchholz S, Mury R, Schuiki E, Bertel O. Characteristics of patients with abnormal stress technetium Tc 99m sestamibi SPECT studies without significant coronary artery diameter stenoses. Clin Cardiol 2003 Nov; 26(11):521-4.

Lauer MS, Lytle B, Pashkow F, Snader CE, Marwick TH. Prediction of death and myocardial infarction by screening with exercise-thallium testing after coronary-artery-bypass grafting. Lancet 1998 Feb 28; 351(9103):615-22.

Gosselink AT, Liem AL, Reiffers S, Zijlstra F. Prognostic value of predischarge radionuclide ventriculography at rest and exercise after acute myocardial infarction treated with thrombolytic therapy or primary coronary angioplasty. The Zwolle Myocardial Infarction Study Group. Clin Cardiol 1998 Apr; 21(4):254-60.

Snader CE, Marwick TH, Pashkow FJ, Harvey SA, Thomas JD, Lauer MS. Importance of estimated functional capacity as a predictor of all-cause mortality among patients referred for exercise thallium single-photon emission computed tomography: report of 3,400 patients from a single center. J Am Coll Cardiol. 1997 Sep; 30(3):641-8.

Machecourt J, Longere P, Fagret D, Vanzetto G, Wolf JE, Polidori C, Comet M, Denis B. Prognostic value of thallium-201 single-photon emission computed tomographic myocardial perfusion imaging according to extent of myocardial defect. Study in 1,926 patients with follow-up at 33 months. J Am Coll Cardiol. 1994 Apr; 23(5):1096-106.

Iskandrian AS, Chae SC, Heo J, Stanberry CD, Wasserleben V, Cave V. Independent and incremental prognostic value of exercise single-photon emission computed tomographic (SPECT) thallium imaging in coronary artery disease. J Am Coll Cardiol. 1993 Sep; 22(3):665-70.

Risk Factors

Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA. 2001; 285:2486-2497.

Grundy SM, Pasternak R, Greenland P, Smith S Jr, Fuster V. Assessment of cardiovascular risk by use of multiple-risk-factor assessment equations. A statement for health care professionals from the American Heart Association and the American College of Cardiology. Circulation 1999; 100:1481-1492

Khan NA, McAlister F, Lewanczuk R et al. For the Canadian Hypertension Education Program. The 2005 Canadian Hypertension Education Program (CHEP) recommendations for the management of hypertension: Part 2- Therapy. Can J Cardiol 2005; 21(2005):657-672.

D'Agostino RB, Wolf PA, Belanger AJ, Kannel WB. Stroke risk profile; adjustment for antihypertensive medication. Stroke 1994; 25: 40- 43.

Meyers MG, Haynes RB, Rabkin SW. Canadian Hypertension Society Guidelines for ambulatory blood pressure monitoring. Am J Hypertension 1999; 12: 1149-1157

Fodor JG, Frohlich JJ, Genest JJ Jr, McPherson PR. Recommendations for the management and treatment of dyslipidemia. Report of the Working Group on Hypercholesterolemia and Other Dyslipidemias. CMAJ. 2000;1 62:1441-1447

Wilson P, D'Agostino R, Levy D, Belanger A, Silbershatz H, Kannel W. Prediction of coronary heart disease using risk factor categories. Circulation 1998;97:1837-1847.

Wannamethee SG, Shaper AG, Lennon L, Morris RW. Metabolic Syndrome vs Framingham Risk Score for Prediction of Coronary Heart Disease, Stroke, and Type 2 Diabetes Mellitus. Arch Intern Med 2005; 165:2644-2650.

Dunstan DW, Zimmet PZ, Welborn TA et al. The rising prevalence of diabetes and impaired glucose tolerance. The Australian Diabetes, Obesity and Lifestyle Study. *Diabetes Care* 2002; 25:829-34

Ford ES, Giles WH, Dietz WH. Prevalence of the metabolic syndrome among US adults: findings from the third National Health and Nutrition Examination Survey. *JAMA* 2002; 287(3):356-9

Isomaa B, Almgren P, Tuomi T et al. Cardiovascular morbidity and mortality associated with the metabolic syndrome. *Diabetes Care* 2001; 24(4):683-9
Stern M, Williams K, Gonzalez-Villalpando C et al. Does the metabolic syndrome improve identification of individuals at risk of type 2 diabetes and/or cardiovascular disease? *Diabetes Care* 2004; 27(11):2676-81

Lakka HM, Laaksonen DE, Lakka TA, Niskanen LK, Kumpusalo E, Tuomilehto J, Salonen JT. The metabolic syndrome and total and cardiovascular disease mortality in middle-aged men. *JAMA* 2002; 288: 2709-2716.

Carr DB, Utzschneider KM, Hull RL, et al. Intra-abdominal fat is a major determinant of the National Cholesterol Education Program Adult Treatment Panel III criteria for the metabolic syndrome. *Diabetes* 2004; 53(8): 2087-94.

Non-Ischemic Heart Disease

Bonow RO, Carabello B, de Leon AC Jr, et al. ACC/AHA guidelines for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Management of Patients With Valvular Heart Disease). J Am Coll Cardiol 1998; 32:1486-1588.

Aortic Stenosis

Horstkotte D, Loogen F. The natural history of aortic valve stenosis. Eur Heart J 1988;9 (Suppl E): 57–64.

Otto CM, Burwash IG, Legget ME, et al. Prospective study of asymptomatic valvular aortic stenosis: clinical, echocardiographic, and exercise predictors of outcome. Circulation 1997; 95:2262-2270.

Otto CM. Aortic Stenosis: clinical evaluation and optimal timing of surgery. Cardiol Clin 1998; 16:353-373.
Rosenhek R, Binder T, Porenta G, et al. Predictors of outcome in severe, asymptomatic aortic stenosis. N Engl J Med 2000; 343:652-654.

Turina J, Hess O, Sepulcri F, et al. Spontaneous course of aortic valve disease. Eur Heart J 1987; 8:471-483.

Aortic Regurgitation

Bonow RO, Lakatos E, Maron BJ, et al. Serial long-term assessment of the natural history of asymptomatic patients with chronic aortic regurgitation and normal left ventricular systolic function. Circulation 1991; 84:1625-1635.

Bonow RO, Rosing DR, McIntosh CL, et al. The natural history of asymptomatic patients with aortic regurgitation and normal left ventricular function. Circulation 1983; 68:509-517.

Dujardin KS, Enriquez-Sarano M, Schaff HV, et al. Mortality and morbidity of aortic regurgitation in clinical practice: a long-term follow-up study. Circulation 1999; 99:1851-1857.

Padial LR, Oliver A, Vivaldi M, et al. Doppler echocardiographic assessment of progression of aortic regurgitation. Am J Cardiol 1997; 80: 306–314.

Turina J, Hess O, Sepulcri F, et al. Spontaneous course of aortic valve disease. Eur Heart J 1987; 8:471-483.

Mitral Stenosis

Gordon SPF, Douglas PS, Come PC, et al. Two-dimensional and Doppler echocardiographic determinants of the natural history of mitral valve narrowing in patients with rheumatic mitral stenosis: implications for follow-up. J Am Coll Cardiol 1992; 19:968-973.

Horstkotte D, Niehues R, Strauer BE. Pathomorphological aspects, aetiology and natural history of acquired mitral valve stenosis. Eur Heart J 1991; 12[Suppl B]:55-60.

Moreyra AE, Wilson AC, Deac R, et al. Factors associated with atrial fibrillation in patients with mitral stenosis: a cardiac catheterization study. Am Heart J 1998; 135:138-145.

Olesen KH. The natural history of 271 patients with mitral stenosis under medical treatment. Br Heart J 1962; 24:349-357.

Ramsdale DR, Arumugam N, Singh SS, et al. Holter monitoring in patients with mitral stenosis and sinus rhythm. Eur Heart J 1987; 8: 164-170.

Sagie A, Freitas N, Padial LR, et al. Doppler echocardiographic assessment of long-term progression of mitral stenosis in 103 patients: valve area and right heart disease. J Am Coll Cardiol 1996; 28:472-479.

Selzer A, Cohn KE. Natural history of mitral stenosis: a review. Circulation 1972;45:878-890.

Mitral Regurgitation

Freed LA, Levy D, Levine RA, et al. Prevalence and clinical outcome of mitral-valve prolapse. N Engl J Med 1999; 341:1-7.

Gilon D, Buonanno FS, Joffe MM, et al. Lack of evidence of an association between mitral-valve prolapse and stroke in young patients. N Engl J Med 1999; 341:8-13.

Grigioni F, Enriquez-Sarano M, Zehr KJ, et al. Ischemic mitral regurgitation: long-term outcome and prognostic implications with quantitative Doppler assessment. Circulation 2001;103:1759-1764.

Kim S, Kuroda T, Nishinaga M, et al. Relation between severity of mitral regurgitation and prognosis of mitral valve prolapse: echocardiographic follow-up study. Am Heart J 1996; 132:348-355.

Lamas GA, Mitchell GF, Flaker GC, et al. Clinical significance of mitral regurgitation after acute myocardial infarction. Circulation 1997; 96:827–833.

Marks AR, Choong CY, Sanfilippo AJ, et al. Identification of high-risk and low-risk subgroups of patients with mitral-valve prolapse. N Engl J Med 1989; 320:1031-1036.

Nishimura RA, McGoon MD, Shub C, et al. Echocardiographically documented mitral-valve prolapse: long-term follow-up of 237 patients. N Engl J Med 1985; 313:1305-1309.

Zuppiroli A, Rinaldi M, Kramer-Fox R, et al. Natural history of mitral valve prolapse. Am J Cardiol 1995; 75:1028-1032.

Pulmonary Stenosis

Hayes CJ, Gersony WM, Driscoll DJ, et al. Second natural history study of congenital heart defects: results of treatment of patients with pulmonary valvular stenosis. Circulation 1993; 87[Suppl I]:I- 28-I-37.

Prosthetic Valves

Fann JI, Burdon TA. Are the indications for tissue valves different in 2001 and how do we communicate these changes to our cardiology colleagues? Curr Opin Cardiol 2001; 16:126–135.

Fann JI, Miller DC, Moore KA, et al. Twenty-year clinical experience with porcine bioprostheses. Ann Thorac Surg 1996; 62:1301-1312.

Glower DD, Landolfo KP, Cheruva S, et al. Determinants of 15-year outcome with 1119 standard Carpentier-Edwards porcine valves. Ann Thorac Surg 1998; 66:S44-48.

Jamieson WR, Burr LH, Munro AI, et al. Carpentier- Edwards standard porcine bioprosthesis: a 21–year experience. Ann Thorac Surg 1998; 66:S40–43.

Park SZ, Reardon MJ. Current status of stentless aortic xenografts. Curr Opin Cardiol 2000; 15:74–81.

Puvimanasinghe JPA, Steyerberg EW, Takkenberg JJM, et al. Prognosis after aortic valve replacement with a bioprosthesis: predictions based on meta-analysis and microsimulation. Circulation 2001; 103:1535-1541.

Remadi JP, Baron O, Roussel C, et al. Isolated mitral valve replacement with St. Jude medical prosthesis: long-term results: a follow-up of 19 years. Circulation 2001; 103:1542-1545.

Stein PD, Bussey HI, Dalen JE, et al. Antithrombotic therapy in patients with mechanical and biological prosthetic heart valves. Chest 2001; 119:220S-227.

Vongpatanasin W, Hillis D, Lange RA. Prosthetic heart valves. N Engl J Med 1996; 335:407-416.

Aortic Allograft Replacement

Doty JR, Salazar JD, Liddicoat JR, et al. Aortic valve replacement with cryopreserved aortic allograft: ten-year experience. J Thorac Cardiovasc Surg 1998; 115:371-380.

Kirklin JK, Smith D, Novick W, et al. Long-term function of cryopreserved aortic homografts: a ten-year study. J Thorac Cardiovasc Surg 1993; 106:154-166.

O'Brien MF, Stafford EG, Gardner MAH, et al. Allograft aortic valve replacement: long-term follow-up. Ann Thorac Surg 1995; 60:565-570.

Ross Procedure

Chambers JC, Somerville J, Stone S, et al. Pulmonary autograft procedure for aortic valve disease: long-term results of the pioneer series. Circulation 1997;96:2206-2214.

Oury JH, Hiro SP, Maxwell JM, et al. The Ross procedure: current registry results. Ann Thorac Surg 1998; 66 :S162-165.

Stelzer P, Weinrauch S, Tranbaugh RF. Ten years of experience with the modified Ross procedure . J Thorac Cardiovasc Surg 1998; 115:1091-1100.

Carr-White GS, Kilner PJ, Hon JKF, et al. Incidence, location, pathology, and significance of pulmonary homograft stenosis after the Ross operation. Circulation 2001; 104[Suppl I]:I16-20.

Transposition

Ikeda U, Kimura K, Suzuki O et al. Long-term survival in "corrected transposition. Lancet 1991; 337:180-181.

Mitral Valve Repair

Bernal JM, Rabasa JM, Olalla JJ, et al. Repair of chordae tendinae for rheumatic mitral valve disease: a twenty-year experience. J Thorac Cardiovasc Surg 1996; 111:211-217.

Braunberger E, Deloche A, Berrebi A, et al. Very long-term results (more than 20 years) of valve repair with Carpentier's techniques in nonrheumatic mitral valve insufficiency. Circulation 2001; 104[Suppl I]:I8-11.

Chauvaud S, Fuzellier J-F, Berrebi A, et al. Longterm (29 years) results of reconstructive surgery in rheumatic mitral valve insufficiency. Circulation 2001; 104[Suppl I]:I12-15.

Gillinov AM, Cosgrove DM, Blackstone EH, et al. Durability of mitral valve repair for degenerative disease. J Thorac Cardiovasc Surg 1998; 116: 734–743.

Hausmann H, Siniawski H, Hotz H, et al. Mitral valve reconstruction and mitral valve replacement for ischaemic mitral insufficiency. J Cardiac Surg 1997;12:8-14.

Mohty D, Orszulak TA, Schaff HV, et al. Very longterm survival and durability of mitral valve repair for mitral valve prolapse. Circulation 2001; 104[Suppl I]:I1-7.

Obadia JF, Farra ME, Bastien OH, et al. Outcome of atrial fibrillation after mitral valve repair. J Thorac Cardiovasc Surg 1997; 114:179-185.

Yau TM, El-Thoneimi YAF, Armstrong S, et al. Mitral valve repair and replacement for rheumatic disease. J Thorac Cardiovasc Surg 2000; 119:53-61.

Percutaneous Mitral Balloon Valvuloplasty

Hernandez R, BaZuelos C, Alfonso F, et al. Longterm clinical and echocardiographic follow-up after percutaneous mitral valvuloplasty with the Inoue balloon. Circulation 1999;99:1580-1586.

Iung B, Garbarz E, Michaud P, et al. Late results of percutaneous mitral commissurotomy in a series of 1024 patients: analysis of late clinical deterioration: frequency, anatomic findings, and predictive factors. Circulation 1999; 99: 327 2–3278.

Orrange SE, Kawanishi DT, Lopez BM, et al. Actuarial outcome after catheter balloon commissurotomy in patients with mitral stenosis. Circulation 1997; 95:382-389.

Palacios IF, Tuzcu ME, Weyman AE, et al. Clinical follow-up of patients undergoing percutaneous mitral balloon valvotomy. Circulation 1995; 91:671-676.

Percutaneous Pulmonary Balloon Valvuloplasty

Chen CR, Cheng TO, Huang T, et al. Percutaneous balloon valvuloplasty for pulmonic stenosis in adolescents and adults. N Engl J Med 1996; 335:21-25.

Jarrar M, Betbout F, Ben Farhat M, et al. Long-term invasive and noninvasive results of percutaneous balloon pulmonary valvuloplasty in children, adolescents and adults. Am Heart J 1999; 138:950-954.

Rao PS, Galal O, Patnana M et al. Results of three to 10 year follow up of balloon dilation of the pulmonary valve. Heart 1998; 80:591-595.

Sadr-Ameli MA, Sheikholeslami F, Firoozi et al. Late results of balloon pulmonary valvuloplasty in adults. Am J Cardiol 1998; 82:398-400.

Dysrhythmias

Cardiology Clinics: “Cardiac Arrhythmias and Related Syndromes; Current Diagnosis and Management” Ed.M. Akhtar, Volume II, Number 1, February 1993, ppl-198, W.B. Saunders, Toronto.

Hirsh J. Guidelines for antithrombotic therapy (Summary of American College of Chest Physicians Recommendations 1992) Decker Periodicals Inc.

Jackman WM, Beckman KJ et al. Treatment of supraventricular tachycardia due to atrioventricular nodal reentry by radiofrequency catheter ablation of slow-pathway conduction. N Engl J Med 1992; 327:313-318.

Jackman WM, Wang X et al. Catheter ablation of accessory atrioventricular pathways (Wolff- Parkinson-White Syndrome) by radiofrequency current. N Engl J Med 1991; 324:1605-1611.

NHLBI Working Group on Atrial Fibrillation. Current understandings and research imperatives. J Am Coll Cardiol 1993; 22:1830-1834.

Vascular Disorders

Chimowitz MI, Weiss DG, et al. Cardiac prognosis of patients with carotid stenosis and no history of coronary artery disease, Stroke 1994; 25: 759–765.

Ernst CB. Abdominal aortic aneurysm. NEJM 1993; 328:1167-1172.

4.7 – Diabetes

Medical Guidelines for the Employment of Individuals with Diabetes in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees working in a Safety Critical Position operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

These medical fitness for duty guidelines provide an overview of diabetes mellitus (diabetes) and medications used to treat diabetes. The Diabetes Canada 2018 Clinical Practice Guidelines served as a reference for the development of these guidelines. If an individual has a medical condition related to diabetes that is not covered by these guidelines, medical fitness for duty will be determined by the Railway's Chief Medical Officer and guided, in part, by the considerations listed in section 2.

2. Medical Fitness for Duty Considerations

Diabetes, medications used to treat diabetes and complications related to diabetes can cause gradual functional impairment or sudden incapacitation. The following should be taken into consideration when assessing the medical fitness for duty of an individual occupying a Safety Critical Position:

- The presence and type of the individual's diabetes.
- The length, course and severity of the individual's diabetes.
- The degree of impairment of alertness, attention, cognitive function, concentration, insight, judgement and memory due to the individual's diabetes or due to medications used to treat the individual's diabetes.
- The stability of the individual's diabetes.
- The potential for gradual functional impairment or sudden incapacitation.
- The individual's compliance with treatment recommendations and medical monitoring.
- The predictability and reliability of the individual.
- Comorbidities.
- The occupational requirements of the individual's Safety Critical Position.

When multiple medical conditions are present, including medical conditions related to diabetes, the medical fitness for duty of an individual occupying a Safety Critical Position should take into consideration the cumulative risk associated with all of their medical conditions.

3. Definitions

Diabetes mellitus (diabetes) is a medical condition in which the body cannot produce adequate amounts of insulin, or the body is resistant to the action of the insulin that it produces. As a result, blood glucose levels are not well controlled.

> **Type 1 diabetes** is an autoimmune disease in which individuals are not able to produce their own insulin due to damage to the insulin producing beta cells of the pancreas. Type 1 diabetes generally develops in childhood or adolescence; however, it can occur at any age. Individuals with type 1 diabetes require insulin injections or an insulin pump to ensure they have adequate amounts of insulin.
>
> **Type 2 diabetes** refers to the condition where individuals are not able to produce adequate amounts of insulin or there is resistance to the action of insulin (insulin resistance). Type 2 diabetes generally develops in adulthood, although increasingly it is now occurring in younger age groups. Type 2 diabetes can often be managed by a healthy diet, maintaining an appropriate body weight and participating in regular exercise. If these measures are not sufficient, medications or insulin may be required to control blood glucose levels.

Diabetes education is an important part of diabetes self-care and can empower individuals with diabetes to manage their condition. Diabetes education programs offer individual counselling and/or group workshops that can support individuals living with diabetes. Treating Physicians or Specialists and health care professionals trained in diabetes care can also provide effective diabetes education, often within a multidisciplinary medical clinic or facility.

Hypoglycemia with cognitive impairment refers to hypoglycemia (low blood glucose) that is associated with neuroglycopenic symptoms (difficulty concentrating, confusion, weakness, drowsiness, vision changes, difficulty speaking, headache, dizziness) or the situation where an individual that experiences an episode of hypoglycemia requires the assistance of another person.

Hypoglycemia unawareness refers to the situation where an individual is unaware that their blood glucose is low. The individual does not experience the characteristic neurogenic (autonomic) symptoms of hypoglycemia (trembling, palpitations, sweating, anxiety, hunger, nausea, tingling) that serve to warn the individual that their blood glucose is low.

Hyperglycemia refers to the situation where an individual's blood glucose level is high, most often due to an inadequate amount of insulin. Hyperglycemia can be acute or chronic and can result in gradual functional impairment or sudden incapacitation. Glycated hemoglobin (hemoglobin A1c, HbA1c, or A1C) is an indirect measure of glycemic control and provides insight into the individual's average blood glucose levels over the previous three months.

Medically stable diabetes refers to the situation where an individual's diabetes has been managed well enough to minimize any safety risk. For the purposes of these guidelines, an individual's diabetes is considered to be medically stable when all of the following are met:

1. A recent A1C level (within the previous three months) is not greater than 12%.

2. Over the previous three-month period, no more than 10% of blood glucose self-monitoring values are below 4 mmol/L.

3. For individuals initiating therapy with an insulin secretagogue medication or for individuals currently on an insulin secretagogue medication, the individual's medication regimen has not changed for a minimum period of one week. This includes any change to medication monotherapy, initiation of combination therapy or changes to combination therapy.

4. For individuals initiating insulin therapy, or for individuals currently on insulin therapy, the individual's medication regimen has not changed for a minimum period of one month. This includes any change to the type of insulin or to the number of insulin injections.

   Note: Circumstances may arise where the medical stability of an individual's diabetes requires an individualized assessment. At the discretion of the Railway's Chief Medical Officer, these individuals should undergo further assessment to determine whether the individual's diabetes has been managed well enough to minimize any safety risk.

Specialist refers to an Endocrinologist or other Internal Medicine Physician.

4. Medical Fitness for Duty Guidelines

The following medical fitness for duty guidelines include an introduction to diabetes, an overview of the treatment options for individuals with diabetes, a section on medication-induced hypoglycemia, medical fitness for duty and assessment considerations and guidelines for the frequency of medical fitness for duty assessments for individuals with diabetes.

4.1 Diabetes

Diabetes, medications used to treat diabetes and complications related to diabetes can cause gradual functional impairment or sudden incapacitation. The impact to safe railway operations is largely dependant on how well an individual manages their diabetes.

Acutely, extreme hyperglycemia can cause visual disturbances, cardiovascular complications, diabetic ketoacidosis, a hyperosmolar hyperglycemic state or diabetic coma.

Longer-term complications associated with diabetes include cardiovascular complications (including silent ischemia), nephropathy, neuropathy, retinopathy, vision disturbances or other diabetes related comorbidities.

Medications used to treat diabetes, if not well managed, can cause hypoglycemia. Hypoglycemia, if untreated, can cause gradual functional impairment or sudden incapacitation.

An individual living with diabetes can face challenges with the complexities of their medical condition. The impact of diabetes on an individual’s mental health should also be taken into consideration.

Diabetes Treatment Options

The treatment options for individuals with diabetes include lifestyle modifications, oral and injectable non-insulin medications and injectable insulin. For the purposes of these guidelines, the treatment of diabetes can be classified into four treatment groups based on the risk of hypoglycemia.

Diabetes Treatment Group 1 (Lifestyle Modifications)

Lifestyle modifications include a healthy diet, maintaining an appropriate body weight and participating in regular exercise.

There is an extremely low risk of hypoglycemia when diabetes is treated with lifestyle modification.

Diabetes Treatment Group 2 (Non-insulin Secretagogue Medications)

Alpha-glucosidase Inhibitors
Biguanides
DPP-4 Inhibitors
Thiazolidinediones
GLP-1 Receptor Agonists (Incretin Mimetics)
SGLT2 Inhibitors

Appendix I includes a representative list of common non-insulin secretagogue medications.

There is a low risk of medication-induced hypoglycemia when diabetes is treated with a non-insulin secretagogue.

Diabetes Treatment Group 3 (Insulin Secretagogue Medications)

Sulphonylureas
Meglitinides

Appendix I includes a representative list of common insulin secretagogue medications.

If not well managed, there is a risk of medication-induced hypoglycemia when diabetes treatment includes an insulin secretagogue medication, whether used alone or in combination with other diabetes medications.

Diabetes Treatment Group 4 (Insulin Therapy)

Rapid-acting Insulin
Short-acting Insulin
Intermediate-acting Insulin
Long-acting Insulin
Premixed Insulin Preparations

Appendix I includes a representative list of common types of insulin.

If not well managed, the highest risk of medication-induced hypoglycemia occurs when diabetes treatment includes insulin.

Medication-induced hypoglycemia

Hypoglycemia associated with the use of insulin secretagogue medications or with insulin therapy can cause gradual functional impairment or sudden incapacitation. Individuals working in Safety Critical Positions should take appropriate measures to prevent medication-induced hypoglycemia and be educated on how to treat it if it occurs.

Prevention and recognition of hypoglycemia

Diabetes education can assist individuals with activity, dietary and medication scheduling, with understanding the symptoms of hypoglycemia and on how to prevent hypoglycemia.

Treatment of hypoglycemia

Individuals with diabetes that are on insulin secretagogue medications or are on insulin therapy must carry a source of rapidly absorbable glucose at all times while on duty or subject to duty.

Reporting of hypoglycemia with cognitive impairment

All individuals are required to report immediately to the Railway's Chief Medical Officer any episode of hypoglycemia with cognitive impairment, as defined in section 3.

Medical Fitness for Duty

In addition to the medical fitness for duty considerations in section 2 and taking into consideration their type of treatment, individuals with a diagnosis of diabetes may be considered medically fit for duty in a Safety Critical Position if all of the following conditions are met:

a) The individual has attended a diabetes education program or has been provided diabetes education by their treating Physician or Specialist or by a health care professional trained in diabetes care.

b) The individual is compliant with all blood glucose monitoring recommendations in accordance with their diabetes education.

Individuals should maintain a record of their blood glucose readings from the previous three months. To ensure accuracy, for individuals on an insulin secretagogue medication or on insulin therapy, a blood glucose monitoring device using a memory meter that can be downloaded for further review is required.

c) The individual's diabetes is stable as defined in section 3.

d) Hypoglycemia unawareness is not present.

e) All episodes of hypoglycemia with cognitive impairment, as defined in section 3, have been investigated by the treating Physician or Specialist and appropriate measures have been taken to minimize recurrence.

f) A resting electrocardiogram does not identify a cardiovascular disorder.

If a cardiovascular disorder is identified, medical fitness for duty will be determined by the applicable cardiovascular disorders medical fitness for duty guidelines.

g) Diabetic complications including cardiovascular disorders, nephropathy, neuropathy, retinopathy, vision disturbances or diabetes related comorbidities have been assessed and the individual is medically fit for duty in accordance with the applicable medical fitness for duty guidelines.

h) A treating Physician or Specialist's assessment supports that the individual's diabetes is stable. This assessment should include a review of A1C levels and blood glucose readings from the previous three months, and all other diagnostic tests.

It is acknowledged that access to a treating Physician or Specialist may be limited in some regions. At the discretion of the Railway's Chief Medical Officer, an assessment by a treating Nurse Practitioner trained in diabetes care may be an acceptable alternative.

Note: Insulin pump therapy (continuous subcutaneous insulin infusion) with sensory augmentation via feedback from a continuous glucose monitoring device is a relatively new and evolving technology. The medical fitness for duty of individuals using this type of system is at the discretion of the Railway's Chief Medical Officer.

Insulin secretagogue medications or insulin therapy reporting requirements

Individuals are required to report immediately to the Railway's Chief Medical Officer:

a) Initiation of treatment with an insulin secretagogue medication.

b) Initiation of insulin therapy.

c) Modification of treatment involving an insulin secretagogue medication, including changes to medication monotherapy, initiation of combination therapy or changes to combination therapy.

d) Modification of insulin therapy including changes to the number of insulin injections per day or any change in the type of insulin.

Medical Fitness for Duty Assessment

As part of their medical fitness for duty assessment, individuals with a diagnosis of diabetes should be assessed by a Physician or a Specialist.

The medical fitness for duty assessment should include a thorough history, a review of medications, a review of modifiable and non-modifiable cardiovascular disease risk factors, a physical examination, a review of A1C results and blood glucose readings and any other diagnostic or functional tests deemed appropriate by the treating Physician or Specialist.

A cardiovascular disease medical fitness for duty assessment, including an assessment for ischemic heart disease, should be completed in individuals with diabetes that have any of the following:

a) Typical or atypical symptoms of myocardial ischemia (e.g. unexplained dyspnea, chest discomfort).

b) Comorbid medical conditions:

Peripheral arterial disease or carotid bruit.
History of a previous transient ischemic attack, stroke or other cerebrovascular event.
Chronic kidney disease.
Autonomic neuropathy.

c) Abnormalities on a resting electrocardiogram or changes from previous electrocardiograms.

d) Modifiable cardiovascular disease risk factors that are not well controlled.

A written report, which is to include all relevant consultation letters and an opinion on the stability of the individual's diabetes, should be submitted to the Railway's Chief Medical Officer. This written report should also include any functional limitations and/or work restrictions.

It is acknowledged that access to a treating Physician or Specialist may be limited in some regions. At the discretion of the Railway's Chief Medical Officer, a written report submitted by a treating Nurse Practitioner trained in diabetes care may be an acceptable alternative.

Frequency of Medical Fitness for Duty Assessments

Diabetes Treatment Group 1 (Lifestyle Modifications) and Group 2 (Non-insulin Secretagogue Medications)

a) At the time of diagnosis.

b) As part of their Safety Critical Position Periodic Medical Assessment.

Diabetes Treatment Group 3 (Insulin Secretagogue Medications)

a) At the time of diagnosis.

b) At the time of initiation of treatment with an insulin secretagogue or modification of treatment involving insulin secretagogue medications.

c) One year after initiation of treatment with an insulin secretagogue or modification of treatment involving insulin secretagogue medications.

d) As part of their Safety Critical Position Periodic Medical Assessment.

Diabetes Treatment Group 4 (Insulin Therapy)

a) At the time of diagnosis.

b) At the time of initiation of treatment with insulin or modification of insulin therapy.

c) Annually thereafter.

Note: A resting electrocardiogram should be conducted:

a) At the time of diagnosis or initial presentation.

b) Every five years up to age 40 and every three years thereafter.

and

c) Commencing at age thirty, individuals with type 1 diabetes should have an annual resting electrocardiogram.

Appendix I - Diabetes Medications

Non-Insulin Medications

Non-insulin Secretagogue Medications

Alpha-glucosidase Inhibitors: Acarbose (Glucobay®)

Biguanides: Metformin (Glucophage®), Long Acting Metformin (Glumetza®)

DPP-4 Inhibitors*: Linagliptin (Trajenta™), Saxagliptin (Onglyza®) Sitagliptin (Januvia®),

Combination agents: Linagliptin/metformin (Jentadueto®), Saxagliptin/metformin (Komboglyze™), Sitagliptin/metformin (Janumet®)

GLP-1 Receptor Agonists**: Exenatide (Byetta®), Liraglutide (Victoza®), Semaglutide (Ozempic®)

SGLT2 Inhibitors***: Canagliflozin (Invokana®), Dapagliflozin (Forxiga™), Empagliflozin (Jardiance™)

* Dipeptidyl Peptidase-4 Inhibitors
** Glucagon Like Peptide 1 Receptor Agonists
*** Sodium-Glucose co-Transport 2 Inhibitors

Insulin Secretagogue Medications

Non-sulfonylurea insulin secretagogues: Nateglinide (Starlix®), Repaglinide (Gluconorm®)

Sulfonylurea insulin secretagogues: Gliclazide (Diamicron®), Glimepiride (Amaryl®), Glyburide (DiaBeta®)

Insulin and Insulin Analogs

Rapid-acting insulin analogs: Insulin aspart (NovoRapid®), Insulin glulisine (Apidra®), Insulin lispro U-100 U-200 (Humalog®), Faster-acting insulin aspart (Fiasp®)

Short-acting insulins: Insulin regular (Humulin®-R, Novolin®, Entuzity®)
Intermediate-acting insulin: Insulin neutral protamine Hagedorn (Humulin®-N, Novolin®)

Long-acting insulins: Insulin detemir (Levemir®), Insulin glargine U-100 (Lantus®), Insulin glargine U-300 (Toujeo®), Insulin glargine biosimilar (Basaglar®), Degludec U-100, U-200 (Tresiba®)

Premixed regular insulins-NPH: (Humulin® 30/70, Novolin® 30/70, 40/60, 50/50)

Premixed insulin analogues: Biphasic insulin aspart (NovoMix® 30), Insulin lispro/lispro protamine (Humalog® Mix25 and Mix50)

Appendix II - Medical Fitness for Duty Summary Table

* This summary table is provided as a practical resource. It is not to be used in isolation or without reference to the Diabetes Guidelines

	Treatment Options	Monitoring Frequency	Medical Fitness for Duty
Group 1	• Lifestyle Modifications	1) at initiation of treatment 2) with Periodic Medical Assessments	☐ Diabetes education ☐ Compliant with blood glucose monitoring recommendations ☐ Recent A1C ≤ 12% ☐ No more than 10% of blood glucose < 4 mmol/L in past 3 months ☐ If on an insulin secretagogue medication: No changes in medication for 1 week ☐ If on insulin: No changes in type of insulin or number of injections for 1 month ☐ No hypoglycemia unawareness ☐ Episodes of hypoglycemia with cognitive impairment investigated and measures taken to minimize recurrences ☐ Resting electrocardiogram does not identify a cardiovascular disorder ☐ Diabetic complications have been assessed (cardiovascular, neuropathy, nephropathy, retinopathy or other diabetes-related comorbidities) ☐ Physician's assessment supports that the individual's diabetes is stable
Group 2	• Alpha-glucosidase Inhibitors • Biguanides • DPP-4 Inhibitors • Thiazolidinediones • GLP-1 Receptor Agonists • SGLT2 inhibitors		
Group 3	• Sulfonylureas • Meglitinides	1) at initiation of treatment 2) 1 year after initiation or modification of treatment with insulin secretagogue 3) with Periodic Medical Assessments	
Group 4	• Rapid-acting Insulin • Short-acting Insulin • Intermediate-acting Insulin • Long-acting Insulin • Premixed Insulin Preparations	1) at initiation/modification of treatment 2) annually	Frequency of electrocardiogram: At diagnosis/initial presentation Every 3-5 years with Periodic Medical Assessments and Annually for type 1 diabetics, commencing at age 30 Annually for type 2 diabetics on insulin therapy Frequency of ischemic heart disease assessment: As indicated

Appendix III - Diabetes Medical Report

MEDICAL REPORT FOR INDIVIDUALS WITH DIABETES

Section 1 - Employee information and consent (to be completed by the employee)

Name	PIN if applicable

Street Address / Box Number / City / Province	Postal Code	Phone (home)

Birth Date (Y/M/D)	Job Title	Immediate Supervisor	Phone (work)

Employee's Consent for the Release of Medical Information to the Office of the Chief Medical Officer

I, the undersigned, acknowledge that I occupy a Safety Critical Position and I will report any medical condition that may constitute a threat to safe railway operations. I declare that the information that I have provided or will be providing to the physician completing this report is truthful and complete. I hereby authorize the physician to release this completed form to the Office of the Chief Medical Officer (CMO) and to discuss the information contained in this report. I also authorize the physician to release any relevant medical information related to testing such as laboratory tests, ECG, etc., as well as medical reports from specialists. I understand that this information will be reviewed for the purpose of making a fitness for duty determination. This consent is valid for six months from the date of signature.

Signature of Employee:_____ Date:_____

Section 2 - Instructions to physician

Employees working in Safety Critical Positions operate or control the movement of trains. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment. Special attention should be devoted to medical conditions that may result in sudden mental or physical impairment or any condition that may potentially interfere with an employee's ability to perform their duties in a safe manner. In the case of chronic conditions, be aware that impairment may occur gradually. In order to make an individualized assessment of your patient's fitness for duty, we require some information from you. Please complete Sections 3, 4 and 5 of this form. Under the Federal Railway Safety Act, physicians have an obligation to notify the Office of the Chief Medical Officer if an individual occupying a Safety Critical Position has a medical condition that, in their opinion, is likely to pose a threat to safe railway operations.

PLEASE WRITE LEGIBLY

FOR ASSISTANCE REGARDING ANY COMPONENT OF THIS REPORT, CALL:

The complete Canadian Railway Medical Rules Handbook can be found online at:
https://www.railcan.ca/resources/?_sf_s=medical

Section 3 - To be completed by the physician

MEDICAL HISTORY

Date of onset: _____ Type 1 ☐ Type 2 ☐

Has the individual completed diabetes education (mandatory)? Yes ☐ No ☐
Date: _____ Provider (and designation): _____

Is there any evidence of:
- Ophthalmic disease? Yes ☐ No ☐
- Cardiovascular disease? Yes ☐ No ☐
- Neurological disease? Yes ☐ No ☐
- Renal disease? Yes ☐ No ☐
- Other complications? (specify) _____ Yes ☐ No ☐

Comments:

Has your patient had any surgical or laser procedures done in either eye in the last yea Yes ☐ No ☐
If yes, please describe:

MEDICATIONS

NOTE: An individual who is commencing insulin will be considered unfit for duty in a Safety Critical Position for a period of at least one (1) month. The physician MUST report immediately to the Chief Medical Officer the initiation of any insulin therapy.

Please include the name, start dose and current dose of each anti-hyperglycemic oral medication:

Name	Start dose	Current dose	Date adjusted

For insulin users, specify type(s) or insulin and schedule of injections:

Type(s) of insulin	Schedule of injections

Any change in the number of injections in the last 6 months? Yes ☐ No ☐

List all other current medications:

GLUCOSE MONITORING AND HYPOGLYCEMIA

- Average number of blood sugar level tests done per day and schedule: _____

- Is the individual familiar with the symptoms of hypoglycemia? Yes ☐ No ☐
- What type of sugar does the individual have available while at work: _____
- Was the individual carrying that type of sugar at the time of your examination? Yes ☐ No ☐
  If no, why not? _____
- If the individual has had hypoglycemic episodes, then:
  - Does the individual recognize the symptoms at the time of an episode? Yes ☐ No ☐
  - Can the individual explain the cause of the episode? Yes ☐ No ☐
  - Is the individual capable of treating it quickly? Yes ☐ No ☐
- Average number of minor hypoglycemic episodes (recognized and treated by the individual) per month: _____
- Have there been episodes in the past 12 months:
  - That have required hospitalization? Yes ☐ No ☐
  - That have required an emergency visit? Yes ☐ No ☐
  - That came on suddenly (without warning signs)? Yes ☐ No ☐
  - That reduced concentration or readiness at work? Yes ☐ No ☐
  - That have required someone else's assistance? Yes ☐ No ☐
  - That caused a loss of consciousness? Yes ☐ No ☐

If you answered yes to any of the 6 questions above, please describe the episodes, dates, causes and any other characteristics or circumstances. Please also provide the clinical notes, if available.

For individuals treated with insulin or an insulin secretagogue medication:

- Is the individual using a memory meter that can be downloaded for further review? Yes ☐ No ☐
  If no, why not? _____
- Are more than 10% of the values below 4 mmol/L in the last 3 months? Yes ☐ No ☐

OBJECTIVE FINDINGS

WEIGHT: _____ HEIGHT: _____ BLOOD PRESSURE: _____

MEDICAL REPORTS

The following reports **MUST** be appended to this report:

- Interpreted report of a resting ECG done in the last 3 months Yes ☐ No ☐
- Report of an A1C done during the last 3 months Yes ☐ No ☐

For individuals treated with insulin or an insulin secretagogue medication:

- 30-day download of blood glucose values Yes ☐ No ☐

If reports not attached, please explain: _____

Section 4 - Fitness for duty

IMPORTANT : Canadian Railway employees who work in a Safety Critical Position operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment. **Your opinion on this individual's fitness to work in a Safety Critical Position would be appreciated.**

In your professional opinion, is the examined individual medically fit for duty in a Safety Critical Position?

Yes ☐ No ☐

Comments: _____

Section 5 - Physician statement and information

This report will be used to make an assessment on this employee's fitness for duty and constitutes a third party service. In completing this report, please be thorough and write legibly. If you have any questions regarding any components of this report, call the toll-free number listed at the bottom of the first page.

I certify that the information documented in this report is, to the best of my knowledge, correct.

Date of examination: _____

Signature: _____ Date: _____

Name of physician: _____ ☐ Family physician
Please print ☐ Specialist (specify) : _____

Address: _____ Phone: _____

City / Province: _____ Fax: _____

Postal Code: _____

4.8 – Substance Use Disorders

Medical Fitness for Duty Guidelines for the Employment of Individuals with Substance Use Disorders in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees working in a Safety Critical Position operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

These guidelines cover specific substance use disorders utilizing the terminology contained in both the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) and the Fifth Edition (DSM-5) of the American Psychiatric Association. Medical fitness for duty guidelines for the DSM-IV-TR diagnoses of substance abuse and substance dependence have been retained and medical fitness for duty guidelines for the DSM-5 diagnosis of mild substance use disorder have been included.

A diagnosis using the criteria of both the DSM-IV-TR and the DSM-5 is now a required component of the medical fitness for duty assessment process. Appendix I provides the rationale for this approach and Appendix II provides a summary of the DSM-IV-TR and the DSM-5 diagnostic criteria.

If an individual has a medical condition or other issues related to substance use not covered by these guidelines, medical fitness for duty will be determined by the Railway's Chief Medical Officer.

2. Medical Fitness for Duty Considerations

The following should be taken into consideration when assessing the medical fitness for duty of an individual occupying a Safety Critical Position:

- The presence of a substance use disorder as defined by the DSM-IV-TR and the DSM-5.
- The length, course and severity of the substance use disorder.
- The length, course and severity of any previous substance use disorder.

- The degree of current behavioral dysfunction or mood dysfunction.
- The degree of impairment of alertness, attention, cognitive function, concentration, insight, judgement and memory related to the substance use disorder or medications used to treat the substance use disorder.
- The individual's compliance with treatment recommendations.
- The likelihood of recurrence or relapse of the substance use disorder or a related substance use disorder.
- The potential for acute or gradual functional impairment.
- The predictability and reliability of the individual.
- Co-morbid medical conditions.

3. Definitions

- **Addiction Medicine Physician** refers to a Physician with formal accreditation or experience in the diagnosis and treatment of substance use disorders.

- **Mutual Support Program** refers to in person (face-to-face) group meetings, structured recovery activities, educational materials and relapse prevention techniques for people recovering from substance use disorders and for their families.

- **Relapse Prevention Agreement** refers to a formal document listing all necessary behaviours expected of the individual with a diagnosis of a substance use disorder to remain in stable abstinent recovery. A sample substance use disorders Relapse Prevention Agreement is provided in Appendix III.

- **Substance** refers to any mood-altering, psychoactive or potentially addictive chemical. For the purpose of these guidelines, categories of substances include: alcohol; cannabis/cannabinoids; hallucinogens; inhalants; opioids; sedatives, hypnotics and anxiolytics; and stimulants, including amphetamine-type substances and cocaine.

- **Substance Use Disorders Treatment Program** refers to a residential (inpatient) or outpatient treatment program that is abstinence-based and provides psychoeducation, motivational enhancement, cognitive/behavioral therapy, skills training, physical activities, mutual support program introduction and family therapy.

4. Medical Fitness for Duty Guidelines

Medical fitness for duty guidelines for the DSM-IV-TR diagnoses of substance abuse and substance dependence have been enhanced by the inclusion of medical fitness for duty guidelines for the DSM-5 diagnosis of mild substance use disorder. A diagnosis using the criteria of both the DSM-IV-TR and the DSM-5 will now be a required component of the medical fitness for duty assessment process. Appendix I provides the rationale for using both the DSM-IV-TR and the DSM-5 diagnostic criteria. Appendix II summarizes the DSM-IV-TR and the DSM-5 diagnostic criteria for substance use disorders.

4.1. Mild Substance Use Disorder

DSM-5 Diagnostic Criteria

Individuals with substance use disorders have cognitive, behavioral, and physiological symptoms related to their continued use of a substance despite significant problems related to its use. The severity of substance use disorders can cover a broad range. In accordance with the DSM-5, the presence of two to three of the symptom criteria is suggestive of a mild substance use disorder.

Medical Fitness for Duty

Individuals may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual does not have a DSM-IV-TR diagnosis of substance abuse or substance dependence. If an individual meets the DSM-IV-TR diagnostic criteria for substance abuse or substance dependence, the guidelines for substance abuse or substance dependence should be followed.

b) The individual has completed counselling and/or education regarding the potential adverse impact of their substance use.

Medical Fitness for Duty Assessment

Written reports should be requested from the individual's healthcare providers.

At the discretion of the Railway's Chief Medical Officer an assessment by a Substance Abuse Professional, an Addiction Medicine Physician and/or a Psychiatrist may also be required.

The components of a Comprehensive Substance Use Disorders Medical Assessment are summarized in Appendix IV.

Medical Fitness for Duty Monitoring

The requirement for medical fitness for duty monitoring and follow up reports and the frequency of their submission will be at the discretion of the Railway's Chief Medical Officer.

Additional requirements or assessments are at the discretion of the Railway's Chief Medical Officer.

4.2 Substance Abuse

DSM-IV-TR Diagnostic Criteria

A. A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:

(1) recurrent substance use resulting in a failure to fulfill major role obligations at work, school or home.

(2) recurrent substance use in situations in which it is physically hazardous.

(3) recurrent substance-related legal problems.

(4) continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance.

B. The symptoms have never met the criteria for Substance Dependence for this class of substance.

Medical Fitness for Duty

Individuals with a diagnosis of substance abuse may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual has completed treatment for their substance use disorder.

b) The individual has remained abstinent from all substances for a minimum period of thirty days. The Railway's Chief Medical Officer may extend this thirty-day period if there is supporting medical evidence that a longer period is indicated.

c) The individual is documented to be in compliance with all components of a substance use disorders Relapse Prevention Agreement.

d) The individual demonstrates ongoing compliance with all components of a substance use disorders Relapse Prevention Agreement for a minimum period of two years. The Railway's Chief Medical Officer may extend this two-year period if there is supporting medical evidence that a longer period is indicated.

Medical Fitness for Duty Assessment

Written reports should be requested from the individual's healthcare providers.

At the discretion of the Railway's Chief Medical Officer an assessment by a Substance Abuse Professional, an Addiction Medicine Physician and/or a Psychiatrist may also be required.

The components of a Comprehensive Substance Use Disorders Medical Assessment are summarized in Appendix IV.

Medical Fitness for Duty Monitoring

The medical fitness for duty monitoring for individuals with a diagnosis of substance abuse should include documented compliance with all components of a substance use disorders Relapse Prevention Agreement.

Additional requirements or assessments are at the discretion of the Railway's Chief Medical Officer.

4.3 Substance Dependence

DSM-IV-TR Diagnostic Criteria

A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:

(1) tolerance, as defined by either of the following:

(a) a need for markedly increased amounts of the substance to achieve intoxication or desired effect.

(b) markedly diminished effect with continued use of the same amount of the substance.

(2) withdrawal, as manifested by either of the following:

(a) the characteristic withdrawal syndrome for the substance.

(b) the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms.

(3) the substance is often taken in larger amounts or over a longer period than was intended.

(4) there is persistent desire or unsuccessful efforts to cut down or control substance use.

(5) a great deal of time is spent in activities necessary to obtain the substance, use the substance or recover from its effects.

(6) important social, occupational or recreational activities are given up or reduced because of substance use.

(7) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.

Medical Fitness for Duty

Individuals with a diagnosis of substance dependence may be considered medically fit for duty in a Safety Critical Position if the following conditions are met:

a) The individual has completed a residential (inpatient) substance use disorders treatment program. Residential treatment programs are preferred for individuals with a diagnosis of substance dependence as they often result in improved outcomes with a decreased risk of relapse.

   If a residential treatment program is not indicated or is not available, at the discretion of the Railway's Chief Medical Officer an outpatient substance use disorders treatment program may be an acceptable alternative.

b) The individual has remained abstinent from all substances for a minimum period of ninety days. The Railway's Chief Medical Officer may extend

this ninety-day period if there is supporting medical evidence that a longer period is indicated.

c) The individual is documented to be in compliance with all components of a substance use disorders Relapse Prevention Agreement.

d) The individual demonstrates ongoing compliance with all components of a substance use disorders Relapse Prevention Agreement for a minimum period of two years. The Railway's Chief Medical Officer may extend this two-year period if there is supporting medical evidence that a longer period is indicated.

e) The individual remains abstinent from the use of substances for the duration of their employment in a Safety Critical Position.

Medical Fitness for Duty Assessment

Written reports should be requested from the individual's healthcare providers.

At the discretion of the Railway's Chief Medical Officer an assessment by a Substance Abuse Professional, an Addiction Medicine Physician and/or a Psychiatrist may also be required. The components of a Comprehensive Substance Use Disorders Medical Assessment are summarized in Appendix IV.

Medical Fitness for Duty Monitoring

The medical fitness for duty monitoring for individuals with a diagnosis of substance dependence should include documented compliance with all components of a substance use disorders Relapse Prevention Agreement.

Following successful completion of their Relapse Prevention Agreement individuals should submit an annual report from their Treating Physician to the Railway's Chief Medical Officer verifying their ongoing abstinence. These annual reports should be submitted for a minimum period of five years.

Additional requirements or assessments are at the discretion of the Railway's Chief Medical Officer.

Appendix I - Rationale for using DSM-IV-TR and DSM-5 Diagnostic Criteria

The Railway Medical Guidelines for Substance Use Disorders were first introduced in the Canadian Railway Medical Rules Handbook in November 2004 and used the terminology contained in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR). With the introduction of these guidelines, the railway industry acknowledged substance use disorders as a significant and potentially impairing medical condition.

The principles contained in the original guidelines have stood the test of time and the Railway Medical Guidelines for Substance Use Disorders remain the accepted standard in the Canadian railway industry. They have also been recognized as a valuable resource by other industry sectors in Canada concerned with public safety.

Medical fitness for duty guidelines for the DSM-IV-TR diagnoses of substance abuse and substance dependence have been retained. The sections related to substance use disorders in the DSM-5 provided the opportunity to enhance the original guidelines by including medical fitness for duty guidelines for the DSM-5 diagnosis of mild substance use disorder.

A diagnosis using the criteria of both the DSM-IV-TR and the DSM-5 will now be a required component of the medical fitness for duty assessment process. The following support this approach:

- The DSM-5 only focuses on the current severity of problematic substance use and does not account for a previous DSM-IV-TR diagnosis of either substance abuse or substance dependence.

- Individuals with a DSM-5 diagnosis of mild substance use disorder may have a DSM-IV-TR diagnosis of substance abuse or substance dependence, which have different medical fitness for duty guidelines.

- Medical fitness for duty guidelines for a DSM-5 diagnosis of mild substance use disorder address the situation of an individual meeting only two of the DSM-IV-TR diagnostic criteria for substance dependence, not meeting the diagnostic criteria for substance abuse, yet still having a substance use disorder.

Appendix II provides a summary of the DSM-IV-TR and DSM-5 diagnostic criteria for substance use disorders.

Appendix II - Summary of DSM-IV-TR and DSM-5 Diagnostic Criteria for Substance Use Disorders

Criteria	DSM-IV-TR Substance Abuse 1 or more of 4	DSM-IV-TR Substance Dependence 3 or more of 7	DSM-5 Substance Use Disorder (Current Severity) Mild 2 – 3 Moderate 4 – 5 Severe 6 – 11
Recurrent use resulting in failure to fulfill major roles at work, school, or home	[ ]		[ ]
Recurrent use in physically hazardous situations	[ ]		[ ]
Recurrent substance-related legal problems	[ ]		N/A
Continued use despite persistent or recurrent social or interpersonal problems related to effects of the substance	[ ]		[ ]
Tolerance		[ ]	[ ]
Withdrawal		[ ]	[ ]
Taken in larger amounts or over a longer period than intended		[ ]	[ ]
Persistent desire or unsuccessful efforts to cut down or control use		[ ]	[ ]
Great deal of time spent to obtain, use or recover from effects		[ ]	[ ]
Important activities given up or reduced because of use		[ ]	[ ]
Continued use despite persistent or recurrent physical or psychological problems related to use		[ ]	[ ]
Craving or strong desire or urge to use	N/A	N/A	[ ]

Appendix III - Substance Use Disorders Relapse Prevention Agreement*

Canadian railway employees working in a Safety Critical Position operate or control the movement of trains. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

The medical reports and documents regarding your substance use disorder have been reviewed. This Relapse Prevention Agreement will assist you in maintaining your stable and abstinent recovery. It is also required to support your ongoing fitness for work in a Safety Critical Position.

You must review and acknowledge that you understand and agree to comply with all components of this Relapse Prevention Agreement.

The components of your Relapse Prevention Agreement include:

1. [*For Substance Abuse Select*]: Total abstinence from all legal, illegal or illicit drugs and other mood-altering substances (which includes alcohol, cannabis/cannabinoids, and any potentially addictive medications) for the duration of this Relapse Prevention Agreement.

   [*For Substance Dependence Select*]: Total abstinence from all legal, illegal or illicit drugs and other mood-altering substances (which includes alcohol, cannabis/cannabinoids, and any potentially addictive medications) for as long as you are working in a Safety Critical Position.

2. Relapse Prevention Program Counsellor meetings at a minimum of once a month.

3. Mutual Support Program meetings at a minimum of three times per week. These meetings are to be attended by you in person with attendance records to be provided to your Relapse Prevention Program Counsellor on request.

4. Maintenance of a substance use disorders sponsor.

5. Immediately notifying your Relapse Prevention Program Counsellor of any relapse behaviors, including the use of any prohibited substances including legal, illegal or illicit drugs and any other mood-altering substances.

6. Participation in a substance testing program.

7. Compliance with any recommended treatment program recommendations including the frequency of counseling and continuing care meetings.

8. Written reports from your healthcare providers, at the discretion of the Railway's Chief Medical Officer.

9. A duration of two years.

Incidences of non-compliance with the components of this Relapse Prevention Agreement will result in a review of your fitness to work.

Acknowledgement:

I acknowledge that I have read and understand, and agree to comply with, all components of this Relapse Prevention Agreement.

I consent for a copy of this Relapse Prevention Agreement to be forwarded to my Treating Physician.

_____
Name (printed)

_____ _____
Signature Date

_____ _____
Phone number(s) email address

*** This is a sample substance use disorders Relapse Prevention Agreement. It has been prepared to allow for a consistent and standardized approach. It can be modified at the discretion of the Railway's Chief Medical Officer.**

Appendix IV - Comprehensive Substance Use Disorders Medical Assessment

A Comprehensive Substance Use Disorders Medical Assessment should include the following:

1. Signed, informed consent, including permission to communicate all findings to the Railway's Chief Medical Officer.

2. A medical history, including:

   a) Past and current history of substance use.
   b) Past and current history of medical conditions associated with substance use disorders (e.g., hypertension, liver disease, pancreatitis, seizures, type 2 diabetes, etc…).
   c) Past and current history of psychiatric conditions associated with substance use disorders (e.g., anxiety disorders, depressive disorders, trauma- and stressor related disorders, etc…).
   d) Substance related injuries (e.g., motor vehicle accidents, fights, recreational injuries, etc…).

3. A psychosocial history, including family and relationship dysfunction.

4. A history of behaviors associated with substance use disorders, including:

   a) Retaining multiple doctors or pharmacies.
   b) Frequent changes in doctors or pharmacies.
   c) Missed medical appointments.
   d) Abusive or concerning interactions with medical office staff.
   e) Erratic or volatile emotions.
   f) Cigarette or tobacco use.
   g) Unexplained weight loss or weight gain.
   h) Frequent requests for notes for workplace absences.
   i) Early requests for psychoactive medication prescription refills.
   j) Requests for repeat prescriptions for opioids or benzodiazepines for acute, self-limiting conditions.
   k) Preference for short-acting opioids over sustained-release opioids.

l) Requests for cannabis/cannabinoids for medical purposes (e.g. medical marijuana).

5. An occupational history, including:

   a) Multiple jobs with different employers.
   b) Multiple job dismissals.
   c) Workplace absenteeism.
   d) Multiple workplace injuries.
   e) Presenteeism.

6. A pain evaluation, if indicated.

7. A review of systems to determine any co-morbid medical conditions.

8. A mental status examination including any indications of imminent or substantial risk of harm.

9. A physical examination focusing on signs of substance use, including:

   a) Odour of alcohol and/or cannabis.
   b) Advanced dental or periodontal disease.
   c) Advanced liver disease.
   d) Nasal cavity damage (e.g. cocaine use).
   e) Needle marks.

10. Substance use disorders assessment tools, including:

    a) Alcohol Use Disorders Identification Test (AUDIT).
    b) CAGE Questionnaire.
    c) Drug Abuse Screening Test (DAST)
    d) Cannabis Use Disorders Identification Test – Revised (CUDIT-R).

11. Laboratory investigations, including:

    a) Blood work (e.g. MCV, GGT, AST, ALT, uric acid, etc…).
    b) Urinalysis.
    c) Substance testing (e.g. breath alcohol, hair and/or urine testing, etc…).

12. Review of supplementary information, including:

    a) Collateral interviews.
    b) Review of collateral medical, legal and vocational documents.

13. A diagnostic formulation in accordance with both the DSM-IV-TR and the DSM-5.

14. Treatment recommendations.

15. A prognostic formulation.

4.9 – Sleep Disorders

Medical Fitness for Duty Guidelines for the Employment of Individuals with Sleep Disorders in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Canadian railway employees working in a Safety Critical Position operate or control the movement of trains. Physical and mental fitness is mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

The performance of Safety Critical Position duties requires a high level of alertness and vigilance. Impaired performance can result from sleep of inadequate continuity, duration, and/or quality. Sleep disorders have an adverse effect on sleep, which can negatively impact mental, physical, social and occupational functioning.

These sleep disorders guidelines focus on obstructive sleep apnea, central sleep apnea, narcolepsy and idiopathic hypersomnia. The Railway's Chief Medical Officer will determine the medical fitness for duty of individuals with sleep disorders not covered by these guidelines.

2. Medical Fitness for Duty Considerations

The following should be taken into consideration when assessing the medical The following should be taken into consideration when assessing the medical fitness for duty of an individual occupying a Safety Critical Position:

- The presence of a sleep disorder.
- The severity of the sleep disorder.
- The degree of impairment of alertness, attention, cognitive function, concentration, insight, judgement and memory related to the sleep disorder.
- The individual's compliance with treatment recommendations.
- The effectiveness or adverse effects of treatment.
- The potential for acute or gradual functional impairment.
- The predictability and reliability of the individual.
- Co-morbid medical conditions.

3. Definitions

- **Apnea-Hypopnea Index (AHI)** is the number of apneas and hypopneas per hour of sleep. Apnea is the cessation of breathing for 10 seconds or more. Hypopnea is a 30% or greater reduction in airflow from baseline that lasts at least 10 seconds and is accompanied by an arousal and/or at least 3% oxygen desaturation.

- **Home Sleep Apnea Test** is an unattended sleep study performed by an individual in their home using a home sleep apnea test device (portable monitor) to diagnose obstructive sleep apnea. It is also referred to as a level 3 sleep study.

- **Oral Appliances** are devices used to advance the mandible and/or keep the tongue in position to reduce airway obstruction.

- **Polysomnography** is an attended sleep study performed in a sleep laboratory. Sleep is recorded and staged by electroencephalography (brain waves), electro-oculography (eye movements), and electromyography (muscle activity). In addition, breathing, heart rate and rhythm, oxygen saturation, body position and snoring are recorded. It is also referred to as a level 1 sleep study.

- **Positive Airway Pressure (PAP) Devices** introduce positive pressure into the airway to keep it patent. They are used to treat sleep related breathing disorders. Positive airway pressure can be auto-titrating (Auto PAP), specific with inspiration and expiration (BiPAP or BPAP), continuous (CPAP) or it can provide auto-adjusting support (adaptive servo ventilation, ASV).

- **Respiratory Disturbance Index (RDI)** is the average number of respiratory disturbances (apneas, hypopneas, and respiratory event-related arousals) per hour.

- **Respiratory Event Index (REI)** can be considered synonymous with the respiratory disturbance index.

- **Sleep Apnea Event Indices** are used to assess the severity of sleep apnea and the response to treatment. These indices include the apnea-hypopnea index, the respiratory disturbance index and the respiratory event index.

- **Sleep Medicine Physician** refers to a Physician with formal training or accreditation in Sleep Medicine.

4. Medical Fitness for Duty Guidelines for Specific Sleep Disorders

4.1 Sleep Apnea

Types of Sleep Apnea

There are three types of sleep apnea: obstructive sleep apnea, central sleep apnea and a combination of both types referred to as mixed sleep apnea.

Severity of Sleep Apnea

For the purposes of these guidelines the severity of sleep apnea is classified as mild, moderate, or severe based on the results of a sleep study, interpreted by a Sleep Medicine Physician. The apnea-hypopnea index, the respiratory disturbance index, and the respiratory event index may all be reported on a sleep study. The interpreting Sleep Medicine Physician will consider the significance of each of these sleep apnea event indices in arriving at a sleep apnea diagnosis. The severity of sleep apnea is typically reported with 5 - < 15 events/hour considered to be mild, 15-30 events/hour considered to be moderate, and >30 events/hour considered to be severe. If the severity of sleep apnea is not reported by the interpreting Sleep Medicine Physician it should be requested by the Railway's Chief Medical Officer.

Risk to Safe Railway Operations

Symptoms of sleep apnea that constitute a risk to safe railway operations and directly impact fitness for duty include daytime sleepiness, fatigue, lack of concentration, cognitive deficits, mood changes, irritability, angina on awakening, and reports of a motor vehicle collision or near miss.

Snoring, breathing cessation during sleep, choking or gasping during sleep, nocturia, nonrestorative sleep, frequent awakenings (fragmented sleep), nocturnal restlessness, and vivid dreams are also associated with sleep apnea. Dry mouth or sore throat on awakening, morning headaches, and decreased libido and impotence are other indicators. Sleep apnea can also be associated with diabetes, metabolic dysfunction and an increased risk of cardiovascular disease and mortality.

The assessment of individuals for Safety Critical Positions should take into consideration the symptoms of sleep apnea and its related medical conditions, as their presence is an indication for further diagnostic evaluation.

Treatment Options

Treatment of sleep apnea depends on the type and severity and may include the use of a positive airway pressure device, the use of an oral appliance, lifestyle modification, or alternate therapies (e.g. upper airway surgery, hypoglossal nerve stimulation, and pharmacologic therapy).

Information on compliance and effectiveness of positive airway pressure therapy should be documented by obtaining data downloaded from the device. For sleep apnea treated with oral appliance therapy, devices with compliance monitoring capabilities are preferred.

4.1.1 Obstructive Sleep Apnea

Description

Obstructive sleep apnea is the most common type of sleep apnea. It is characterized by repetitive upper airway collapse and obstruction during sleep, which results in apneas, hypopneas, increased respiratory effort, intermittent hypoxemia, and arousals.

Screening for Obstructive Sleep Apnea

For the purpose of these guidelines, the accepted screening tool for obstructive sleep apnea is the STOP-Bang questionnaire© (See Appendix I). A score of ≥ 3 is an indication for further diagnostic evaluation with a sleep study.

Individuals with a previous diagnosis of asymptomatic mild obstructive sleep apnea that have had a ≥ 10% increase in their body weight or a ≥ 1 point increase on their STOP-Bang questionnaire© score should undergo a sleep study to determine if there has been a change in the severity of their obstructive sleep apnea.

Medical Fitness for Duty

Symptomatic Mild Obstructive Sleep Apnea

Individuals with symptomatic mild obstructive sleep apnea may be considered medically fit for duty in a Safety Critical Position if the following condition is met:

a) The individual is asymptomatic after recommended treatment.

Asymptomatic Moderate Obstructive Sleep Apnea

The medical fitness for duty of an individual with asymptomatic moderate obstructive sleep apnea will be determined by the Railway's Chief Medical Officer taking into consideration the results of the individual's sleep study and the recommendations of the interpreting Sleep Medicine Physician.

Symptomatic Moderate Obstructive Sleep Apnea and Severe Obstructive Sleep Apnea

Individuals with symptomatic moderate obstructive sleep apnea or individuals with severe obstructive sleep apnea may be considered medically fit for duty in a Safety Critical Position if all of the following conditions are met:

a) The individual is asymptomatic after recommended treatment.

b) The individual is compliant with recommended treatment for a minimum period of two continuous weeks.

   Acceptable compliance for positive airway pressure therapy is considered to be a minimum of 5 hours of positive airway pressure therapy when averaged over all recorded days (or equivalent 24-hour periods).

   The compliance goal for oral appliance therapy is regular use during the entire sleep period. Compliance should not be less than what is acceptable for positive airway pressure therapy.

c) The individual's reported apnea-hypopnea index is less than 5 after recommended treatment.

   or

   The individual's reported apnea-hypopnea index is less than 15 after recommended treatment and there has also been a greater than 50% improvement in the apnea-hypopnea index after recommended treatment.

Medical Fitness for Duty Assessment

As part of their fitness for duty assessment, individuals with a diagnosis of symptomatic mild obstructive sleep apnea or moderate or severe obstructive sleep apnea should be assessed by a Physician, and at the discretion of the Railway's Chief Medical Officer, by a Sleep Medicine Physician or by a Physician with competence in Sleep Medicine. This assessment should include an evaluation of compliance with recommended treatment and the effectiveness of recommended treatment. A written report, which is to include an opinion on the individual's medical fitness for duty in a Safety Critical Position, should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

An annual medical report documenting compliance and effectiveness of recommended treatment is required. The requirement for more frequent medical fitness for duty monitoring and follow up reports will be at the discretion of the Railway's Chief Medical Officer.

4.1.2 Central Sleep Apnea

Description

Central sleep apnea is characterized by repetitive airflow cessation or airflow reduction due to a lack of respiratory effort during sleep. Central sleep apnea can be classified as primary or secondary. Primary central sleep apnea has no clear or known etiology. Secondary central sleep apnea is associated with medical or neurological conditions, medication or substance use, or high-altitude periodic breathing. The diagnosis is confirmed by polysomnography.

Medical Fitness for Duty

Individuals with untreated symptomatic central sleep apnea are unfit to work in a Safety Critical Position.

Individuals with symptomatic central sleep apnea may be considered medically fit for duty in a Safety Critical Position if all of the following conditions are met:

a) The individual is asymptomatic after recommended treatment.

b) The individual is compliant with recommended treatment for a minimum period of two continuous weeks.

   Acceptable compliance for positive airway pressure therapy is considered to be a minimum of 5 hours of positive airway pressure therapy when averaged over all recorded days (or equivalent 24-hour periods).

c) The individual's reported apnea-hypopnea index is less than 5 after recommended treatment.

   or

   The individual's reported apnea-hypopnea index is less than 15 after recommended treatment and there has also been a greater than 50% improvement in the apnea-hypopnea index after recommended treatment.

Individuals with a diagnosis of secondary central sleep apnea should also be assessed for all contributing medical conditions. Established medical fitness for duty guidelines are to be applied for each medical condition.

Medical Fitness for Duty Assessment

As part of their fitness for duty assessment, individuals with a diagnosis of symptomatic mild central sleep apnea or moderate or severe central sleep apnea should be assessed by a Physician, and at the discretion of the Railway's Chief Medical Officer, by a Sleep Medicine Physician or by a Physician with competence in Sleep Medicine. This assessment should include an evaluation of compliance with recommended treatment and the effectiveness of recommended treatment. A written report, which is to include an opinion on the individual's medical fitness for duty in a Safety Critical Position, should be submitted to the Railway's Chief Medical Officer.

Medical Fitness for Duty Monitoring

An annual medical report documenting compliance and effectiveness of recommended treatment is required. The requirement for more frequent medical fitness for duty monitoring and follow up reports will be at the discretion of the Railway's Chief Medical Officer.

4.2 Central Disorders of Hypersomnolence

4.2.1 Narcolepsy

Description

Narcolepsy is a sleep disorder characterized by daily periods of an irrepressible need to sleep or daytime lapses into sleep (sleep attacks) for at least three months. Narcolepsy is associated with excessive daytime somnolence and signs of rapid eye movement (REM) - sleep dissociation or abnormal manifestations of rapid eye movement sleep. There are two types of narcolepsy - type 1 and type 2. The major difference is the presence of cataplexy in narcolepsy - type 1.

Medical Fitness for Duty

Individuals with a diagnosis of narcolepsy are unfit to work in a Safety Critical Position.

4.2.2 Idiopathic Hypersomnia

Description

Idiopathic hypersomnia is a rare sleep disorder characterized by chronic excessive daytime sleepiness with daily periods of irrepressible need to sleep or daytime lapses into sleep, without cataplexy, and which is not explained by another disorder or by medication or substance use. Individuals with this condition may experience difficulty arousing from nighttime sleep or daytime naps. Daytime naps are usually unrefreshing. Idiopathic hypersomnia is considered a long-lasting sleep disorder, however, spontaneous resolution has been reported.

Medical Fitness for Duty

Individuals with a diagnosis of idiopathic hypersomnia are unfit to work in a Safety Critical Position. In cases of spontaneous resolution, the determination of medical fitness for duty will be at the discretion of the Railway’s Chief Medical Officer.

Appendix I – STOP - Bang Questionnaire

The STOP-Bang questionnaire© is an eight-point screening tool to determine the risk for Obstructive Sleep Apnea. It has subjective and objective components with related questions, which have been modified for the purpose of these guidelines as outlined below:

1. Snoring

   Do you snore loudly (loud enough to be heard through closed doors or your bed-partner elbows you for snoring at night)?

2. Tired

   Do you often feel tired, fatigued, or sleepy during the daytime (such as falling asleep during driving or talking to someone)?

3. Observed

   Has anyone observed you stop breathing or choking/gasping during your sleep?

4. Pressure

   Do you have or are being treated for high blood pressure?

5. Body Mass Index greater than 35 kg/m^2?

   Body Mass Index calculation: weight (in kilograms)/height (in metres)^2

6. Age

   Are you older than 50?

7. Neck size as measured around the “Adams apple”

   For male, is your shirt collar 17 inches / 43 cm or larger?

   For female, is your shirt collar 16 inches / 41 cm or larger?

8. Gender

Male?

Each question is answered with a “yes” or “no”. A “yes” answer is 1 point.

The scores are interpreted as follows:

Low Risk for Obstructive Sleep Apnea:

Yes to 0 - 2 questions

Intermediate Risk for Obstructive Sleep Apnea:

Yes to 3 - 4 questions

High Risk for Obstructive Sleep Apnea:

Yes to 5 - 8 questions

or

Yes to 2 or more of 4 STOP questions + male gender

or

Yes to 2 or more of 4 STOP questions + BMI > 35 kg/m^2

or

Yes to 2 or more of 4 STOP questions + neck circumference 17 inches (43 cm) in males or 16 inches (41 cm) in females

For more information about the STOP-Bang questionnaire©, visit www.stopbang.ca.

Appendix II - Bibliography

Aarab, G. *et al.* (2011) 'Oral appliance therapy versus nasal continuous positive airway pressure in obstructive sleep apnea: a randomized, placebo-controlled trial.', *Respiration; international review of thoracic diseases*, 81(5), pp. 411–9. doi: 10.1159/000319595.

Benoist, L. *et al.* (2017) 'A randomized, controlled trial of positional therapy versus oral appliance therapy for position-dependent sleep apnea', *Sleep Medicine*. Elsevier, 34, pp. 109–117. doi: 10.1016/J.SLEEP.2017.01.024.

BIXLER, E. O. *et al.* (2001) 'Prevalence of Sleep-disordered Breathing in Women', *American Journal of Respiratory and Critical Care Medicine*. American Thoracic SocietyNew York, NY, 163(3), pp. 608–613. doi: 10.1164/ajrccm.163.3.9911064.

Carberry, J. C., Amatoury, J. and Eckert, D. J. (2018) 'Personalized Management Approach for OSA', *Chest*, 153(3), pp. 744–755. doi: 10.1016/j.chest.2017.06.011.

Chiu, H. Y. *et al.* (2017) 'Diagnostic accuracy of the Berlin questionnaire, STOP-BANG, STOP, and Epworth sleepiness scale in detecting obstructive sleep apnea: A bivariate meta-analysis', *Sleep Medicine Reviews*. W.B. Saunders Ltd, pp. 57–70. doi: 10.1016/j.smrv.2016.10.004.

Cistulli, P. A. *et al.* (2004) 'Treatment of snoring and obstructive sleep apnea with mandibular repositioning appliances.', *Sleep medicine reviews*, 8(6), pp. 443–57. doi: 10.1016/j.smrv.2004.04.002.

Dempsey, J. A. *et al.* (2010) 'Pathophysiology of Sleep Apnea', *Physiological Reviews*, 90(1), pp. 47–112. doi: 10.1152/physrev.00043.2008.

Epstein, L. J. *et al.* (2009) 'Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults.', *Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine*, 5(3), pp. 263–76. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19960649 (Accessed: 2 March 2019).

Ferguson, K. A. *et al.* (2006) 'Oral appliances for snoring and obstructive sleep apnea: a review.', *Sleep*, 29(2), pp. 244–62. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16494093 (Accessed: 26 March 2019).

Friedman, M. *et al.* (2016) 'Targeted hypoglossal nerve stimulation for the treatment of obstructive sleep apnea: Six-month results', *The Laryngoscope*, 126(11), pp. 2618–2623. doi: 10.1002/lary.25909.

Gagnadoux, F. *et al.* (2009) 'Titrated mandibular advancement versus positive airway pressure for sleep apnoea.', *The European respiratory journal*, 34(4), pp. 914–20. doi: 10.1183/09031936.00148208.

Hoffstein, V. *et al.* (1992) 'Treatment of obstructive sleep apnea with nasal continuous positive airway pressure. Patient compliance, perception of benefits, and side effects.', *The American review of respiratory disease*, 145(4 Pt 1), pp. 841–5. doi: 10.1164/ajrccm/145.4_Pt_1.841.

Ip, M. S. M. *et al.* (2001) 'A Community Study of Sleep-Disordered Breathing in Middle-aged Chinese Men in Hong Kong', *Chest*. Elsevier, 119(1), pp. 62–69. doi: 10.1378/chest.119.1.62.

Ip, S. *et al.* (2012a) 'Auto-titrating versus fixed continuous positive airway pressure for the treatment of obstructive sleep apnea: a systematic review with meta-analyses.', *Systematic reviews*. BioMed Central, 1, p. 20. doi: 10.1186/2046-4053-1-20.

Ip, S. *et al.* (2012b) 'Auto-titrating versus fixed continuous positive airway pressure for the treatment of obstructive sleep apnea: a systematic review with meta-analyses', *Systematic Reviews*, 1(1), p. 20. doi: 10.1186/2046-4053-1-20.

Jonas, D. E. *et al.* (2017) 'Screening for Obstructive Sleep Apnea in Adults: Evidence Report and Systematic Review for the US Preventive Services Task Force.', *JAMA*, 317(4), pp. 415–433. doi: 10.1001/jama.2016.19635.

Kim, JinKwan *et al.* (2004) 'Prevalence of Sleep-disordered Breathing in Middle-aged Korean Men and Women', *American Journal of Respiratory and Critical Care Medicine*. American Thoracic Society, 170(10), pp. 1108–1113. doi: 10.1164/rccm.200404-519OC.

Kryger, M. H. and Malhotra, A. (2019) *Management of obstructive sleep apnea in adults - UpToDate*, *UpToDate*. Available at: https://www.uptodate.com/contents/management-of-obstructive-sleep-apnea-in-adults?search=obstructive sleep apnea treatment&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H7 (Accessed: 26 March 2019).

Kuhn, E. *et al.* (2017) 'Effects of CPAP and Mandibular Advancement Devices on Health-Related Quality of Life in OSA', *Chest*, 151(4), pp. 786–794. doi: 10.1016/j.chest.2017.01.020.

Lim, J *et al.* (2004) 'Oral appliances for obstructive sleep apnoea.', *The Cochrane database of systematic reviews*. Edited by Jerome Lim. Chichester, UK: John Wiley & Sons, Ltd, (4), p. CD004435. doi: 10.1002/14651858.CD004435.pub2.

McDaid, C. *et al.* (2009) 'A systematic review of continuous positive airway pressure for obstructive sleep apnoea–hypopnoea syndrome', *Sleep Medicine Reviews*. W.B. Saunders, 13(6), pp. 427–436. doi: 10.1016/J.SMRV.2009.02.004.

Morgenthaler, T. I. *et al.* (2006) 'Practice Parameters for the Medical Therapy of Obstructive Sleep Apnea', *Sleep*. Oxford University Press, 29(8), pp. 1031–1035. doi: 10.1093/sleep/29.8.1031.

Nagappa, M. *et al.* (2015) 'Validation of the stop-bang questionnaire as a screening tool for obstructive sleep apnea among different populations: A systematic review and meta-Analysis', *PLoS ONE*. Public Library of Science, 10(12). doi: 10.1371/journal.pone.0143697.

'Obstructive Sleep Apnea, Adult' (2014) in *International Classification of Sleep Disorders*, pp. 53–62.

Povitz, M. *et al.* (2015) 'Prevalence of Sleep-disordered Breathing in Obese Patients with Chronic Hypoxemia. A Cross-Sectional Study.', *Annals of the American Thoracic Society*, 12(6), pp. 921–7. doi: 10.1513/AnnalsATS.201412-551OC.

Qaseem, A. *et al.* (2013) 'Management of Obstructive Sleep Apnea in Adults: A Clinical Practice Guideline From the American College of Physicians', *Annals of Internal Medicine*. American College of Physicians, 159(7), pp. 471–483. doi: 10.7326/0003-4819-159-7-201310010-00704.

Ramar, K. *et al.* (2015) 'Clinical Practice Guideline for the Treatment of Obstructive Sleep Apnea and Snoring with Oral Appliance Therapy: An Update for 2015', *Journal of Clinical Sleep Medicine*, 11(7), pp. 773–827. doi: 10.5664/jcsm.4858.

Randerath, W. J. *et al.* (no date) 'Non-CPAP therapies in obstructive sleep apnoea the European Respiratory Society task force on non-CPAP therapies in sleep apnoea'. doi: 10.1183/09031936.00099710.

Salord, N. *et al.* (2016) 'A Randomized Controlled Trial of Continuous Positive Airway Pressure on Glucose Tolerance in Obese Patients with Obstructive Sleep Apnea.', *Sleep*. Oxford University Press, 39(1), pp. 35–41. doi: 10.5665/sleep.5312.

Sharma, S. K. *et al.* (2006) 'Prevalence and Risk Factors of Obstructive Sleep Apnea Syndrome in a Population of Delhi, India', *Chest*. Elsevier, 130(1), pp. 149–156. doi: 10.1378/chest.130.1.149.

Steffen, A. *et al.* (2018) 'Outcome after one year of upper airway stimulation for obstructive sleep apnea in a multicenter German post-market study', *The Laryngoscope*, 128(2), pp. 509–515. doi: 10.1002/lary.26688.

Strollo, P. J. *et al.* (2014) 'Upper-Airway Stimulation for Obstructive Sleep Apnea', *New England Journal of Medicine*, 370(2), pp. 139–149. doi: 10.1056/NEJMoa1308659.

Sullivan, C E *et al.* (1981) 'Reversal of obstructive sleep apnoea by continuous positive airway pressure applied through the nares.', *Lancet (London, England)*, 1(8225), pp. 862–5.
Available at: http://www.ncbi.nlm.nih.gov/pubmed/6112294 (Accessed: 3 March 2019).

Sullivan, Colin E. *et al.* (1981) 'Reversal of Obstructive Sleep Apnoea by Continuous Positive Airway Pressure Applied Through the Nares.', *The Lancet*, 317(8225), pp. 862–865. Available at: https://ezproxy-prd.bodleian.ox.ac.uk:6335/S0140673681921401/1-s2.0-S0140673681921401-main.pdf?_tid=548334c3-61a4-4294-8a03-24bf6905d752&acdnat=1550532011_f47f2cb436ee63e99bab10d583793d34 (Accessed: 18 February 2019).

Tan, Y. K. *et al.* (2002) 'Mandibular advancement splints and continuous positive airway pressure in patients with obstructive sleep apnoea: a randomized cross-over trial.', *European journal of orthodontics*, 24(3), pp. 239–49. Available at: http://www.ncbi.nlm.nih.gov/pubmed/12143088 (Accessed: 26 March 2019).

Weaver, E. M. and Kapur, V. K. (2018) *Surgical treatment of obstructive sleep apnea in adults - UpToDate*, *UpToDate*. Available at: https://www.uptodate.com/contents/surgical-treatment-of-obstructive-sleep-apnea-in-adults?search=obstructive sleep apnea

treatment&topicRef=7695&source=see_link#H15956993 (Accessed: 27 March 2019).

Westbrook, P. R. (1990) 'Sleep disorders and upper airway obstruction in adults.', *Otolaryngologic clinics of North America*, 23(4), pp. 727–43. Available at: http://www.ncbi.nlm.nih.gov/pubmed/2199904 (Accessed: 25 February 2019).

White, D. P. (2005) 'Pathogenesis of Obstructive and Central Sleep Apnea', *American Journal of Respiratory and Critical Care Medicine*, 172(11), pp. 1363–1370. doi: 10.1164/rccm.200412-1631SO.

Young, T. *et al.* (1993) 'The Occurrence of Sleep-Disordered Breathing among Middle-Aged Adults', *New England Journal of Medicine*. Massachusetts Medical Society , 328(17), pp. 1230–1235. doi: 10.1056/NEJM199304293281704.

Young, T., Skatrud, J. and Peppard, P. E. (2004) 'Risk Factors for Obstructive Sleep Apnea in Adults', *JAMA*. American Medical Association, 291(16), p. 2013. doi: 10.1001/jama.291.16.2013.

4.10 – Therapeutic Opioids

Medical Guidelines for the Employment of Individuals Under Treatment with Therapeutic Opioids in Safety Critical Positions in the Canadian Railway Industry

1. Introduction

Railway employees who work in a Safety Critical Position (SCP) operate or control the movement of trains. Physical and mental fitness are mandatory. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment. Sudden impairment of their cognitive, sensory or motor functions can pose a serious threat to the safety of the railway operations. Therapeutic opioid use may affect these functions.

It had been postulated that opioid tolerant individuals using long-acting opioid(s) could develop normalization of their cognitive, sensory and motor functions. A 2009 guideline statement of the American Pain Society/American Academy of Pain Medicine on driving and work safety stated that:

"In the absence of signs or symptoms of impairment, there is no evidence that a patient maintained on stable doses of chronic opioid therapy (COT) should be restricted from driving".

Subsequently, the American College of Occupational and Environmental Medicine (ACOEM) conducted a thorough literature review on the subject and commented that the aforementioned 2009 Guideline statement did not provide references for original epidemiological studies. The results of the ACOEM literature review were published with Practice Guidelines in the Journal of Occupational and Environmental Medicine in July 2014 (Volume 56, Number 7)[1].

The following are excerpts from the ACOEM Practice Guidelines:

[1] Hegmann K, Weiss M, Bowden M, Branco F, DuBrueler K, Els C, Mandel S, McKinney DW, Miguel R, Mueller KL, Nadig RJ, Schaffer MI, Studt L, Talmage J, Travis RL, Winters T, Thiese MS, Harris JS. (2014) Opioids and Safety-sensitive Work: The ACOEM Practice Guidelines. JOEM 56:e46-53.

"Both weak and strong opioids have been consistently associated with increased risks of motor vehicle crashes (MVC) in all large epidemiological studies of working age adults sufficiently powered to detect motor vehicle crash risk with the risk estimates ranging from 29% to more than 800% increased risk..."

"… the ACOEM Evidence-based Practice Opioids Panel recommends preclusion of opioid use in safety-sensitive jobs."

Accordingly, and in contrast to the previous version of the Railway Association of Canada Railway Medical Guidelines for the Employment of Individuals Under Treatment with Therapeutic Opioids in Safety Critical Positions in the Canadian Railway Industry the current body of evidence does not support the safe use of opioids by individuals working in an SCP.

2. Scope

These Railway Medical Guidelines pertain only to individuals working in an SCP who have a medical condition that requires the use of an opioid.

3. Definitions

For the purpose of these Railway Medical Guidelines, the following definitions are applicable:

3.1 Opioid(s):

3.1.1 *Opioids* refer to both the naturally occurring opiates (i.e. medications / substances derived from opium, i.e. morphine, codeine, and heroin) as well as a large number of synthetic congeners, all of which mostly have morphine-like activity at receptors in the brain[2]. Synthetic opioids include compounds like tramadol, oxycodone, hydromorphone, fentanyl, meperidine, methadone, as well as buprenorphine, which is a partial agonist at the receptor.

[2] Ries R, Fiellin DA, Miller SC, Saitz R. (Eds) Principles of Addiction Medicine 5th Edition, 2014.

3.1.2 Different opioids vary in half-life[3] and are commercially available in a variety of immediate-release and slow-release formulations. This results in a wide variability in their duration of action.

3.1.3 The metabolism of opioids is impacted by a number of factors, which includes a variety of enzyme systems. The rate of metabolism and the risk of drug interactions with opioids are determined largely by which enzyme systems metabolize the opioid[4]. Medical conditions, degree of tolerance to opioids, medication use, alcohol use patterns, and individual differences in metabolism may result in a significant lack of predictability in opioid-related impairment, and hence occupational capacity and risk.

3.2 Occasional Use of an Opioid: Single administration of an opioid on an "as needed" basis.

3.3 Continuous Use of an Opioid: Regular, typically daily, opioid use.

4. Medical Fitness for Duty

4.1 Occasional Use

a) The occasional use of shorter-acting or immediate-release opioids in therapeutic doses may result in cognitive and performance impairment and occupational risk that is usually sufficiently mitigated 8 hours after the time of their last use.

b) The use of slow-release opioids, truly long-acting opioids (e.g. methadone and others), or high dose opioid use may result in impairment beyond 8 hours. In some cases, cognitive and performance impairment may persist even beyond 24 hours after the time of their last use.

c) Cognitive and performance deficits may persist beyond the period of time that an individual experiences therapeutic or adverse effects from the use of an opioid. Determination of whether an individual is experiencing adverse effects 8 hours after their last use of an opioid

[3] The amount of time for the concentration to drop to half of its initial value.

[4] Smith HS. Opioid Metabolism. Mayo Clin Proc. 2009;84:613–624.

may not be sufficiently sensitive to rule out ongoing cognitive or performance impairment.

d) An individual that has used an opioid cannot be relied upon to accurately determine the degree of their opioid-related cognitive or performance impairment and may underestimate the degree of their impairment.

e) Non-medically trained co-workers or supervisors cannot be relied upon to accurately determine the degree of an individual's opioid-related cognitive or performance impairment.

f) Opioid-related cognitive and performance impairment may occur even in individuals who have become tolerant to the use of opioid(s).

g) Guidelines for return to work in an SCP after the use of an opioid:

   i. In general, an individual under occasional treatment with a shorter-acting or immediate-release opioid cannot work in an SCP for a minimum period of 8 hours after the time of their last use. This period may be longer depending on the duration of action of the opioid, the dosage of the opioid, the use of other medications, and a variety of other factors.

   ii. An individual under occasional treatment with a long-acting opioid or a sustained-release opioid cannot work in an SCP for a minimum period of 24 hours after the time of their last use.

   iii. The use of transdermal patches may result in longer duration of impairment, especially as the skin may act as a reservoir.

   After removal of the patch, serum fentanyl concentrations decline gradually, falling about 50% in approximately 17 hours[5] (i.e. range: 13 to 22 hours). The drug should clear within 4-5 half-lives, i.e. 68 to 85 hours (2.8-3.5 days). An individual under treatment with fentanyl transdermal patch cannot work in an SCP for a minimum period of 4 days (96 hours) after the removal of the last skin patch.

[5] Duragesic Product Monograph, Health Canada http://webprod5.hc-sc.gc.ca/dpd-bdpp/info.do?code=76148&lang=eng (revised: November 17, 2015).

iv. The determination of the presence of cognitive or performance impairment should be conducted on an individualized basis.

4.2 Continuous Use

An individual under continuous treatment with any opioid cannot work in an SCP.

Section 5 - RAILWAY MEDICAL REPORT FORMS

5.1 - Overview

The Railway Medical Rules specify that medical assessments shall be done on persons prior to their commencement of employment in a Safety Critical Position, upon promotion or transfer to a Safety Critical Position and every five years until the age of forty, and every three years thereafter until retirement, or until that person is no longer employed in a Safety Critical Position. In support of this requirement for medical assessments, the Railway Association of Canada (RAC) Medical Advisory Group has developed medical report forms.

The medical report forms in this section have been prepared to assist railway companies in having a consistent and standardized approach to assessing fitness for duty for a Safety Critical Position. An Employment Medical Report form has been included at Section 5.2 that can be used for those persons being considered for a Safety Critical Position, either initial employment or upon promotion or transfer to a Safety Critical Position. Section 5.3 contains a Periodic Medical Report form that can be used for the periodic medical assessments done by a Physician for persons performing work in Safety Critical Positions.

Similar to the approach used for the Railway Medical Guidelines, the RAC Medical Advisory Group will review and update these report forms as needed to ensure they reflect accepted medical practices in Canada. Additional medical report forms may be developed as required.

5.2 - Employment Medical Report Form

PART 1 – CANDIDATE/EMPLOYEE INFORMATION (TO BE COMPLETED BY CANDIDATE/EMPLOYEE)

Position applied for: _____ Male ☐ Female ☐
Employee Number (if applicable): _____
Name:_____ Date of Birth: _____
Address: _____
Telephone: Home ( ) _____
Postal Code:_____ Work ( ) _____

Candidate's/Employee's Declaration and Consent for the Release of Medical Information

I, the undersigned, acknowledge that I may occupy a Safety Critical Position and I will report any medical condition, past or current, that may constitute a threat to safe railway operations.

I declare that the information that I have provided or will be providing to the examining physician is truthful and complete. I understand that if I knowingly have provided false information or have not declared a medical condition, past or current, I will be subject to action by the Railway Company up to and including dismissal.

I consent for any physician, hospital, medical clinic or other medical service provider to release to the Office of the Chief Medical Officer of the Railway Company any information concerning any medical condition, past or current, that may constitute a threat to safe railway operations. I also consent for representatives from the Office of the Chief Medical Officer to discuss any details of this assessment with my physician. I understand that this information will be reviewed for the purpose of making a fitness to work determination. This consent is valid for six months from the date of signature.

_____ _____ _____
Witness **Signature of Candidate/Employee** **Date**

PART 2 - PHYSICIAN STATEMENT, INFORMATION AND REPORTING GUIDELINES

This report will be used to make an assessment on an applicant's/employee's fitness to work and constitutes a third party service. In completing this report, please be thorough and write legibly. If you have any questions regarding any component of this form, call the toll free number listed below for assistance.

Applicant's/Employee's Name _____

Date of examination on which this report is based _____

Physician's Name (Print): _____

Address: _____

City/Province: _____ Postal Code: _____

I certify that the information which I have documented in this report is, to the best of my knowledge, correct.

_____
Physician's Signature

☐ Family Physician/General Practitioner
☐ Certified Specialist in_____

Telephone: ( ) _____
Fax : ( ) _____

The contents of this report are the property of the Railway Company.
Reports may be sent by regular mail or courier to:

FOR ASSISTANCE REGARDING ANY COMPONENT OF THIS REPORT, CALL TOLL FREE 1-xxx-xxx-xxxx

PART 3 – HEALTH QUESTIONNAIRE (TO BE COMPLETED BY APPLICANT/EMPLOYEE)

A: Current Activities

Do you presently have difficulty or are unable to do any of the following activities?

	Yes	No		Yes	No
Carrying, pushing or pulling up to 50 lb. (22kg)	☐	☐	Bending forward to floor level	☐	☐
Lifting up to 80 lb. (35kg)	☐	☐	Kneeling or crawling	☐	☐
Looking directly overhead	☐	☐	Climbing ladders	☐	☐
Neck rotation (e.g. shoulder checking while driving)	☐	☐	Climbing stairs	☐	☐
Reaching overhead with either arm	☐	☐	Activities requiring steady balance	☐	☐
Firm gripping or twisting using either hand	☐	☐	Working at heights (15 feet)	☐	☐
Fine movement or feeling with the fingers	☐	☐	Working night shifts/rotating/on-call	☐	☐
Prolonged standing or walking	☐	☐	Wearing personal safety equipment	☐	☐
Walking on uneven or sloped ground	☐	☐	Working in hot weather	☐	☐
Walking fast on level ground	☐	☐	Working in cold weather	☐	☐
In the last year, what has been your usual (weekly) sport, exercise, or outdoor activities?			Do you wear a brace or a splint for any activities? If yes, please describe:	☐	☐
In the last year, have you held a job that involves heavy physical work? If yes, please describe:_____	☐	☐	Have you ever had a claim for, or received benefits from, disability or workers' compensation for an absence of three weeks or more? If yes, please describe:_____	☐	☐

B: Current Health Problems

In the last year, have you had

	Yes	No	**Sleep Apnea**	Yes	No
Loss of consciousness or awareness?	☐	☐	Have you ever been diagnosed with sleep apnea?	☐	☐
Loss of vision?	☐	☐			
Double vision?	☐	☐	Have you had high blood pressure (hypertension)?	☐	☐
Balance disorder?	☐	☐			
Medical care for injuries to your muscles, bones or joints?	☐	☐	Have you been told you snore **most nights**?	☐	☐
Kidney stones?	☐	☐	Have you been told you choke, gasp, or stop breathing **most nights** while sleeping?	☐	☐
Any permanent disability?	☐	☐	(most nights = 5 to 7 nights a week)		

B: Current Health Problems (cont'd)

Drug and Medication Use	**Yes**	**No**
Do you currently smoke tobacco? If yes, how many packs per day? _____	☐	☐
Have you used marijuana or hashish in the last year? If yes, date last used_____	☐	☐
Have you ever used cocaine, crack, LSD, PCP, heroin, methamphetamine or other illegal drugs? If yes, date last used: _____	☐	☐
Have you ever been in a treatment program for alcohol or drug addiction? If yes, dates in program: _____	☐	☐
Has the use of alcohol or other drugs ever caused any problems in your life? (e.g. driving convictions, police encounters, injury to you or others, etc) If yes, please describe: _____ _____ _____	☐	☐
List all prescribed or over-the-counter medications you have used in the last 12 months: _____ _____ _____		

Medical Care	**Yes**	**No**
Do you have current health problem(s) that may:		
1. Require medical care or monitoring?	☐	☐
2. Require urgent attention while at work?	☐	☐
3. Affect your ability to regularly attend work?	☐	☐
If yes to any 'Medical Care' questions, please describe: _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____		

C: Past Health Problems

Have you ever had? **Heart Problems**	**Yes**	**No**
Chest pain? (e.g. angina)	☐	☐
Heart attack? (myocardial infarction)	☐	☐
Abnormal heartbeat or palpitations?	☐	☐
Abnormal heart tests? (e.g. ECG, exercise test)	☐	☐
Heart murmurs? (as an adult)	☐	☐
Other heart diseases?	☐	☐
Diseases of the blood vessels or circulation?	☐	☐

Nervous System Problems	**Yes**	**No**
Skull fractures or brain injury? (e.g. concussion)	☐	☐
Epilepsy, seizures or convulsions?	☐	☐
Stroke?	☐	☐
Narcolepsy or other sleep disorders?	☐	☐
Problems with nerves in your arms, legs or spine?	☐	☐
Movement or coordination disorders?	☐	☐
Other diseases of the brain or nervous system?	☐	☐
Headaches requiring prescription medication?	☐	☐

C: Past Health Problems (cont'd)

Have you ever had?

Breathing Problems	**Yes**	**No**
Asthma (as an adult)?	☐	☐
Tuberculosis?	☐	☐
Abnormal lung/ breathing test(s)?	☐	☐
Other lung diseases? (e.g., emphysema, chronic bronchitis, other lung infections)	☐	☐

Other Medical Problems	**Yes**	**No**
Kidney disease?	☐	☐
Hepatitis or jaundice (as an adult)?	☐	☐
Other digestive diseases?	☐	☐
Problems with muscles in your arms, legs or spine?	☐	☐
Diseases of your joints or bones? (e.g. arthritis)	☐	☐
Fibromyalgia or chronic fatigue syndrome?	☐	☐
Cancer of any type?	☐	☐
Severe allergic reactions? (e.g. foods, insect stings)	☐	☐
Diabetes or high blood sugar?	☐	☐
Low blood sugar (hypoglycemia)?	☐	☐
Severe frostbite to the hands or feet?	☐	☐
Reading or learning disorders?	☐	☐
Any surgery? If yes, when and why?	☐	☐

Vision and Hearing Problems	**Yes**	**No**
Cataracts?	☐	☐
Glaucoma?	☐	☐
Loss of vision in either eye?	☐	☐
Weak or 'lazy' eye?	☐	☐
Loss of hearing in either ear?	☐	☐
Other eye or ear disorders?	☐	☐

Mental Health Problems	**Yes**	**No**
Anxiety disorders?	☐	☐
Panic or phobic disorders?	☐	☐
Post-traumatic stress disorder?	☐	☐
Obsessive-compulsive disorder?	☐	☐
Depression?	☐	☐
Manic depression (bipolar) disorder?	☐	☐
Psychosis, delusions or schizophrenia?	☐	☐
Personality disorder?	☐	☐
Attention-deficit / hyperactivity disorder?	☐	☐
A mental health problem that required care in hospital? If yes, when and why?	☐	☐
Other mental health disorder(s)? If yes, please specify:	☐	☐

PART 4 – PHYSICIAN COMMENTS (PLEASE PROVIDE COMMENTS FOR ALL 'YES' ANSWERS IN PART 3

PART 5 – PHYSICAL EXAMINATION (TO BE COMPLETED BY PHYSICIAN)

A: General

Height	Weight	BP	Heart rate	Neck circumference (cm)

Normal	Abnormal	Item	Specific finding	Yes	No	Additional comments
☐	☐	Pupils	Cataracts	☐	☐	
☐	☐	Ocular movements	Diplopia or strabismus	☐	☐	
☐	☐	Ears				
☐	☐	Nose	Perforated septum	☐	☐	
☐	☐	Mouth & teeth				
☐	☐	Speech				
☐	☐	Neck	Neck masses or nodes	☐	☐	
☐	☐	Chest expansion				
☐	☐	Breath sounds				
☐	☐	Heart sounds	Murmurs	☐	☐	
☐	☐	Major arteries	Bruits	☐	☐	
☐	☐	Peripheral circulation				
☐	☐	Abdomen	Masses	☐	☐	
			Hernia (men only)	☐	☐	
☐	☐	Liver	Signs of liver disease	☐	☐	
☐	☐	Gait				
☐	☐	Balance				
☐	☐	Eye-hand coordination	Tremor	☐	☐	
☐	☐	Skin	Hand dermatitis	☐	☐	
			Injection track marks	☐	☐	
☐	☐	Cognition				
☐	☐	Mood				
☐	☐	Behaviour				

B: Musculoskeletal

Please asses problems noted in the 'Current Activities' section and note any reduced ROM, weakness, deformity, or joint instability

Normal	Item	Abnormal	Additional Comments
☐	Cervical spine	☐	
☐	Thoracic spine	☐	
☐	Lumbosacral spine	☐	
☐	Shoulders	☐	
☐	Elbows	☐	
☐	Wrists & hands	☐	
☐	Hips	☐	
☐	Knees	☐	
☐	Ankles & feet	☐	

	Yes	No
Are there any findings on your examination that require further assessment	☐	☐

If yes, what advice have you given to the candidate?

_____

PART 6 – PHYSICIAN'S FITNESS TO WORK OPINION (TO BE COMPLETED BY PHYSICIAN)

Based on the information provided by the candidate/employee and on his physical examination, he/she is considered: (check one category)

☐ Fit to work in the position applied for without restrictions

☐ Fit to work in the position applied for with the following restrictions:

List all restrictions: _____

_____

_____

_____

_____

☐ Temporarily unfit. Further medical information/evaluation is required

Please explain: _____

_____

_____

_____

_____

☐ Unfit to work in the position applied for

Please explain: _____

_____

_____

_____

_____

_____
Examining physician's name (print)

_____ _____
Examining physician's signature Date:

5.3 - Periodic Medical Report Form

PART 1 – Information for the physician

Canadian Railway employees working in Safety Critical Positions operate or control the movement of trains. Impaired performance due to a medical condition could result in a significant incident affecting the health and safety of employees, the public, property or the environment.

It is federally mandated by the Railway Safety Act that individuals in Safety Critical Positions undergo periodic medical assessments. This report is to be used to record the results of this medical assessment. The Office of the Chief Medical Officer will review the contents of this report, which in conjunction with supplementary information, will be used to determine this employee's ongoing fitness to work in a Safety Critical Position.

In completing this form, please be aware that the safety of the employee, their co-workers and the general public is at stake. Special attention should be devoted to medical conditions that may result in sudden mental or physical impairment or any condition that may potentially interfere with an employee's ability to perform their duties in a safe manner. In the case of chronic conditions, be aware that impairment may occur gradually. Under the Railway Safety Act, physicians have an obligation to notify the Office of the Chief Medical Officer if an individual occupying a Safety Critical Position has a medical condition that in their opinion is likely to pose a threat to safe railway operations.

See next page for information on payment for completing this form. Please write or print legibly.

PART 2 – Employee Information and Consent (to be completed by the employee)

Name:	Employee number:
Address:	Date of birth:
	Telephone numbers – Home: Work:
Postal Code:	Supervisor:

Employee's Consent for the Release of Medical Information to the Railway Company

I, the undersigned, acknowledge that I occupy a Safety Critical Position and I will report any medical condition that may constitute a threat to safe railway operations. I declare that the information that I have provided or will be providing to the physician completing this report is truthful and complete. I consent for the physician performing this periodic medical assessment to release to, and discuss information contained in this report with, the Office of the Chief Medical Officer. I also consent for representatives from the Office of the Chief Medical Officer to discuss any details of this assessment with my physician. I understand that this information will be reviewed for the purpose of making a fitness to work determination. This consent is valid for six months from the date of signature.

_____ _____

Current Position Signature of Employee Date

PLEASE WRITE LEGIBLY
FOR ASSISTANCE REGARDING ANY COMPONENT OF THIS REPORT, CALL 1-XXX-XXX-XXXX

PART 3 – Medical Assessment (to be completed by the physician)

For any "Yes" response, please elaborate in the space provided and enclose any relevant documentation. Particular attention should be made to any medical condition that may result in sudden impairment.
PLEASE NOTE: Shaded areas are physical examination sections to be completed.

A – VISION – Please complete all sections

History or evidence of:	Yes	No
(a) Reduced distance vision	☐	☐
(b) Reduced near vision	☐	☐
(c) Reduced field of vision	☐	☐
(d) Double vision	☐	☐
(e) Strabismus	☐	☐
(f) Impaired depth perception	☐	☐
(g) Deficient colour vision	☐	☐
(h) Disease(s) of the eye (cataracts, glaucoma, retinal disorders, trauma, etc)	☐	☐

If "Yes" to any of the above, please elaborate:

_____

Please include the results of Snellen visual acuities:

Distance vision – with visual correction (if any)
Right eye _____/_____
Left eye _____/_____

Near vision – with visual correction (if any)	Yes	No
At 40 cm., can this individual identify correctly all 5 letters in one of the series below? (Randomly select one of the six series of letters. If > one error, repeat using a second series of letters).	☐	☐

asxro vzonc saenr
rzvnu enuor aszxn

Indicate number of errors (if any) _____

Visual Fields (by confrontation method)

	Normal	Abnormal
Right eye	☐	☐
Left eye	☐	☐

B – HEARING

History or evidence of:	Yes	No
(a) Significant hearing loss? (enclose audiogram if available)	☐	☐

C – CENTRAL NERVOUS SYSTEM DISORDERS

History or evidence of:	Yes	No
(a) Seizure disorder or syncopal episode (s)?	☐	☐
(b) Other disease(s) of the nervous system? (e.g. disorders of coordination or muscle control, head injury, intracranial tumours, post-traumatic conditions, vestibular disorders etc.)	☐	☐

If "Yes" to any of the above, please elaborate:

_____

D – CARDIOVASCULAR DISORDERS

Blood pressure _____/_____ **Pulse** _____
(If > 140/90 please repeat)

Height _____ **Weight** _____

History or evidence of:	Yes	No
(a) Coronary artery disease	☐	☐
(b) Myocardial infarction(s) Indicate date(s) _____	☐	☐
(c) Cerebrovascular disease (aneurysm / stroke/TIAs, etc)	☐	☐
(d) Hypertension	☐	☐
(e) Aortic aneurysm	☐	☐
(f) Congestive heart failure	☐	☐
(g) Cardiac dysrhythmia	☐	☐
(h) Valvular heart disease	☐	☐
(i) Cardiomyopathy	☐	☐
(j) Heart transplant	☐	☐
(k)Any other cardiovascular disease not listed above	☐	☐

If "Yes" to any of the above, address the following 3 areas:
(1) Please elaborate_____
_____
_____

(2) Indicate Canadian Cardiovascular Society Functional Class (circle)

(b) Other disease(s) of the ear ☐ ☐ I - no limitations, II - mid, III - moderate, IV - severe
(acoustic neuroma, otosclerosis, tinnitus, etc.)
If "Yes", please elaborate: _____
_____

(3) Enclose relevant specialists report and the results of diagnostic test (ECG, echocardiogram, stress test, etc…) if available

PART 3 – Medical Assessment (to be completed by the physician) (cont'd)

E - ENDOCRINE DISORDERS — Yes ☐ No ☐

History or evidence of symptomatic metabolic disease? (e.g., diabetes, hypothyroidism, Cushing's Disease, Addison's Disease, pheochromocytoma, etc.)

If "Yes", please elaborate:

_____

_____

If there is a history of diabetes, please complete the following:

State onset of diabetes (approx. date): _____

Type of control:

Diet only ☐ Oral Medication ☐ Insulin ☐

Current medication(s) and dose: _____

_____

Has this individual had a hypoglycemic episode(s) within the last 12 months? ☐ ☐

If "Yes" please indicate date(s) of last hypoglycemic episode(s): ☐ ☐

_____

_____

History or evidence of hypoglycemic unawareness? ☐ ☐

If "Yes", please elaborate:

_____

F - RESPIRATORY DISORDERS — Yes ☐ No ☐

History or evidence of respiratory disease? (e.g., asthma, COPD, bronchitis, sarcoidosis, etc.) ☐ ☐

Does this individual smoke? (indicate packs, years) ☐ ☐

If "Yes", please elaborate:

_____

G - GASTROINTESTINAL/GENITOURINARY DISORDERS — Yes ☐ No ☐

History or evidence of significant gastrointestinal or genitourinary condition(s)? ☐ ☐

H - MUSCULOSKELETAL DISORDERS — Yes ☐ No ☐

History or evidence of significant musculoskeletal condition? (e.g., amputation of a limb, arthritis, significant major joint dysfunction, disease of the spine, etc.) ☐ ☐

If "Yes", please elaborate:

_____

_____

I - SUBSTANCE USE DISORDERS — Yes ☐ No ☐

History or evidence of abuse or dependence on alcohol, illegal drugs, medications, or other substances? ☐ ☐

Has the use of alcohol or other drugs (substances) ever caused any problems for this person? ☐ ☐

If "Yes", please elaborate:

_____

_____

J - MEDICATIONS

List all current medications including any over-the-counter and prescription medication(s):

Medication _____ **Dose** _____

K - PSYCHIATRIC/MENTAL DISORDERS

History or evidence of:	Yes	No
(a) Anxiety disorder(s)? (e.g., generalized anxiety, panic attack, phobias, etc.)	☐	☐
(b) Cognitive disorder(s)? (e.g., dementia, delirium, amnesia, etc.)	☐	☐
(c) Mood disorder(s)? (e.g., depression, manic, bipolar, etc.)	☐	☐
(d) Personality disorder(s) manifesting in anti-social, erratic or aggressive behaviour?	☐	☐
(e) Psychiatric/mental disorder(s) due to a general medical condition?	☐	☐
(f) Psychotic disorder(s)? (e.g., schizophrenia, delusional, unspecified, etc.)	☐	☐
(g) Any other psychiatric/mental disorder(s) not listed above?	☐	☐

If "Yes" to any of the above, please elaborate:

_____

Enclose relevant specialists reports if available.

L - SLEEP DISORDERS Yes No

History of established diagnosis of sleep apnea? ☐ ☐

If "No", please complete the following obstructive sleep apnea screening assessment:

Please measure neck circumference in centimeters

_____

History of hypertension? ☐ ☐

History of frequent* reported snoring? ☐ ☐

History of frequent* reported choking, gasping or witnessed apneas? ☐ ☐

*occurs on most nights (5/7 to 7/7)

History or evidence of other sleep disorder(s)? ☐
☐

If "Yes", please elaborate:

_____
_____
_____
_____
_____

Part 4 – Physician summary

1. In your medical opinion, does this individual have a medical condition that is likely to pose a threat to safe railway operations? Yes ☐ No ☐
2. Do you think that there is a need for further assessment in regards to your patient's fitness to work? Yes ☐ No ☐
3. Would you like to discuss this report with the Railway Company Physician? Yes ☐ No ☐
4. How long has this individual been your patient? _____

COMMENTS:

_____
_____
_____
_____

PART 5 - Physician Statement and Contact Information

This report will be used to make an assessment on an employee's fitness to work and constitutes a third party service. In completing this form, please be thorough and write legibly. If you have any questions regarding any component of this form, call the number listed below for assistance.

Employee's Name

_____

Date of medical visit on which this report is based

_____

I certify that the information contained in this report is, to the best of my knowledge, correct.

Physician's Name: _____ Telephone: ( ) _____

Address: _____ Fax: ( ) _____

_____

_____ Postal Code: _____

☐ Family Physician/General Practitioner

☐ or Certified Specialist in _____

Part 6 - Information Regarding Payment

The Railway Company agrees to pay to the physician a fee of $XX.XX. This fee is used as a guide. It is appreciated that in some circumstances a greater fee may be appropriate commensurate with the physician's time and the detail of the information provided. In such circumstances, a fee in accordance with the current provincial guidelines for uninsured services would be appropriate. No additional invoice is necessary. Please provide in the space below the person to whom the cheque should be made payable, and the address. **Reports may be sent by regular mail or courier to:**

INSERT ADDRESS OF RAILWAY COMPANY HERE

Person to whom the cheque should be made payable and the mailing address:

PLEASE WRITE LEGIBLY
FOR ASSISTANCE REGARDING ANY COMPONENT OF THIS REPORT,
CALL 1 - XXX - XXX - XXXX