

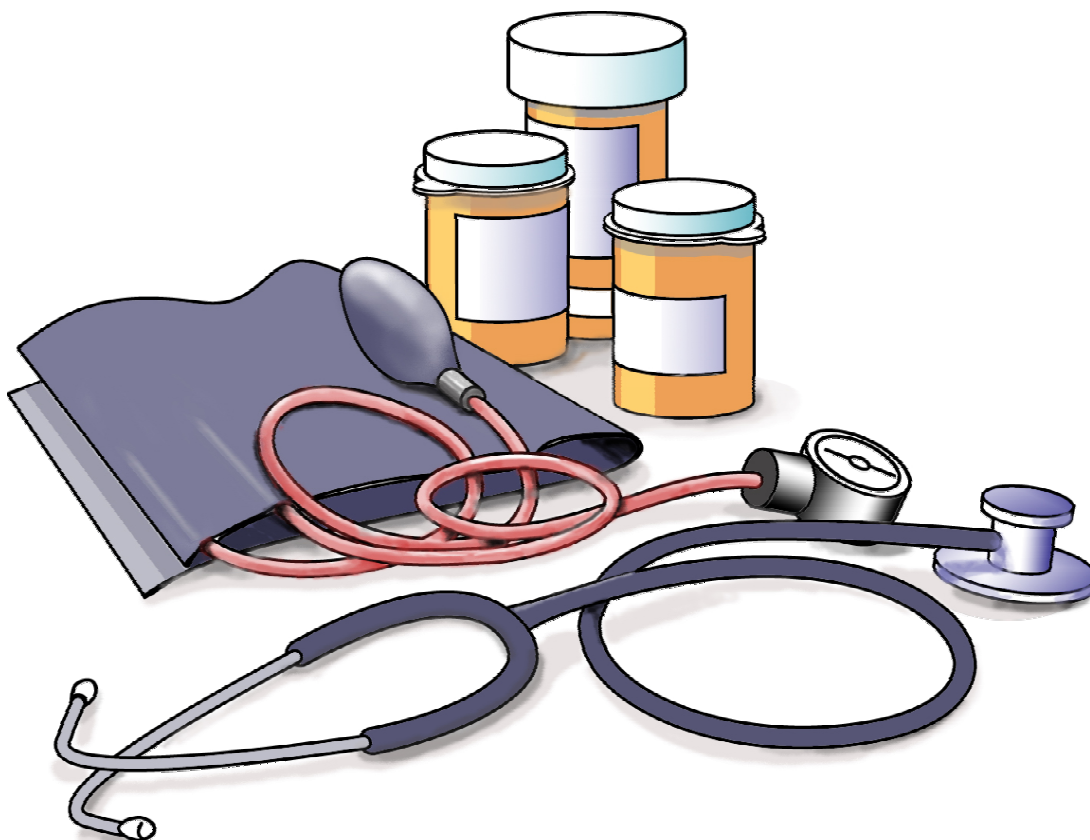


U.S. Department of
Transportation

**Federal Railroad
Administration**

Medical Standards for Railroad Workers

Office of Safety
Washington, DC 20590



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REPORT DOCUMENTATION PAGE			<i>Form Approved</i> OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE January 2005		3. REPORT TYPE AND DATES COVERED Final Report, Oct. 2003 – Sept. 2004
4. TITLE AND SUBTITLE Medical Standards for Railroad Workers			5. FUNDING NUMBERS	
6. AUTHOR(S) Judith Gertler, Natalie Hartenbaum, MD*, Alex Viale, Ellison Wittels, MD*, Sharon Henderson Ellis, Esq.*				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Foster-Miller, Inc. 350 Second Avenue Waltham, MA 02451-1196			8. PERFORMING ORGANIZATION REPORT NUMBER DFRA.040039	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Federal Railroad Administration Office of Safety Washington, DC 20590			10. SPONSORING/MONITORING AGENCY REPORT NUMBER DOT/FRA/RRS-05/01	
11. SUPPLEMENTARY NOTES *Consultant to Foster-Miller				
12a. DISTRIBUTION/AVAILABILITY STATEMENT This document is available to the public through the National Technical Information Service, Springfield, VA 22161.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This report provides information for the FRA to use in assessing the need for a medical standards program for railroad workers performing safety-sensitive functions and in determining an appropriate course of action. The study examined existing programs of three U.S. DOT modal administrations, five foreign programs and 12 railroads representing Class 1, regional/short line and commuter operators. Review of five different sources of accident and casualty data found several accidents and injuries where the medical condition of the employee was the probable or contributing cause. Over half of employee-on-duty fatalities in 2003 were due to medical conditions. The available medical literature on operator impairment consistently links performance impairment to fatigue, certain medications and hypoglycemia. Compatibility of a medical standards program with the Americans with Disabilities Act, the Railway Labor Act, Health Insurance Portability and Accountability Act regulations and existing labor agreements does not appear to be a problem. Based on the programs of the DOT modal administrations, foreign countries and existing railroad programs, options for the various components of a medical standards program are outlined. Three alternative models for FRA involvement in such a program are presented along with resource estimates. The study concludes that the FRA should proceed with development of a medical standards program and points out key issues that must be resolved.				
14. SUBJECT TERMS medical standard, safety-sensitive job, medical regulation, medical guideline, waiver, dispute resolution			15. NUMBER OF PAGES 211	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT None	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

METRIC/ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in)	=	2.5 centimeters (cm)
1 foot (ft)	=	30 centimeters (cm)
1 yard (yd)	=	0.9 meter (m)
1 mile (mi)	=	1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in ²)	=	6.5 square centimeters (cm ²)
1 square foot (sq ft, ft ²)	=	0.09 square meter (m ²)
1 square yard (sq yd, yd ²)	=	0.8 square meter (m ²)
1 square mile (sq mi, mi ²)	=	2.6 square kilometers (km ²)
1 acre = 0.4 hectare (ha)	=	4,000 square meters (m ²)

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1 pound (lb)	=	0.45 kilogram (kg)
1 short ton = 2,000 pounds (lb)	=	0.9 tonne (t)

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1 tablespoon (tbsp)	=	15 milliliters (ml)
1 fluid ounce (fl oz)	=	30 milliliters (ml)
1 cup (c)	=	0.24 liter (l)
1 pint (pt)	=	0.47 liter (l)
1 quart (qt)	=	0.96 liter (l)
1 gallon (gal)	=	3.8 liters (l)
1 cubic foot (cu ft, ft ³)	=	0.03 cubic meter (m ³)
1 cubic yard (cu yd, yd ³)	=	0.76 cubic meter (m ³)

TEMPERATURE (EXACT)

$$[(x-32)(5/9)]^{\circ}\text{F} = y^{\circ}\text{C}$$

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm)	=	0.04 inch (in)
1 centimeter (cm)	=	0.4 inch (in)
1 meter (m)	=	3.3 feet (ft)
1 meter (m)	=	1.1 yards (yd)
1 kilometer (km)	=	0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm ²)	=	0.16 square inch (sq in, in ²)
1 square meter (m ²)	=	1.2 square yards (sq yd, yd ²)
1 square kilometer (km ²)	=	0.4 square mile (sq mi, mi ²)
10,000 square meters (m ²)	=	1 hectare (ha) = 2.5 acres

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1 gram (gm)	=	0.036 ounce (oz)
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1 tonne (t)	=	1,000 kilograms (kg)
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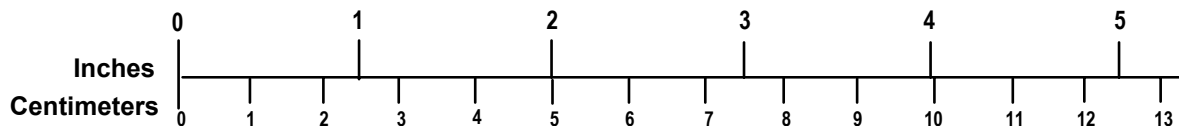
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1 liter (l)	=	1.06 quarts (qt)
1 liter (l)	=	0.26 gallon (gal)
1 cubic meter (m ³)	=	36 cubic feet (cu ft, ft ³)
1 cubic meter (m ³)	=	1.3 cubic yards (cu yd, yd ³)

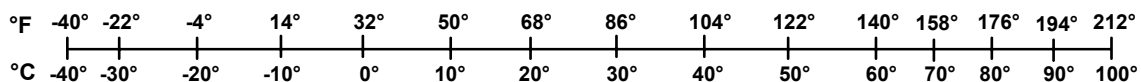
TEMPERATURE (EXACT)

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Updated 6/17/98

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Acknowledgements

This report presents the results of a study to investigate the feasibility of implementing a medical standards program for U.S. railroad workers. The Federal Railroad Administration (FRA) Office of Safety funded this work under contract DTFR53-01-D-00029. Throughout the study Mr. Alan Misiaszek, the FRA COTR, provided guidance and encouragement to the study team. Mr. Grady Cothen, FRA Acting Administrator for Safety, provided the overall agency perspective for the study.

Other FRA Office of Safety staff members provided the study team with data and information that made the work possible. Mr. Stan Ellis summarized relevant data from the FRA Accident/Incident and Injury/Illness databases. Mr. Lamar Allen provided information on employee drug usage and accidents. Mr. Douglas Taylor and Mr. John Conklin provided information about development of the FRA regulations for vision and hearing screening. Mr. John Murphy, Esq., suggested sources for information regarding labor agreements. Mr. Alan Nagler, Esq., provided information about the Locomotive Engineer Review Board. Mr. Rick Narvell of NTSB helped in identifying railroad accidents related to medical condition of the employee.

Much of the information in this report was obtained through personal contact with representatives of U.S. railroads and officials from the DOT modal administrations. Railroad oversight agencies in Canada, Australia and the U.K. also spoke with the study team and provided valuable information about their approaches to medical standards for railroad workers. A representative of the UIMC (Union Internationale des Services Médicaux des Chemins de fer), an international organization of railroad medical officers, provided information on the group's medical standards. The authors gratefully acknowledge the time that representatives of these organizations spent answering our questions, providing documents and reviewing our written descriptions of their programs.

Special thanks are extended to Ms. Susan McDonough of Foster-Miller who assisted with the organization and formatting of this report and to Ms. Faith Caldron of Foster-Miller who translated the Mexican regulations from Spanish to English.

Executive Summary

Failure to recognize potentially incapacitating medical conditions can have serious safety consequences for railroad employees, the railroads and the public. Conditions such as seizure disorders, cardiovascular disease and sleep disorders, as well as some prescription and over-the-counter medications, may put the employee at risk of being unable to perform his or her safety-critical job. Several modes of transportation in the U.S., in particular motor carrier, aviation and maritime, have regulations and a government-mandated process in place to minimize the risk of an employee performing a job in the presence of a medical condition or medication that has the risk of compromising the employee's ability to safely carry out the requirements of the job. Recommendations from a National Transportation Safety Board (NTSB) investigation of a serious train accident resulting from the medical condition of the employees led the Federal Railroad Administration (FRA) to examine the need to adopt more rigorous medical standards for railroad workers with safety-sensitive functions, as defined by 49 C.F.R. § 209.303.

In addition to the NTSB's recommendations with regard to a medical standards program for railroad workers, the demographics of the U.S. railroad workforce justify the need for such a program. The U.S. railroad workforce is an aging one. Over 60 percent are between the ages of 45 and 64. Epidemiological data from the National Center for Health Statistics indicates that 13.7 percent of males in this age range have heart disease and over 28 percent have hypertension. Both of these conditions are associated with increased risk of sudden incapacitation. An adult population is also susceptible to sleep disorders. The National Sleep Foundation estimates that 4 percent of middle-aged men and 2 percent of middle-aged women experience excessive daytime sleepiness resulting from sleep apnea. Sleep disorders are also associated with increased risk of sudden incapacitation.

This report provides information for the FRA to use in assessing the need for a medical standards program and determining an appropriate course of action for the railroad industry. The objectives of the work described in this report were to:

- Assemble information to assess the need for medical standards in the U.S. railroad industry.
- Formulate options for a medical standards program.
- Make recommendations on the feasibility and need for a medical standards program for the U.S. railroad industry.

The work described in this report had three phases: 1) information gathering, 2) analysis and 3) formulation of recommendations. Assembling relevant data involved literature search and review, structured interviews with medical and administrative personnel from relevant agencies and railroads, analysis of FRA and National Transportation Safety Board accident and injury reports, and review of dispute resolution provisions of current labor agreements. The analysis phase involved comparing the existing FRA medical standards program for vision and hearing with programs of the other U.S. Department of Transportation (DOT) modal administrations and with five foreign programs. Options for various aspects of a medical standards program were defined based on existing U.S. railroad industry practices and the examples provided by foreign programs and the other modes of transportation. This phase also included defining alternative

medical standards program models and estimating the resource requirements for each. The final phase focused on drawing conclusions and formulating recommendations.

The study examined existing programs of three U.S. DOT modal administrations, five foreign rail oversight agencies/organizations, and a total of 12 railroads representing Class 1, regional/short line and commuter operators. Table 1 provides the names of the organizations that provided information for this study.

Table 1. Organizations contacted regarding medical standards programs

Category	Organizations
U.S. DOT modal administrations	Federal Aviation Administration (FAA), Federal Motor Carrier Safety Administration (FMCSA), U.S. Coast Guard (USCG) ¹
Foreign railroad oversight agencies/organizations	Transport Canada, National Transport Commission (Australia), Rail Safety and Standards Board (U.K.), Secretaria de Comunicaciones y Transportes (Mexico), Union Internationale des Services Médicaux des Chemins de fer
Class 1 railroads	Burlington Northern Santa Fe Railway, CSX Transportation, Kansas City Southern Railroad, Norfolk Southern Railroad, Union Pacific Railroad
Commuter railroads	Metro-North Railroad, NJTransit
Short line/regional railroads	Belt Railway of Chicago, Florida East Coast Railway, holding company ² , Montana Rail Link, RailAmerica

DOT Modal Administrations

Three DOT modal administrations have medical standards programs that are more extensive than the current FRA vision and hearing requirements. The FAA programs for pilots and air traffic control specialists are the most comprehensive and most centralized within the agency. Only FAA-certified aviation medical examiners may issue medical certificates. In contrast, FMCSA and the Coast Guard permit any health care provider who is permitted to perform independent examinations by their state license, to perform their exams. The FAA program is the most resource intensive. All three modal administrations have a procedure for determining if an employee who does not meet some regulations/guidelines can work. The process for pilots includes appeal to the NTSB. All agencies provide some level of guidance to their examiners.

Foreign Medical Standards Programs

All foreign programs reviewed have more extensive medical standards programs for their railroad workers than the U.S. The Mexican program is the most centralized with the Secretaria

¹ As of March 1, 2003, the U.S. Coast Guard is part of the U.S. Department of Homeland Security.

² One railroad requested that it not be identified by name.

de Comunicaciones y Transportes overseeing all modes of transportation and requiring daily fitness-to-work exams as well as periodic medical evaluations by government appointed physicians. The Australian, Canadian and U.K. programs allow railroads to select the examiners and make the final determination of medical fitness. There is no waiver process in these countries although Mexico does allow the de-certified employee to request a re-examination. The Australian program went into effect in July 2004. It includes a process that each railroad must use to identify its safety-sensitive positions. In contrast, the programs in the other countries cover all engineers, conductors, brakemen and dispatchers. Railroads from 28 countries, primarily in Europe, have medical standards programs that meet the minimal standards of medical fitness adopted by the Union Internationale des Services Médicaux des Chemins de fer.

Current Industry Practices

Existing medical practices of the 12 U.S. railroads reviewed have several similar aspects. In addition to the tri-annual vision and hearing examinations, all require a medical examination on three occasions: 1) post-offer, 2) upon promotion to a safety-critical position, and 3) when medical fitness-to-work is questioned. In addition, return-to-work following a medical leave of absence requires review of the treating physician's report and, in some instances, a medical examination by a company-selected physician. A review of 35 labor agreements on file with the National Mediation Board found that none of the agreements establish when medical examinations could be required although each indicates they are normally given upon an employee's return-to-work from a medical leave of absence. Beyond this, current practices vary from railroad to railroad. Only three railroads require periodic medical examinations that go beyond the current tri-annual vision and hearing screening for engineers. Most railroads do not have written standards. Some provide a copy of the employee's job description to the medical examiner and others do not. No railroad clearly defines the medical conditions and prescription drugs that safety-sensitive employees must report to the railroad. One railroad does provide an 800 number that employees and their health care providers can call for advice on this issue.

Accident and Casualty Data

Five sources of accident and casualty data were examined: NTSB railroad accident reports, FRA Accident/Incident data, FRA Illness/Injury data, FRA Employee-on-Duty Fatality reports, and FRA survey data on use of prescription and over-the-counter drugs.

- *NTSB* - From 1989 to 2003, NTSB accident investigations included two cases in which medical condition of a crew member was the probable cause of the accident. In two other accidents, NTSB believed that medical condition was related to probable cause, but not the probable cause itself. In a fifth case, the NTSB discovered undiagnosed medical conditions that did create a safety risk.
- *FRA Accident/Incident data* - Review of FRA Accident/Incident data for the period 1989-2003 identified 50 accidents/incidents in which the physical condition of the employee was the primary cause. Three of these had clear medical causes. In 41 cases the employee fell asleep but it is not possible to determine if this was due to lack of sleep or an underlying medical problem. The remainder were due to "Impairment of efficiency or judgment due to drugs or alcohol." In addition, there were 31 FRA reportable accidents since 1989 where employee physical condition was the secondary cause. Seventeen of these are linked to drug and alcohol use, one was from incapacitation due to injury or

illness, nine were categorized as “employee asleep,” and four were categorized as “employee physical condition/other.”

- *FRA Injury/Illness data* – Since the FRA began collecting detailed injury/illness data in 1997, there have been 975 instances linked to substance use or physical condition and fatigue. Five were positively related to medical condition, 30 were questionably related, and the remaining 940 are incomplete or unclear.
- *Employee-on-duty fatalities* – The FRA Office of Safety report on employee-on-duty fatalities indicates that of the 36 employee-on-duty fatalities in 2003, 20 (56 percent) were due to medical conditions, primarily heart attacks. These employees ranged in age from 47 to 74.
- *Use of prescription and over-the-counter drugs* – Review of data collected by FRA field accident investigators between April 2002 and July 2004 for human factors caused accidents indicates that 10 percent of the employees involved in these accidents were taking prescription and over-the-counter medications that have the potential to impair cognitive function.

While there have been few accidents where the medical condition of the employee was clearly the cause of the accident, a medical standards program requiring periodic medical examinations likely would have identified the condition that caused these accidents. The significant proportion of employee-on-duty fatalities due to medical conditions indicates that there may be significant risk of an employee performing a safety-sensitive function becoming incapacitated.

Medical Literature Review

The majority of the medical literature on operator impairment focuses on automobile drivers and commercial motor vehicle operators. There is limited literature from the aviation community and none for railroad environments. The available medical literature consistently links performance impairment to sleep disorders, certain medications and hypoglycemia. There is some evidence that other medical conditions, such as seizures and heart disease impair performance. There is also a relationship between the risk of impairment or sudden incapacitation and poorly controlled medical or end stage conditions. The medical literature also documents that both individuals and their health care providers are often unable to judge the degree of impairment. In many cases health care providers are not aware of the safety-sensitive work of their patients or existing regulations and standards, particularly with regard to driving.

Legal Considerations

Any medical standards program for railroad workers must comply with the Railway Labor Act, the Americans with Disabilities Act (ADA), the recently implemented Health Insurance Portability and Accountability Act (HIPAA) regulations, and in so far as possible, existing labor agreements. The Railway Labor Act requires that wages, hours and conditions of employment be collectively bargained between management and the various unions representing railroad employees. Union participation in the development of a medical standards program will comply with any obligations under the Railway Labor Act and will facilitate acceptance in future negotiations.

The ADA prohibits discrimination against “qualified individuals with a disability.” A disability is a physical or mental impairment or disorder that substantially limits the person’s ability to

perform a “major life activity” such as seeing, working, hearing, etc. Many courts have taken a restrictive view of what qualifies as a “major life activity” resulting in findings of no disability. In addition, courts have consistently found that safety considerations that are required for the essential functions of the job limit ADA application as a matter of law. However, under the ADA, only those who pose a direct threat of substantial harm can be disqualified.

Many existing labor agreements provide for a tripartite medical panel to resolve disputed medical issues. This panel consists of one physician chosen by the employer, one chosen by the employee and a third agreed to by both the employee and the employer. Some agreements further require that the neutral third physician be a specialist in the relevant medical problem, and some require that the neutral physician be familiar with the nature of the employee’s job. This dispute resolution process could be used to resolve issues arising from a comprehensive medical standards program. It is possible that the existing grievance/arbitration process could be used in cases where the employee does not meet the medical regulations/guidelines but believes, due to unique circumstances, s/he should be allowed to continue in his/her present position or a similar one.

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) should not be an impediment to new medical standards in the railroad industry. If an FRA regulation requires periodic medical examinations, then HIPAA would permit the medical examiner to provide the results of the examination to the railroad and/or the FRA.

Program Options

The medical standards programs of the U.S. DOT modal administrations and foreign countries suggest a number of options that could be incorporated into an FRA medical standards program. In some cases the appropriate option is clear, but in others the choice is not as clear cut, and will require input from stakeholders to make a decision. Table 2 summarizes the latter group of components along with the options for each program component. The medical criteria should be contained in regulations that are supported by guidelines. These guidelines should be developed by medical specialists, either railroad medical specialists or an independent panel of medical specialists. The medical standards from the DOT modal administrations and the foreign railroad oversight agencies, as well as the Railroad Retirement Board disability criteria, provide a basis for developing U.S. railroad standards.

Resource requirements will be a function of the level of involvement that the FRA has in the overall medical standards program. While it is difficult to make a precise resource estimate until decisions on all program components have been made, it is possible to estimate the FRA staffing levels for three alternative levels of FRA involvement. All three models assume that 1) there are generally stated regulations with more specific guidelines, 2) the FRA convenes a panel of medical specialists to draft the medical guidelines, and 3) existing dispute resolution mechanisms, specifically the tripartite panel and arbitration, are used. Table 3 summarizes the three options along with their corresponding staffing requirements.

Table 2. Medical standards program components requiring input from stakeholders

Component	Options
Positions covered	<ol style="list-style-type: none"> 1. All functions defined as safety-sensitive by 49 C.F.R. § 209.303 2. Require each railroad to conduct a risk analysis to identify covered functions 3. All positions defined as safety-sensitive by 49 C.F.R. § 209.303 with procedure available for a railroad to justify otherwise
Development of medical criteria	<ol style="list-style-type: none"> 1. Done by railroad medical specialists 2. Done by independent panel of medical specialists
Timing of examinations	<ol style="list-style-type: none"> 1. At fixed interval 2. Interval based on age
Examiners	<ol style="list-style-type: none"> 1. Any health care professional licensed to perform medical examination 2. Physician only <hr/> <ol style="list-style-type: none"> 1. Examiners trained and certified by organization that is approved by the FRA 2. Examiners, with knowledge of railroading, selected by the railroad
Waivers	<ol style="list-style-type: none"> 1. FRA Medical Officer grants waiver 2. FRA Medical Review Board grants waiver 3. Railroad CMO makes decision in accordance with guidelines
Transferability of medical certification	<ol style="list-style-type: none"> 1. Medical certification for current employer only 2. Medical certification for railroad industry 3. Medical certification for railroad industry but employer may request re-examination
Audit of examinations	<ol style="list-style-type: none"> 1. Allow railroad personnel to do quality control on their examiners 2. Third party administrator hired by railroad does quality control

Conclusions

Review of the information summarized above led to the following conclusions:

- There is a need for a consistent industry-wide medical standards program.
- The U.S. railroad medical standards program is significantly less comprehensive than that of other DOT modal administrations and foreign countries.
- There have been several accidents and injuries due to medical condition of the employee. A medical standards program could likely have prevented these accidents.
- The medical literature supports performance impairment from sleep disorders, hypoglycemia and certain medications. There is some support for other conditions.
- Individuals and health care providers are often unable to assess the degree of impairment.
- Health care providers are often unaware of regulations and guidelines regarding medical conditions and risk of incapacitation.
- Existing railroad industry processes, and regulations and guidelines from the DOT modal administrations and other countries provide a basis for development of a U.S. program.

Table 3. Alternative models of FRA involvement in medical standards program and corresponding staffing requirements

	Model		
	A	B	C
Certify examiners	✓	Audit process	Audit process
Review results of exams	✓		
Review and permit employees not meeting regulations/guidelines to work	✓	✓	
Advise on resources examiner should use in making determination	✓	✓	
Convene medical panel to develop initial guidelines and update periodically	✓	✓	✓
Perform process oversight	✓	✓	✓
Staffing	3 form reviewers (non-medical) 10 support staff 1 manager, examiner certification 330 medical examiners 1 part-time physician in each region to review examination results	1 FRA Medical Program Manager (not an MD) 1 FRA Medical Officer (full-time for 6 months until program is set up, then part-time) 1.5 full-time equivalent support staff	1 FRA Medical Program Manager (not an MD) 1 support staff

- The existence of a medical standards program will provide consistency across the industry and will reduce the risk of accidents due to the sudden incapacitation of an employee.

Recommendations

- The FRA should expedite development to the extent possible.
- The FRA should identify a group, such as the Railroad Safety Advisory Committee (RSAC)³, representing stakeholders to recommend the program structure.
- The program should have generally stated regulations with more specific supporting guidelines.

³ RSAC consists of representatives from all of FRA's major customer groups. This committee develops consensus recommendations for rulemakings and other safety program issues.

- The program should build on existing resources and processes to facilitate program development and implementation.
- The program must assure that examiners understand the safety-sensitive functions of railroad jobs.

Critical Issues

The process of developing options for the program components identified several key issues that must be addressed by the group that designs the medical standards program. These issues are the following:

- What options are available for employees not meeting new criteria at program inception?
- What can be challenged and what process is used for dispute resolution?
- What is the scope of the medical standards?

1. Introduction

Failure to recognize potentially incapacitating medical conditions can have serious safety consequences for railroad employees, the railroads and the public. Conditions, such as seizure disorders, cardiovascular disease and sleep disorders, as well as some prescription and over-the-counter medications, may put the employee at risk of being unable to perform his or her safety-sensitive function. Several modes of transportation in the U.S., in particular motor carrier, aviation and maritime, have regulations and a government-mandated process in place to minimize the risk of an employee performing a job in the presence of a medical condition or medication that has the risk of compromising the employee's ability to safely carry out the requirements of the job. Prompted by a fatal accident involving two Canadian National/Illinois Central trains, the Federal Railroad Administration (FRA) is now examining the need to adopt more rigorous medical standards in the railroad industry. This report provides information for the FRA to use in assessing this need and determining an appropriate course of action for the railroad industry.

1.1 Background

The FRA has many safety regulations governing the safety of both passenger and freight railroad operations. However, with the exception of vision and hearing standards for locomotive engineers, these regulations do not address the medical condition of the employee. In contrast to other modes of transportation, these medical standards are limited in scope and apply to only one group of safety-sensitive employees.

In November 2001 two Canadian National/Illinois Central Railway trains collided near Clarkston, Michigan. One of the trains approaching the mainline from a siding did not stop before proceeding onto the mainline track and collided with the oncoming train on the mainline. The National Transportation Safety Board (NTSB) investigation found the probable cause of this accident to be the fatigue of the crewmembers on the train that approached from the siding. Further, this fatigue was primarily due to the engineer's untreated and the conductor's insufficiently treated obstructive sleep apnea. (Sleep apnea is a sleep disorder involving cessation of breathing and disrupted sleep. The lack of continuous nighttime sleep may lead to excessive daytime sleepiness.) As a result of its investigation of this accident, the NTSB made the following recommendations to the FRA:⁴

- Develop a standard medical examination form that includes questions regarding sleep problems and require that the form be used, pursuant to 49 *Code of Federal Regulations* Part 240, to determine the medical fitness of locomotive engineers; the form should also be available for use to determine the medical fitness of other employees in safety-sensitive positions.

⁴ *Railroad Accident Report: Collision of Two Canadian National/Illinois Central Railway Trains Near Clarkston, Michigan, November 15, 2001.* (NTSB Report No. NTSB/RAR-02/04). Washington, DC: National Transportation Safety Board.

- Require that any medical condition that could incapacitate, or seriously impair the performance of, an employee in a safety-sensitive position be reported to the railroad in a timely manner.
- Require that, when a railroad becomes aware that an employee in a safety-sensitive position has a potentially incapacitating or performance-impairing medical condition, the railroad prohibit that employee from performing any safety-sensitive duties until the railroad's designated physician determines that the employee can continue to work safely in a safety-sensitive position.

There have been other instances in which the NTSB investigation of a railroad accident led to recommendations regarding medical standards for railroad workers in safety-sensitive positions. (See Appendix A for summary of relevant NTSB decisions.) Recommendations related to an accident in 1988 were for periodic medical examinations and development of a federal medical certificate for railroad workers similar to programs of the Federal Aviation Administration (FAA) and Federal Highway Administration (FHWA), now the Federal Motor Carrier Safety Administration (FMCSA). A 1991 NTSB recommendation focused on the content of fatigue education awareness programs.

NTSB recommendations resulting from accident investigations have also focused on medication use. All of the U.S. Department of Transportation (DOT) modal administrations have been advised to develop procedures for educating employees on the effect of medications on alertness and human performance and for assuring that employees in safety-sensitive positions report the use of relevant medications and do not work if their capabilities are compromised by medication.

In addition to the NTSB's recommendations with regard to a medical standards program for railroad workers, the demographics of the U.S. railroad workforce justify the need for such a program. Over 60 percent of U.S. railroad workers are between the ages of 45 and 64. (See Figure 1.) Available epidemiological data indicates that individuals in this age group are susceptible to developing heart disease, hypertension and diabetes.

Figure 2 contains data from the U.S. Centers for Disease Control on the prevalence of selected chronic medical conditions by age group for U.S. males. Since over 90 percent of the U.S. railroad worker population is male, these data indicate a substantial risk for the prevalence of these conditions in the railroad worker population. Heart disease, hypertension and diabetes, especially if undiagnosed or untreated, increase the risk of sudden incapacitation.

An adult population is also susceptible to sleep disorders. The National Sleep Foundation estimates that 4 percent of middle-aged men and 2 percent of middle-aged women experience excessive daytime sleepiness resulting from sleep apnea. The prevalence of sleep apnea as well as other sleep disorders increases with age. Overweight individuals have a higher risk of developing this condition. An individual with untreated sleep apnea may experience learning and memory difficulties, and more seriously, is at greater risk of falling asleep while operating a vehicle. This was the case in the Clarkston, MI accident described above. Other sleep disorders, such as narcolepsy and periodic limb movement, also lead to excessive daytime sleepiness and have the same potential consequences and risks.

Medical standards programs for transportation employees typically apply to positions with safety-sensitive functions. These are jobs in which the actions of the employee can affect the safety of other employees and the public as well as the integrity of the vehicle and other

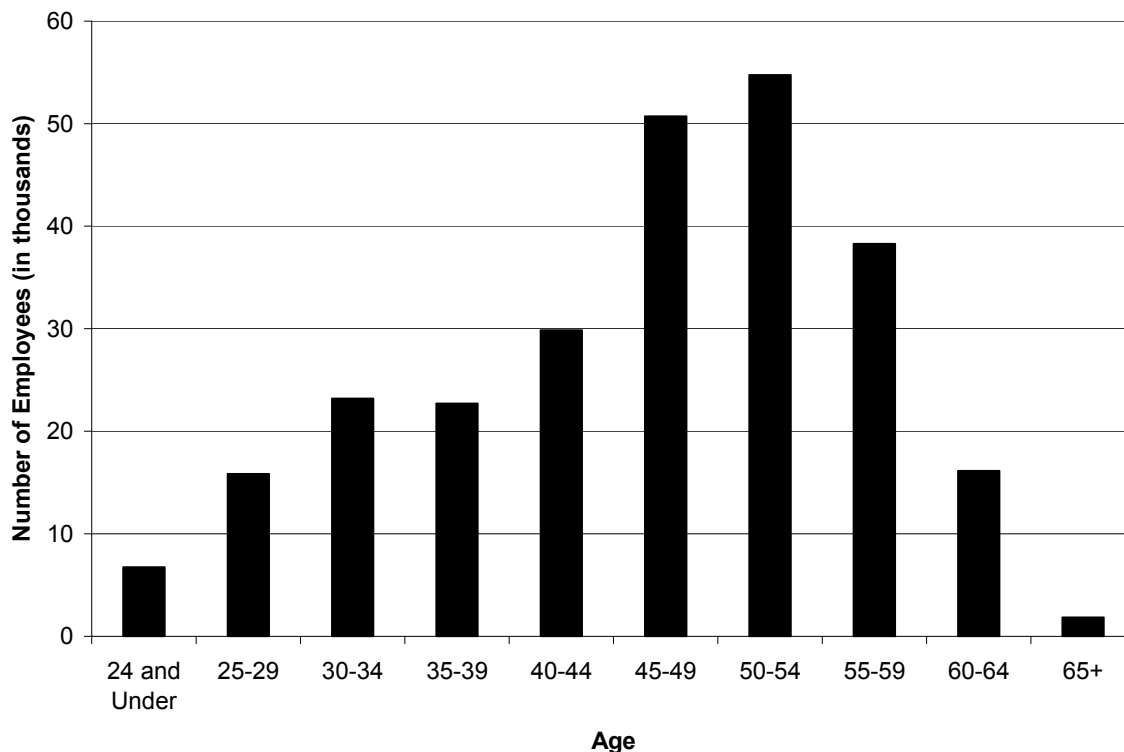


Figure 1. Distribution of U.S. railroad workers by age, 2002

Source: U.S. Railroad Retirement Board. Statistical Tables: Data through Fiscal Year 2003, Table D10 – Employees in 2002, by amount of creditable compensation or sex and by age. Retrieved June 15, 2004 from <http://www.rrb.gov/act/pdf/ST03partd.pdf>.

property. One subset of positions with safety-sensitive functions is that group covered by the Hours of Service Law. Typically, these positions are locomotive engineers, conductors, trainmen, signalmen and dispatchers. The Railroad Retirement Board reports total U.S. railroad employment for 2003 was 222,500.⁵ According to the Association of American Railroads, employment for Class 1 railroads during this period averaged 154,656 with 70,825 employees or 46 percent in positions covered by the Hours of Service Law. Assuming that there is the same proportion of all U.S. railroad employees in Hours of Service positions and that a medical standards program would apply to these employees, then at least 101,894 employees would be required to meet medical standards.

⁵ U.S. Railroad Retirement Board. *Active Employees and Railroad Retirement Act Beneficiaries by State, Calendar Year 2003*. May 2004. Retrieved June 15, 2004 from <http://www.rrb.gov/act/statsindex.html>.

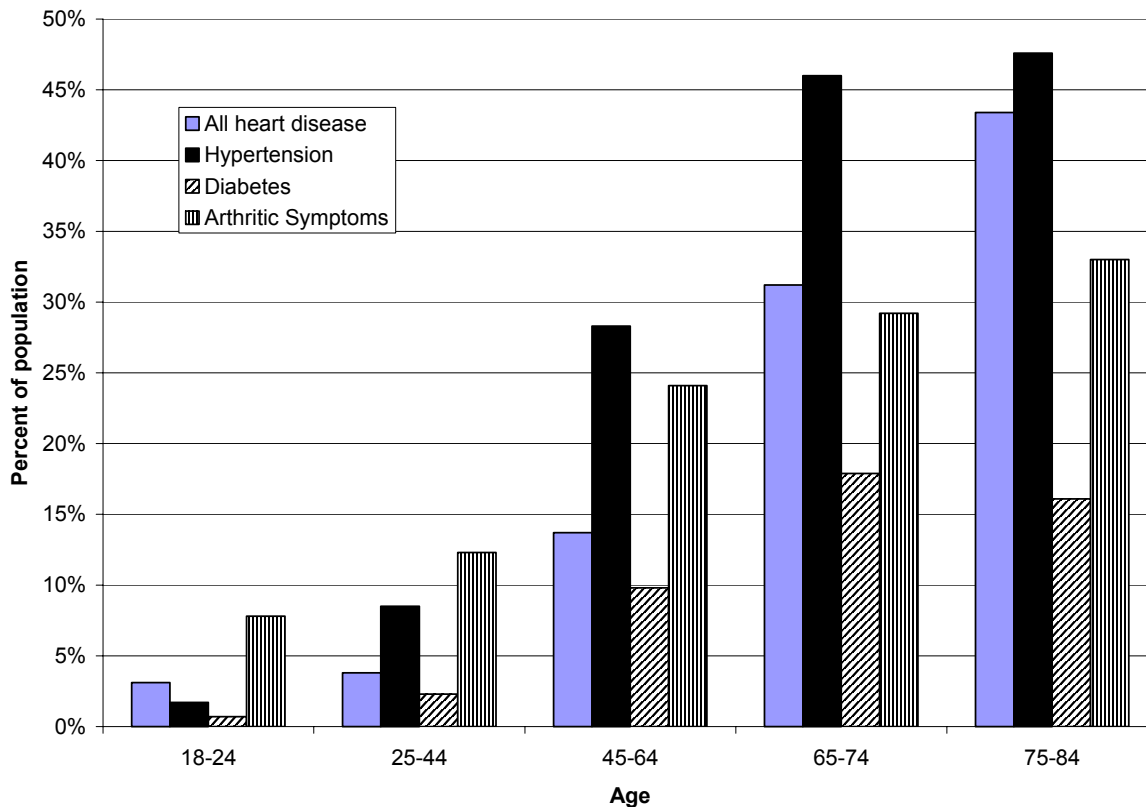


Figure 2. Prevalence of selected chronic conditions by age: U.S. males, 2000-2001

Data Source: National Center for Health Statistics. (2004). Prevalence of Selected Chronic Conditions by Age, Sex, Race, and Hispanic Origin: United States, 1997-2001. NHIS (NHIC01c). Retrieved August 17, 2004, from <http://209.217.72.34/aging/TableView/tableView.aspx?ReportId=144>.

1.2 Objectives

The objectives of the work described in this report were to:

- Assemble information to assess the need for medical standards in the U.S. railroad industry.
- Formulate options for a medical standards program.
- Make recommendations on the feasibility and need for a medical standards program for the U.S. railroad industry.

1.3 Overall approach

The work described in this report had three phases: 1) information gathering, 2) analysis and 3) formulation of recommendations. (See Figure 3.) Assembling relevant data involved literature search and review, structured interviews with medical and administrative personnel from relevant agencies and railroads, analysis of FRA and NTSB accident and casualty reports, and

review of dispute resolution provisions of current labor agreements. In some cases, railroad representatives preferred to provide a written response to questions rather than participate in a phone interview. For one foreign medical standards program, a government official was not available to provide information and only limited information could be obtained from a translation of the relevant regulation.

The analysis phase involved identifying the gaps in existing U.S. railroad medical standards. The existing FRA medical standards program for vision and hearing was compared with programs of the other DOT modal administrations and with five foreign programs. Options for various aspects of a medical standards program were defined based on existing U.S. railroad industry practices and the examples provided by foreign programs and the other modes of transportation. This phase also included defining alternative medical standards program models and estimating the resource requirements for each. The final phase focused on drawing conclusions and formulating recommendations.

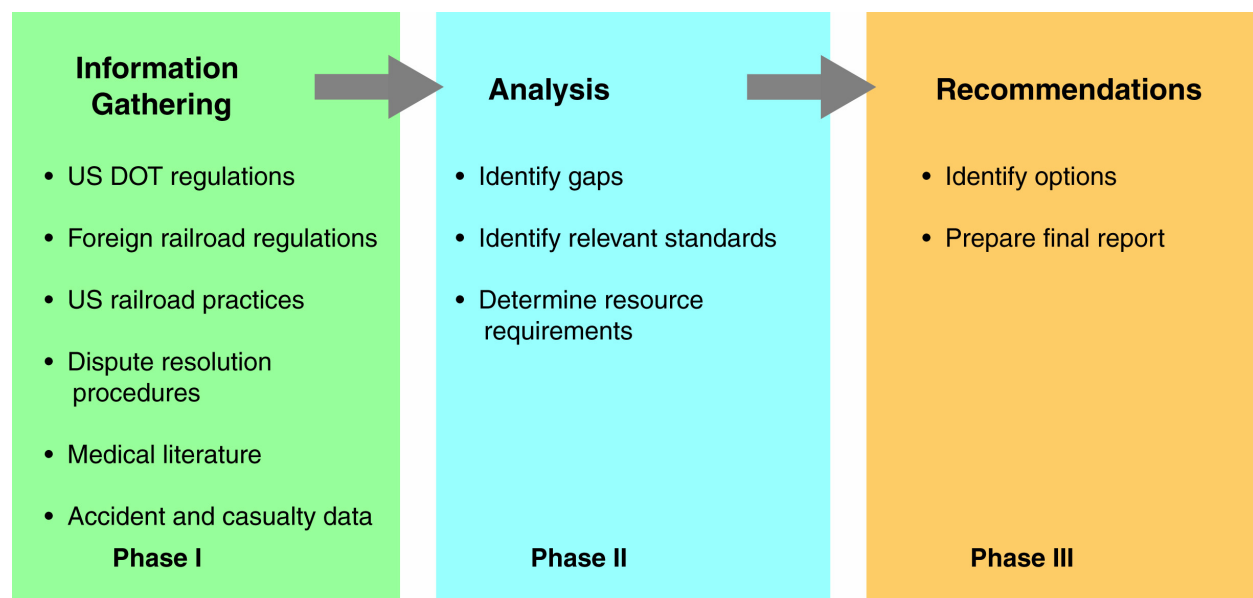


Figure 3. Overall approach

1.4 Scope

The focus of the investigation described in this report was primarily on the process for developing and implementing a medical standards program that seeks to identify employees with medical conditions that can lead to sudden incapacitation. A medical standards program is based on regulations that are further explained and supported by guidelines. While this effort gave some attention to the content and extent of medical criteria contained in the regulations and guidelines, the specific criteria were beyond the scope of this work. The study examined existing programs of three U.S. DOT modal administrations, five foreign rail organizations, and a total of 12 railroads representing Class 1, regional/short line and commuter operators. This program is intended to apply to railroad workers performing safety-sensitive functions. The FRA defines safety-sensitive functions in 49 C.F.R. § 209.303 as follows:

- (a) Railroad employees who are assigned to perform service subject to the Hours of Service Act (45 U.S.C. 61-64b) during a duty tour, whether or not the person has performed or is currently performing such service, and any person who performs such service.
- (b) Railroad employees or agents who:
 - (1) Inspect, install, repair, or maintain track and roadbed;
 - (2) Inspect, repair, or maintain, locomotives, passenger cars, and freight cars;
 - (3) Conduct training and testing of employees when the training or testing is required by the FRA's safety regulations; or
- (c) Railroad managers, supervisors, or agents when they:
 - (1) Perform the safety-sensitive functions listed in paragraphs (a) and (b) of this section;
 - (2) Supervise and otherwise direct the performance of the safety-sensitive functions listed in paragraphs (a) and (b) of this section; or
 - (3) Are in a position to direct the commission of violations of any of the requirements of parts 213 through 236 of this title.

1.5 Organization of the Report

Chapters 2, 3, and 4 describe the medical standards programs of, respectively, the U.S. DOT modal administrations, foreign railroad agencies/organizations and U.S. railroads. A review of NTSB and FRA accident and casualty data is in Chapter 5. Chapter 6 presents the results of the medical literature review and Chapter 7 focuses on legal considerations. Chapter 8 describes options for the various components of a medical standards program and Chapter 9 contains the conclusions and recommendations for next steps. Four appendices contain supporting material on NTSB recommendations with regard to medical standards programs, FMCSA's handling of vision and diabetes waivers, abstracts for medical literature review and relevant ADA court cases.

2. Medical Standards Programs of U.S. DOT Modal Administrations

Three DOT modal administrations have longstanding medical standards programs. These agencies are the FAA, the FMCSA and the U.S. Coast Guard (USCG), now a part of the Department of Homeland Security. While the FRA has had railroad safety oversight responsibilities for many years, the only medical standards that it administers are those for vision and hearing, and relative to the other agencies, these were instituted relatively recently. The following subsections describe the medical standards programs of each DOT modal administration. Table 4 highlights the features of each of the programs.

The Federal Transit Administration (FTA) has no regulatory functions and as such does not have any medical standards program. However, the FTA recently sponsored a study to document approaches to management of the use of prescription and over-the-counter medication by transit operators.⁶ The National Highway Traffic Safety Administration (NHTSA) does not oversee operator certification, but their mandate includes driver safety. NHTSA has sponsored two important studies related to drugs and human performance.⁷

2.1 Federal Railroad Administration

FRA regulations set vision and hearing standards for engineers and remote control operators. The railroads are responsible for ensuring that the engineer meets the medical standards. In addition, a separate standard covers the use of prescription and over-the-counter medications.

Who is Covered

The hearing, vision and color vision requirements apply to only engineers and remote control operators. The standard relating to the use of prescription and over-the-counter medications affects those employees who may perform service subject to the Hours of Service Law.

Frequency of Examination

Engineers and remote control operators are required by federal standards to undergo the vision, hearing and color vision evaluation every 3 years. This interval is consistent with that for engineer re-certification.

Development of the Standards/Guidelines

The initial vision and hearing standards were based on existing U.S. DOT standards for other modes of transportation. The FRA Rules for visual acuity, 49 C.F.R. § 240.121 and 49 C.F.R. § 240.207, became effective in 1991. The vision standards require the engineer to have 20/40 vision in each eye with or without corrective lenses and a binocular visual acuity of at least 20/40. They must have a field of vision of at least 70° in the horizontal meridian in each eye. The engineers must also have the ability to recognize and distinguish between the colors of

⁶ Sarles, R. (2003). *Prescription and Over-the-Counter Medications Tool Kit* (Report No. DOT-VNTSC-FTA-03-03). Washington, DC: U.S. Department of Transportation.

⁷ Couper, F & Logan, B. (2004). *Drugs and Human Performance Fact Sheets*. (Report No. DOT HS 809 725). Washington, DC: U.S. Department of Transportation; and Moskowitz, H. & Wilkinson, C. (2004). *Antihistamines and Driving-Related Behavior: a review of the evidence for impairment*. (Report No. DOT HS 809 714). Washington, DC: U.S. Department of Transportation.

railroad signals as demonstrated by successfully completing one of several tests specified in Appendix F of the regulation.

The hearing requirement is that the engineer cannot have an average hearing loss in the better ear greater than 40 decibels at 500Hz, 1,000 Hz, and 2,000 Hz with or without use of a hearing aid.

The rules in 49 C.F.R. § 219.101 to 219.103 prohibit use of controlled substances or alcohol. Employees are permitted to use a controlled substance if it is prescribed or authorized by a medical practitioner if;

- (1) The treating medical practitioner or a physician designated by the railroad has made a good faith judgment, with notice of the employee's assigned duties and on the basis of the available medical history, that use of the substance by the employee at the prescribed or authorized dosage level is consistent with the safe performance of the employee's duties;
- (2) The substance is used at the dosage prescribed or authorized; and
- (3) In the event the employee is being treated by more than one medical practitioner, at least one treating medical practitioner has been informed of all medications authorized or prescribed and has determined that use of the medications is consistent with the safe performance of the employee's duties (and the employee has observed any restrictions imposed with respect to use of the medications in combination).

A 1998 FRA Safety Advisory, Safe Use of Prescription and Over-the-Counter Drugs, 63 Fed. Reg. 71334 (1998) recommended that the railroads use the same guidelines when considering the use of prescription or over-the-counter medication as would be used when reviewing controlled substances.

Since the establishment of the Railroad Safety Advisory Committee (RSAC) in 1996, this group has developed recommendations on selected safety issues and if approved by the RSAC workgroup and the full RSAC, these recommendations are presented to the FRA. The FRA is not required to accept these recommendations. An RSAC subgroup, consisting of railroad medical officers, was involved in revisions to the color vision standard, which became final in 2000. Recent safety advisories have included those on the use of prescription and over-the-counter medication and evaluation of engineers to determine if they meet the vision requirement.

Legal Challenges

There have been no legal challenges to the regulations.

Examiners

The medical examiner is selected by the railroad and may be a physician or physician assistant (PA not included in definition 49 C.F.R. § 240.7 but is in 49 C.F.R. § 240.207). There is no required training or certification. Medical examiners are to be provided with a copy of the standard and the appendices.

Table 4. Summary of medical standards programs of U.S. DOT modal administrations

FAA					
	FRA	Airmen	Air Traffic Control Specialists	FMCSA	Coast Guard – Mariners Coast Guard – Military
Covered positions	Locomotive engineers Remote control operators	Class 1,2,3 pilots Non-FAA air traffic controllers (covered by Class 3 pilot regulations)	FAA employed Air Traffic Control Specialists	Commercial drivers operating commercial motor vehicles as defined by 49 CFR 390.5	Licensed (officers, masters and mates) Qualified (sailors) Unqualified (no mariner skills) Aviators All other positions
Development of standards	FRA through RSAC process	FAA	FAA – Based on Office of Personnel Management medical standards GS-2152	FMCSA	U.S. Armed Forces and U.S. Coast Guard
Frequency of exams	Every 3 yr	Class 1 – 6 mo Class 2 – 1 yr Class 3 – 3 yr to age 39, 2 yr ages 40+	Control center and tower ATCS – 2 yr to age 39, 1 yr ages 40+ Flight service – 3 yr to age 39, 2 yr ages 40+	Every 2 yr, unless examiner decides on closer follow-up Every year if operating under waiver/exemption	Aviators - every 2 yr to age 49, then yearly Other positions - every 5 yr

FAA						
	FRA	Airmen	Air Traffic Control Specialists	FMCSA	Coast Guard – Mariners	Coast Guard – Military
Examiners	Physician (employed or contracted)	FAA designated examiners (AMEs) - all physicians	Regional Flight Surgeon designates selected AMEs	State-licensed health care providers, including: medical osteopathy, and chiropractic doctors, also PA's and advanced PN's	State-licensed health care providers	Accession exam: Civilian physicians, preferably with military experience Retention exam: Physicians in CG and civilian physicians with knowledge of military duties; also NP or PA with physician oversight Only military flight surgeons or AME's conduct aviator exam
Examiners credentialed?	No	Yes – trained and certified	Yes	No	No	Yes
Program Review		Evaluate for accident involvement of airmen on Special Issuance. Also efficiency and timeliness in handling requests for reconsideration or Special Issuance	Evaluated for timeliness and accident involvement for individuals on Special Consideration	Evaluated through motor carrier audits, safety reviews and roadside checks.	Monitor overall process, feedback from field. Medical staff monitors medical developments	Keep abreast of medical developments
Waiver/exemption	Railroad's medical officer in consultation with Supervisor of Locomotive Engineers	Special Issuance (valid for specific period) Statement of Demonstrated Ability (SODA) (Non-progressive disqualifying condition)	Medical qualification by Special Consideration (waiver)	Waiver when vision does not meet criteria or if driver is using Insulin to control diabetes. SPE if does not meet limb requirement	Can be placed in limited duty	Temporary and permanent waivers for non-aviators

FAA						
	FRA	Airmen	Air Traffic Control Specialists	FMCSA	Coast Guard – Mariners	Coast Guard – Military
Dispute resolution	Locomotive Engineer Review Board. Administrator has final authority within FRA, but could go to Courts of Appeals and finally Supreme Court.	Federal Air Surgeon has final authority within FAA, but could go to NTSB, Court of Appeals and finally Supreme Court	Federal Air Surgeon has final authority	Request for resolution of conflict by the FMCSA can be requested. Very few done as process allows for third party impartial review	National Maritime Center has final decision	Commander, Coast Guard Personnel Command makes final determination
Information for examiners	Medical standards in 49 C.F.R. § 240.121 and 49 C.F.R. § 240.207 (Appendix F)	Medical standards in Title 14 CFR Part 67 of the Federal Aviation Regulations	Medical standards for initial employment and retention	Medical examiners are expected to be familiar with 49 C.F.R. § 391.43. Limited guidance on medical examination report form. Also conference reports and advisory panel reports.	Guidelines in NVIC 02-98	DOD medical standards for accession and aviators. CG standards for retention of non-aviators.
		Medical guideline letters by Federal Air Surgeon - online	Medical guideline letters by Federal Air Surgeon - online			
Resource requirements		Federal Air Surgeon's Medical Bulletin - online	Federal Air Surgeon's Medical Bulletin - online			
	4500 AMEs	4500 AMEs	400-500 AMEs handle 10,000 exams annually	Staff of seven full-time equivalents and a contractor	One MD at the NMC handles 1200 to 1400 waivers annually.	Two physicians handle all waiver applications
	9 Regional Flight Surgeons and Federal Air Surgeon	9 Regional Flight Surgeons and Federal Air Surgeon		Current proposal in Congress for 3-4 physicians based in Washington, DC	Occasional need for specialist consultation	2200 waiver requests per year for accession and 450 for retention (most waivers are aviators)
	40 non-physician legal examiners in CAMI with a staff of 130 who support 6 physicians and the Manager of Aeromedical Certification	40 non-physician legal examiners in CAMI with a staff of 130 who support 6 physicians and the Manager of Aeromedical Certification				

Application Review and Waiver Process

If an employee does not meet the vision and hearing requirements, s/he is eligible for a single retest without providing information and an additional test if s/he can provide information that the situation has changed. If s/he still does not meet the criteria, the medical examiner in consultation with the designated supervisor of locomotive engineers (DSLE) can determine that the engineer is able to safely perform as an engineer. Specific limitations may be indicated by the medical examiner. If there is still a determination that the engineer is not able to meet criteria for engineer certification, s/he may petition the Locomotive Engineer Review Board (LERB) to review the decision. The Board is composed of at least three employees of the FRA selected by the Administrator.

The LERB would look at whether:

- 1) the railroad followed proper procedures for denying certification or recertification set forth in 49 C.F.R. § 240.219;
- 2) the person did, in fact, not meet the criteria set forth in 49 C.F.R. § 240.121;
- 3) the proper procedures were followed for making the determination on vision and hearing acuity set forth in 49 C.F.R. § 240.207; and
- 4) the proper medical tests and failure criteria were administered as set forth in Appendix F to 49 C.F.R. § 240.

The LERB would not question a medical opinion that has a reasonable basis. FRA also provides review beyond the LERB upon request. An FRA hearing officer is available if a new case (*de novo*) is requested. The FRA Administrator, upon request, will review the hearing officer's decision before aggrieved parties file a suit in Federal Court.

Resource Requirements

The FRA implemented the vision and hearing regulations without the need for additional staff. FRA safety inspectors review engineer certification records of the carriers, which include results of vision and hearing testing, as part of the routine safety audits. Similarly, these regulations have not affected the size of the LERB. Since its inception in 1992, the LERB has not received any hearing acuity cases and has received six vision acuity cases. The LERB has received approximately 1000 cases since its inception in 1992. Approximately 14 percent of all LERB cases (141) have ultimately been reviewed by the FRA Administrator. Only 1 case has been appealed to a Federal Court of Appeals.

References

Qualification and Certification of Locomotive Engineers, 49 C.F.R. § 240 (1998).

2.2 Federal Motor Carrier Safety Administration

The Federal Motor Carrier Safety Administration's Physical Qualification Division is responsible for the medical certification of commercial drivers operating in interstate commerce as defined by 49 C.F.R. § 390.5. Only commercial drivers operating a commercial motor vehicle as defined by 49 C.F.R. § 390.5 are governed by the FMCSA. Many states use the criteria in

49 C.F.R. § 391 for their intrastate commercial drivers but the states have jurisdiction over all intrastate drivers.

Who is Covered

Commercial drivers who operate vehicles meeting the following definition of a commercial motor vehicle (CMV) must comply with the medical qualification requirements. The definition of a CMV for purposes of the medical programs is the following:

“A self-propelled or towed vehicle used on the highways in interstate commerce to transport passengers or property, if the vehicle--

(A) has a gross vehicle weight rating or gross vehicle weight of at least 10,001 pounds, whichever is greater;

(B) is designed or used to transport 9 to 15 passengers (including the driver) for direct compensation operated beyond a 75 air-mile radius (86.3 statute miles or 138.9 kilometers) from the driver's normal work-reporting location,

(C) is designed or used to transport more than 15 passengers, including the driver, and is not used to transport passengers for compensation; or

(D) is used in transporting material found by the Secretary of Transportation to be hazardous under section 5103 of this title and transported in a quantity requiring placarding under regulations prescribed by the Secretary under section 5103.”

Frequency of Examination

Drivers are required to be medically qualified at least every 2 years. Drivers who are operating under a waiver/exemption must be examined annually. The medical examiner may determine that the medical qualification should be valid for less than 2 years if the driver has a medical condition which would not disqualify but would require closer follow up. Guidelines issued by the FMCSA suggest that drivers with certain medical conditions such as hypertension, and cardiovascular disease or on an anticoagulant should be examined more frequently. “Any driver whose ability to perform his/her normal duties has been impaired by a physical or mental injury or disease” must undergo a medical certification examination. Motor carriers are responsible for ensuring that only drivers who are medically qualified are operating commercial vehicles.

Development of the Standards/Guidelines

The authority governing medical criteria for commercial drivers and requiring medical certification was initially granted to the Interstate Commerce Commission (ICC). The first medical standards for commercial drivers were published in 1939 with more detailed standards published in a 1970 Final Rule. These were developed by medical advisors and went through the federal rulemaking process. A medical certificate was first required in 1954. Guidelines have been developed through consensus by medical advisors.

Recently operators of certain vehicles designed to transport 9-15 passengers including the driver have been required to meet the medical criteria. Only those drivers traveling more than 75 air-miles from work reporting location for direct compensation were required to meet criteria. A process to initially grant waivers and now exemptions for insulin taking diabetic drivers and drivers who did not meet the vision requirement was implemented.

Guidelines are also periodically updated through expert consensus. One set of guidelines, the medical advisory criteria, is now included on the examination form to assist the examiner. Another type of guideline available is Regulatory Guidance. This was most recently published in the *Federal Register* in April 1997 and has been periodically updated on the FMCSA web site. These are responses to questions that have been submitted to the FMCSA.⁸ Another resource available to the medical examiner is recommendations from panels or conferences sponsored by the FMCSA. An example is the recently released *Cardiovascular Advisory Panel Guidelines for the Medical Examination of Commercial Motor Vehicle Driver*. There are also conference reports on the commercial driver with pulmonary/respiratory disease, neurologic disease, psychiatric disease, vision and hearing.⁹

According to FMCSA regulations:

“(b) A person is physically qualified to drive a commercial motor vehicle if that person --

(b)(1) Has no loss of a foot, a leg, a hand, or an arm, or has been granted a skill performance evaluation certificate pursuant to § 391.49;

(b)(2) Has no impairment of:

(b)(2)(i) A hand or finger which interferes with prehension or power grasping; or

(b)(2)(ii) An arm, foot, or leg which interferes with the ability to perform normal tasks associated with operating a commercial motor vehicle; or any other significant limb defect or limitation which interferes with the ability to perform normal tasks associated with operating a commercial motor vehicle; or has been granted a skill performance evaluation certificate pursuant to § 391.49 .

(b)(3) Has no established medical history or clinical diagnosis of diabetes mellitus currently requiring insulin for control;

(b)(4) Has no current clinical diagnosis of myocardial infarction, angina pectoris, coronary insufficiency, thrombosis, or any other cardiovascular disease of a variety known to be accompanied by syncope, dyspnea, collapse, or congestive cardiac failure.

(b)(5) Has no established medical history or clinical diagnosis of a respiratory dysfunction likely to interfere with his/her ability to control and drive a commercial motor vehicle safely;

(b)(6) Has no current clinical diagnosis of high blood pressure likely to interfere with his/her ability to operate a commercial motor vehicle safely;

(b)(7) Has no established medical history or clinical diagnosis of rheumatic, arthritic, orthopedic, muscular, neuromuscular, or vascular disease which interferes with his/her ability to control and operate a commercial motor vehicle safely;

(b)(8) Has no established medical history or clinical diagnosis of epilepsy or any other condition which is likely to cause loss of consciousness or any loss of ability to control a commercial motor vehicle;

⁸Available through <http://www.fmcsa.dot.gov/rulesregs/fmcsr/fmcsrguide.htm>, accessed 2/27/04.

⁹Medical reports available through <http://www.fmcsa.dot.gov/rulesregs/medreports.htm>, accessed 2/27/04

- (b)(9) Has no mental, nervous, organic, or functional disease or psychiatric disorder likely to interfere with his/her ability to drive a commercial motor vehicle safely;
- (b)(10) Has distant visual acuity of at least 20/40 (Snellen) in each eye without corrective lenses or visual acuity separately corrected to 20/40 (Snellen) or better with corrective lenses, distant binocular acuity of at least 20/40 (Snellen) in both eyes with or without corrective lenses, field of vision of at least 70° in the horizontal Meridian in each eye, and the ability to recognize the colors of traffic signals and devices showing standard red, green, and amber;
- (b)(11) First perceives a forced whispered voice in the better ear at not less than 5 feet with or without the use of a hearing aid or, if tested by use of an audiometric device, does not have an average hearing loss in the better ear greater than 40 decibels at 500 Hz, 1,000 Hz, and 2,000 Hz with or without a hearing aid when the audiometric device is calibrated to American National Standard (formerly ASA Standard) Z24.5 -- 1951.
- (b)(12)(i) Does not use a controlled substance identified in 21 C.F.R. § 1308.11 *Schedule I*, an amphetamine, a narcotic, or any other habit-forming drug.
- (b)(12)(ii) *Exception.* A driver may use such a substance or drug, if the substance or drug is prescribed by a licensed medical practitioner who:
 - (A) Is familiar with the driver's medical history and assigned duties; and
 - (B) Has advised the driver that the prescribed substance or drug will not adversely affect the driver's ability to safely operate a commercial motor vehicle; and
- (b)(13) Has no current clinical diagnosis of alcoholism.”

The Medical Examination Reporting Form includes Advisory Criteria issued by the FMCSA to guide the examiner.

Legal Challenges

There have been several legal challenges against the U.S. DOT, FHWA (Federal Highway Administration) and later FMCSA on the medical criteria and on the issuance of waivers and exemptions. These cases include *Rauenhorst v. U.S. DOT, FHWA*, 95 F.3d 715 (1996), *Buck v. U.S. DOT*, 56 F.3d 1406 (1995), *Parker v. U.S. DOT*, 207 F.3d 359 (2000), *Anderson v. U.S. DOT, FHWA*, 213 F.3d 422 (2000) and *Moore v. U.S. DOT* 3 Fed.Appx. 508 (2001).

The FHWA instituted a vision waiver program in 1992. (See Appendix B for complete description of vision waiver program.) This program ended in 1994 with *Advocates for Highway and Auto Safety v. Federal Highway Administration*. In *Advocates v. FHWA*, the Eight Circuit Court ruled that the waiver program would not ensure public safety and was therefore invalid. The case of *Rauenhorst v. U.S. DOT* involved a driver who did not meet the vision standards and did not apply for the initial vision waiver program before the program ended in 1994. Mr. Rauenhorst's case was decided in his favor and he was permitted to apply for a waiver. This decision eventually led to the current vision exemption program.

Buck v. U.S. DOT involved a hearing impaired driver who requested a waiver. The courts decided in favor of the FHWA as there was the evidence suggesting that hearing impaired drivers were at a greater crash risk.

In the Parker case, both vision and a limb defect were issues. Mr. Parker was denied a vision exemption as he would need variance from more than one of the standards. Courts decided that the agency would need to assess the eligibility for each variance from the medical standards independently.

Anderson v. U.S. DOT and Moore v. U.S. DOT involved drivers who did not have the 3 years safe driving record the agency was requiring for consideration of a vision exemption. The courts determined that the 3 year requirement was reasonable.

Legal Basis for Medical Fitness

The authority to require medical certification of commercial drivers was originally granted to the ICC in the Motor Carrier Act of 1935. The authority was transferred to the DOT in 1966, and in October 1999, to the Office of Motor Carriers, a new office created in the DOT. The Motor Carrier Safety Improvement Act of 1999, Public Law 106-159, 113 Stat. 1748 transferred the functions to the FMCSA.

Examiners

Prior to 1993, only MDs or DOs were able to perform the commercial driver medical examination. A 1993 rulemaking permitted licensed health care providers, licensed by their state to perform such examination, to determine the medical qualification of the commercial driver. This includes, but is not limited to, doctors of medicine, doctors of osteopathy, physician assistants, advanced practice nurses, and doctors of chiropractic.

There is currently no formal training, certification or registration of examiners although the FMCSA is asking Congress for direction and funding to create a training and certification program. The FMCSA proposes to require all examiners to be registered.

In accordance with 49 C.F.R. § 391.43, medical examiners are expected to:

- (c)(1) “Be knowledgeable of the specific physical and mental demands associated with operating a commercial motor vehicle and the requirements of this subpart, including the medical advisory criteria prepared by the FHWA as guidelines to aid the medical examiner in making the qualification determination; and
- (c)(2) Be proficient in the use of and use the medical protocols necessary to adequately perform the medical examination required by this section.”

The final determination is made by the medical examiner. A driver who does not meet the medical standards for vision or diabetes may be eligible for an exemption and can apply through the Regional Administrator, FMCSA. Drivers who will be eligible have had at least 3 years of experience driving with that medical condition and with a safe driving record.

Drivers who have a loss or impairment of a limb or part of a limb may be able to be qualified through issuance of a Skill Performance Evaluation (SPE). The driver may apply for the SPE Certificate unilaterally or jointly with a motor carrier. The application must include details on the impairment for which the SPE certificate is requested, the type of vehicle that will be used, cargo to be transported, and driver experience and provide documentation that the driver is otherwise medically qualified. A medical evaluation summary completed by either a board qualified or board certified physiatrist or orthopedic surgeon must be submitted. Prior to the certificate being issued, the driver must also satisfactorily complete a road test.

When a difference of opinion can be demonstrated between examiners, a request for resolution of conflict by the FMCSA can be requested. The driver must submit documentation from his provider and that of the motor carrier as well as that of a specialist agreed upon by both parties. Very few are done as the process does allow for a third party impartial review, agreed upon by both carrier and driver. Only when driver and carrier are unable to agree on an impartial examiner does the process occur. Very few are filed per year and none have been overturned. The FMCSA will contract with a specialist, if needed, who will request additional information.

The FMCSA does not review the performance of the medical examination by the examiner nor is there is any mandated review process for the examinations. Some employers work with a third party administrator for scheduling, coordinating and review of the examinations or part of this process.

An examination is not required prior to beginning work for a new employer if the driver has a current valid certificate. Some carriers, however, prior to putting a driver to work will require a new medical examination and certification, by an examiner they choose. There is nothing in the regulations that specifies whether the driver or the motor carrier selects the examiner. A driver is not required to have a new examination prior to returning to work from illness or injury, unless the driver's "*ability to perform his/her normal duties has been impaired by a physical or mental injury or disease.*"¹⁰ Current regulations hold the driver and motor carrier responsible for ensuring that only medically qualified drivers are performing service. The FMCSA does perform motor carrier compliance reviews to determine that the appropriate form was used, information obtained, etc.

Application Review and Waiver Process

The process covering drivers requesting exemptions is covered in 49 C.F.R. § 381. Currently the only medical conditions where an exemption is granted are when the driver's vision does not meet the criteria or if the driver is using Insulin to control diabetes. Appendix B provides a detailed description, including legal challenges, of FMCSA's handling of exemptions for vision and diabetes. Drivers must have at least a 3 year safe driving record operating commercial vehicles with the condition to be considered. Once the application is complete, the FMCSA publishes in the *Federal Register* information on which drivers it plans to issue the exemption and those it plans to deny. A public comment period follows prior to issuance of the exemptions.

The FMCSA has received approximately 3900 applications for vision exemptions since 1997. Of those more than 1200 were granted and approximately 1450 were rejected. There are about 55 new applications per month with approximately 399 incomplete applications in continuous review per month.

To date the FMCSA has not approved any requests for diabetes exemptions. There have been 56 denials.

Program Evaluation

The program is currently evaluated through motor carrier audits, safety reviews, and roadside checks. It is currently difficult to audit performance of medical examiners, however if a national registry is implemented then a partial review of the program will be possible.

¹⁰ Persons who must be medically examined and certified. 49 C.F.R. § 391.45(c). (2003).

Relationship to Job Requirements

The medical standards are intended to ensure public safety on the nation's highways. Drivers who may not be able to operate their vehicle safely due to medical conditions would ideally be identified by the examination process. Drivers are qualified for any operations that a commercial driver might perform. The examiner is unable to limit a driver's duties. The only restriction that can be placed by the examiners is a requirement for corrective lenses, a hearing aid or a SPE certificate. Drivers who have been granted exemptions from the vision or diabetes standards can also be qualified but their duties are not restricted. Examiners may certify the driver for less than 2 years if they feel that the medical condition would not disqualify at the time of examination but would require closer follow up.

Resource Requirements

Currently the department has seven full-time equivalents and a contractor. An ideal program would include an oversight mechanism, a national registry, training and certification of examiners and a standing medical review board. The medical review board would contribute to examiner training, interpreting research to develop regulations, and making recommendations to change standards. There is currently a proposal in Congress for three or four physicians based in Washington, DC.

Advice to the FRA

It was recommended that direction is obtained from Congress and sufficient funding is ensured for appropriate staffing and resources.

References

Medical Advisory Criteria for Evaluation, 49 C.F.R. § 391.41 (2004).

Additional regulations found in other subparts of 391.

2.3 Federal Aviation Administration

The FAA has two separate medical standards programs, one for airmen (pilots) and one for air traffic control specialists.

2.3.1 Airmen

Federal Aviation Administration, Office of Aerospace Medicine, is responsible for the issuance of airman medical certificates. Approximately 450,000 applications for airman medical certificates are received and processed each year. The vast majority of this work is performed through the Aerospace Medical Certification Division (AMCD) which is located at the Civil Aeromedical Institute (CAMI) in Oklahoma City. Considerable support is provided by nine Regional Flight Surgeons, with one Regional Flight Surgeon who manages international and military aviation medical examiners (AMEs). The Federal Air Surgeon provides overall guidance and reviews selected cases.

Who is Covered

All commercial and private pilots must hold licenses issued by the FAA. Medical certification is a part of the licensing process. There are three categories of airman medical certificates that can be issued:

- 1) *Class 1* medical certificates are required for commercial pilots or airline transport pilots (ATP). These have the most stringent medical requirements. The Class 1 certificate is valid through the end of the examination month and 6 months for ATP duties, 1 year for other commercial activities and 2 or 3 years for private pilot duties.
- 2) *Class 2* medical certificates are for commercial, non-airline duties such as crop dusters, charter pilots and corporate pilots. A Class 2 certificate is valid through the end of the examination month plus 1 year for commercial activities and 2 or 3 years for private pilot use.
- 3) *Class 3* medical certificates are for private pilot activities only. These have the least restrictive medical requirements and are valid through the end of the examination month plus 3 years for those under age 40 and 2 years for those over age 40.

The majority of airmen hold Class 3 licenses.

Frequency of Examination

Frequency of examination is as described above. If an airman requires a waiver, the duration of the medical certificate may be limited but the duration of the airman certification remains unchanged. The airman may also be required to undergo a reexamination if, in the opinion of the Federal Air Surgeon or authorized representative within the FAA, there is a reasonable basis to question the airman's ability to meet the medical standards. Interim medical examination may be required in some cases of Special Issuance.

It is the airman's responsibility to not fly if s/he should develop any of the disqualifying medical conditions or receive a known disqualifying treatment or therapy. The airman may consult with the AME or flight surgeon in making that determination.

Development of the Standards/Guidelines

Medical certification of U.S. airmen officially began with the Air Commerce Act of 1926, mandating that all pilots be medically qualified to fly. The current medical standards have been in effect since passage of the FAA Act of 1959. The specific medical standards were created with medical guidance and became regulation through the Rulemaking Process. Current medical knowledge is used to update the criteria for Special Issuance. The medical standards are contained in 14 C.F.R. § 67 and require that in order for an airman medical certificate to be issued a pilot must have no established history or clinical diagnosis of any of the following:

1. Diabetes mellitus requiring hypoglycemic medication;
2. Angina pectoris;
3. Coronary heart disease that has been treated or, if untreated, that has been symptomatic or clinically significant;
4. Myocardial infarction;
5. Cardiac valve replacement;
6. Permanent cardiac pacemaker;
7. Heart replacement;

8. Psychosis;
9. Bipolar disorder;
10. Personality disorder that is severe enough to have repeatedly manifested itself by overt acts;
11. Substance dependence;
12. Substance abuse;
13. Epilepsy;
14. Disturbance of consciousness without satisfactory explanation of cause; and
15. Transient loss of control of nervous system function(s) without satisfactory explanation of cause.

In addition the airman must meet the criteria shown in Table 5.

Legal Challenges

In the 1980s the FAA changed the medical standard regarding coronary artery disease so that anyone being treated for this could be disqualified under the standard. That tightening of the prior standards was appealed to the Federal Court of Appeals but the FAA prevailed and the stricter standard remains in place.

There are numerous legal cases but most revolve around revocation of the medical certificate for positive alcohol and drug testing. The appeals go through the Federal Air Surgeon, Administrative Law Judge of the National Transportation Safety Board, the five member NTSB appellate board, Court of Appeals and finally to the Supreme Court.

One case to date has reached the NTSB appellate board. The primary issue in this case was whether the commercial pilot, who had documented hypertrophic cardiomyopathy, a relatively common genetic heart disease, and an important cause of impaired consciousness and disability at any age, should be allowed to fly. Both the FAA and the Administrative Law Judge ruled that the individual should not be allowed to fly but the NTSB reversed this decision.

Legal Basis for Medical Fitness

The medical standards are contained in 14 C.F.R. § 67.

Examiners

Airmen are examined by FAA designated Aviation Medical Examiners who are all physicians. AMEs are selected and designated by the Regional Flight Surgeons. There is mandatory multi-day training with retraining required every 3 years. Training is provided at CAMI but every other retraining can be completed from a remote location. The AME designation is renewed annually and subject to satisfactory performance and completion of the ongoing training requirements.

The number of AMEs is based on the location and number of airmen in the particular area. There are currently about 4500 – 5000 AMEs in the U.S. with approximately an additional 400 internationally, and 400 in the military.

Table 5. Medical standards for airmen

	First Class (ATP)	Second Class (commercial)	Third Class (private)															
Distant vision	20/20 or better in each eye separately, with or without correction		20/40 or better in each separately, with or without correction.															
Near vision	20/40 or better in each eye separately (Snellen equivalent), with or without correction, as measure at 16 in.																	
Intermediate vision	20/40 or better in each eye separately (Snellen equivalent), with or without correction at age 50 and over, as measure at 32 in.		No requirement.															
Color vision	Ability to perceive those colors necessary for safe performance of airman duties.																	
Hearing	Demonstrate hearing of an average conversational voice in a quiet room, using both ears at six feet, with the back turned to the examiner, or pass one of the audiometric tests below.																	
Audiology	Audiometric speech discrimination test-score at least 70% reception in one ear. Pure tone audiometric test-unaided, with thresholds no worse than: <table><tr><td></td><td>500Hz</td><td>1,000Hz</td><td>2,000Hz</td><td>3,000Hz</td></tr><tr><td>Better ear</td><td>35db</td><td>30db</td><td>30db</td><td>40db</td></tr><tr><td>Worse ear</td><td>35db</td><td>50db</td><td>50db</td><td>60db</td></tr></table>				500Hz	1,000Hz	2,000Hz	3,000Hz	Better ear	35db	30db	30db	40db	Worse ear	35db	50db	50db	60db
	500Hz	1,000Hz	2,000Hz	3,000Hz														
Better ear	35db	30db	30db	40db														
Worse ear	35db	50db	50db	60db														
Ear, nose, and throat	No ear disease or condition manifested by, or that may reasonably be expected to be manifested by, vertigo or disturbance of speech or equilibrium.																	
Pulse	Not disqualifying per se. Used to determine cardiac system status and responsiveness.																	
Blood pressure	No specified values stated in the standards. Hypertension covered under general medical standard and in the <i>Guide for Aviation Medical Examiners</i> .																	
Electro-cardiogram (ECG)	At age 35 and annually after age 40.	Not required if cardiovascular examination is normal.																
Mental	No diagnosis of psychosis or bipolar or severe personality disorders.																	
Substance dependence and substance abuse	A diagnosis or medical history of “substance dependence” is disqualifying unless there is established clinical evidence, satisfactory to the Federal Air Surgeon, of recovery, including sustained total abstinence from the substance(s) for not less than the preceding two years. A history of "substance abuse" within the preceding two years is disqualifying. “Substance” includes alcohol and other drugs (i.e., PCP, sedatives and hypnotics, anxiolytics, marijuana, cocaine, opioids, amphetamines, hallucinogens, and other psychoactive drugs or chemicals).																	

Information for the AME can be found in the *Guide to Aviation Medical Examiners* and Medical Guidelines Letters which are issued by the Federal Air Surgeon. Additional information can be found in the *Federal Air Surgeon's Medical Bulletin* which is published quarterly. The Bulletin is prepared by the FAA's Civil Aerospace Medical Institute, with policy guidance and support from the Office of Aerospace Medicine.

Application Review and Waiver Process

The AME may issue the medical certification. S/He may deny the certificate if the airman has one of the 15 mandatory disqualifying conditions. In most cases, the AME will not deny but defer to the FAA. The information is transferred to the AMCD at CAMI. All denials and deferrals are reviewed. The airman may work directly through AMCD or the Regional Flight Surgeon during the review. If the AMCD denies the certificate, the airman can request reconsideration and the application is then reviewed in Washington, DC by the Federal Air Surgeon. The Federal Air Surgeon has the final authority for all medical certification decisions made within the FAA.

The next appeal is to the Administrative Law Judge of the National Transportation Safety Board and then either the FAA or the airman can appeal to the full Board. (See Figure 4.) The NSTB considers only those cases where the airman does not have one of the 15 disqualifying conditions. They can only consider whether or not the individual has ever had or been diagnosed with one of those conditions. The NTSB does not consider whether an airman would be eligible for a Special Issuance but only whether an individual should be issued an unrestricted license. If the NTSB denies the appeal, the airman can then appeal to the Federal Court of Appeals or eventually the Supreme Court. In 2002 the NTSB considered 73 applications for review. Only one of these went to a hearing and was later appealed to the full Board. The others were withdrawn or dismissed.

If the airman is found to not meet the criteria, s/he may apply for an Authorization for Special Issuance of a Medical Certificate (Special Issuance) that is valid for a specified period. It may be granted to a person who does not meet the medical standards but is able to show s/he would be able to perform the duties of that class of medical certificate applied for without endangering public safety. (Special Issuance is covered in 14 C.F.R. § 67.401.) An example of this might be an airman who has a cardiac condition which is currently stable as demonstrated through an appropriate waiting period and specified objective testing.

The Federal Air Surgeon or his designee can also grant a Statement of Demonstrated Ability (SODA) to a person whose disqualifying condition is static and non-progressive and has previously been found capable by means of a special medical test, of performing airman duties without endangering public safety. A SODA does not expire. Additional information on special issuance for airman with diabetes, cardiovascular disease or hypertension can be found at <http://www.cami.jccbi.gov/AAM-300/medcon.html>.

If an airman is certified and upon review the FAA determines that the medical certification was issued in error, the FAA has 60 days to revoke that certification.

There are approximately 2000 requests for review or appeal per year at CAMI and approximately 250 per year in Washington. Less than 1 percent of all airman applicants are denied medical certification.

Program Evaluation

The FAA evaluates its program in terms of the accident rate of airmen operating under Special Issuance. To date, very few airmen who are operating under Special Issuance have been involved in accidents. A review of special issuance airmen in 1996 revealed that an airman without a special issuance was 60 percent more likely to have an accident than one with. The

program is also evaluated with respect to efficiency and timeliness of reviews of requests for reconsideration or Special Issuance.

Relationship to Job Requirements

Medical requirements are based on safety need.

Resource Requirements

In addition to the 4500 AMEs, nine Regional Flight Surgeons and the Federal Air Surgeon, there are approximately 40 non-physician legal examiners in CAMI with staff of 130 who support six physicians and the Manager of Aeromedical Certification, also a physician. The Regional Flight Surgeons generally have two examiners in their offices. To be more efficient, the Aerospace Medical Certification Division calculated that they would need at least 32 additional examiners.

Advice to the FRA

Recommendations from those interviewed at the FAA included ensuring that sufficient resources are available, and having examiners that understand the specific tasks of the various positions and are properly trained. The FRA must also plan how incumbent employees who do not meet the new medical standards would be addressed.

References

FAA Medical Standards and Certification, 14 C.F.R. § 67 (1996).

Federal Aviation Administration. (n.d.). *Federal Air Surgeon's Medical Bulletin*. Retrieved January 21, 2003 from <http://www.cami.jccbi.gov/AAM-400A/FASMB.HTML>.

Federal Aviation Administration. (n.d.). *Guide to Aviation Medical Examiners*. Retrieved January 21, 2003 from http://www1.faa.gov/avr/aam/Game/Version_2/03amemanual/home/home.htm.

Federal Air Surgeon. (n.d.). *Medical Guidelines Letters*. Retrieved January 21, 2003 from <http://interweb.faa.gov/avr/aam/mgl/>.

Salazar, G & Silberman, W. (2003). Medical Certification of Civilian Aviation Personnel in the United States. In Dehart, R. & Davis, J., (Eds.), *Fundamentals of Aerospace Medicine* (pp. 309-322). Hagerstown, MD: Lippincott Williams & Wilkins.

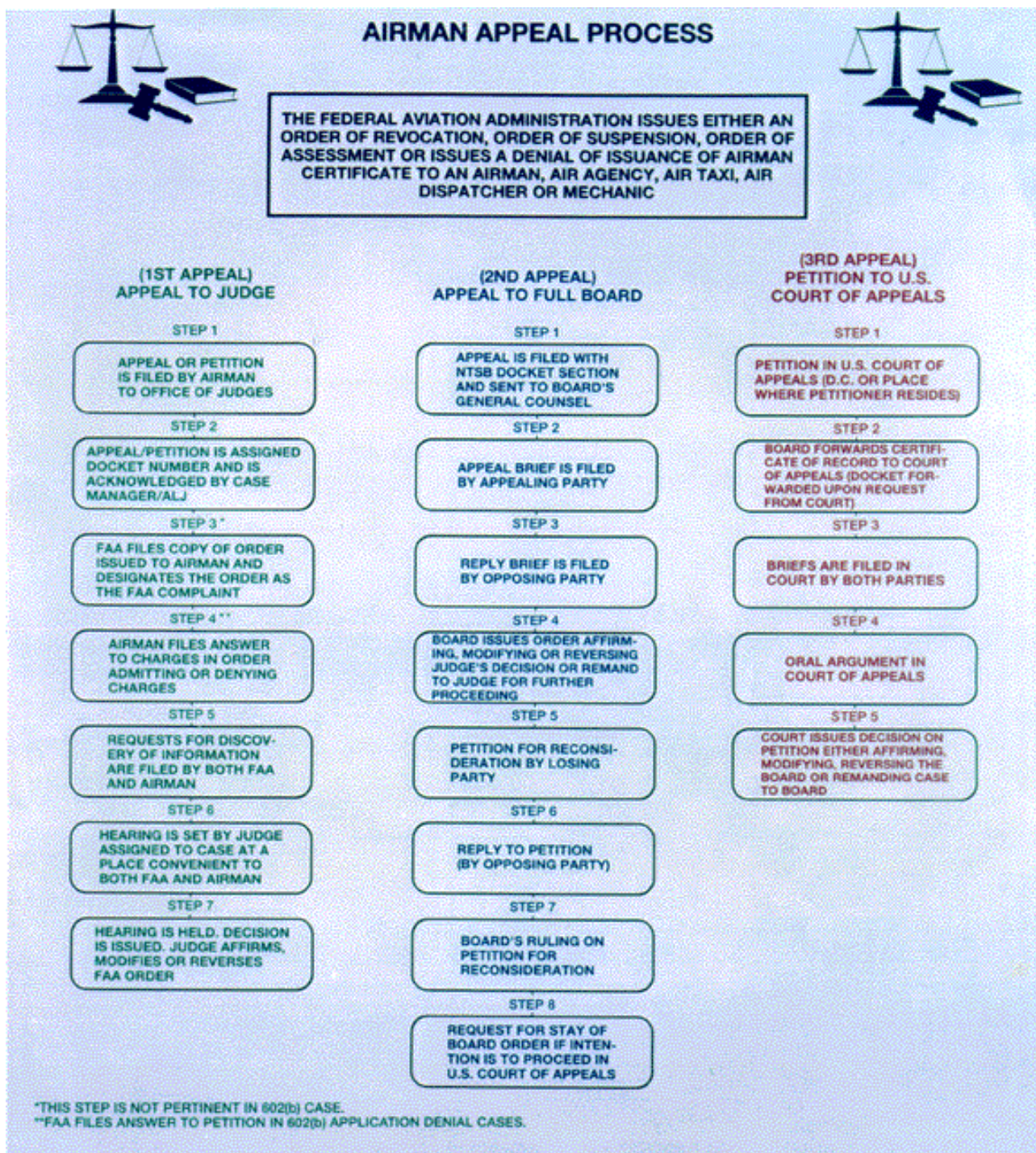


Figure 4. Airman appeal process

2.3.2 Air Traffic Control Specialists

Most civilian air traffic controllers in the U.S. are directly employed by the FAA. Their title is “air traffic control specialist” (ATCS). There are approximately 20,000 ATCSs. Medical standards for ATCS are contained in FAA Order 3930.3a, *Air Traffic Control Specialists Health Program*. The FAA issued this order in 1980 and a revision is in progress. The objectives of the ATCS Health Program are to ensure the safety of the National Airspace System and support the health of the ATCS. The ATCS Health Program is managed primarily by the nine Regional Flight Surgeons. The Occupational Health Division and the Medical Specialty Division provide support. The Federal Air Surgeon provides policy guidance and review.

Who is Covered

In addition to the ATCSs who are employed by the FAA, there are two other groups of air traffic controllers in the U.S. Air traffic controllers who are civilian contract employees at smaller or private airports will fall under the medical standards for Class 2 airman. They are generally employed by municipalities or other organizations. There are also air traffic controllers employed by the military or on active duty military. These individuals are covered by DoD medical standards. The program described below applies only to ATCSs who are FAA employees.

Frequency of Examination

There are three types of ATCS jobs:

- 1) En route control center.
- 2) Terminal, which includes airport towers and approach radar.
- 3) Flight service station – give pilot briefings, weather observations, notice to airman (NOTAMS), en route flight briefing, assist on search and research, assist pilots who are having problems.

Each type of job has a different schedule for re-examination. Center and tower ATCS must be medically qualified every year if over age 40 and every 2 years if under age 40. For flight service station, medical qualification is required every three years under age 40 and every 2 years if over age 40.

Development of the Standards/Guidelines

The medical standards in FAA Order 3930.3a, *Air Traffic Control Specialists Health Program* were derived from the Office of Personnel Management medical standards GS-2152, in 1980. The Federal Air Surgeon has consultant panels and support physicians and issues or withdraws guidance letters as appropriate.

Medical standards for initial employment and retention for ATCS differ. While there are many similarities, the criteria for retention are slightly less restrictive. The medical standards for retention also define different criteria for the different work sites: terminal, center or flight service station.

An ATCS may be qualified by meeting standards, or by Special Consideration (waiver). They may also be restricted, incapacitated or permanently disqualified. The permanent disqualification rate is very low, less than 1 percent annually. ATCSs can be limited in their medical qualification, for example to only one type of facility.

ATCSs are required to report any health condition that occurs between examinations to facility management or the Regional Flight Surgeon. The Regional Flight Surgeon may review the medical information or direct the ATCS to have a medical examination performed. FAA regulations prohibit an ATCS from working if s/he is using specified medications.

Legal Challenges

There are a number of challenges that can be filed by an ATCS who is denied medical certification. They may file complaints with the Equal Employment Opportunity Commission (EEOC) or the Merit System Protection Board. They may also file a complaint directly in Federal District Court. ATCSs may write letters to their congressional representative, file union grievances or make requests under the Freedom of Information Act. The FAA expends considerable resources to resolve these challenges.

Examiners

The Regional Flight Surgeon designates selected aviation medical examiners to examine ATCSs. (See description of AMEs in Airman section.) As is the case with pilots, the AME may issue the medical certification. However, the Regional Flight Surgeons reserve the authority to make ATCS medical status determination. An ATCS who disagrees with a Regional Flight Surgeon decision may request review by the Federal Air Surgeon.

Application Review and Waiver Process

An ATCS who does not meet medical standards may be granted medical qualification by Special Consideration if s/he can safely perform the essential functions of the job. An individual with a cardiovascular condition which is currently stable, as demonstrated through specified objective testing, may be eligible to be qualified by Special Consideration. The FAA Office of Aviation Medicine in coordination with air traffic management issues the waiver.

ATCS may request review through their Regional Flight Surgeon. They may also request review by the Federal Air Surgeon. The Federal Air Surgeon has final authority to make a medical determination within the FAA. The Federal Air Surgeon will also reconsider cases when new information is submitted.

Program Evaluation

The program is evaluated in terms of timeliness of reviews and whether individuals who are on Special Consideration are involved in accidents. The program could improve if more resources were available. Some goals would be improved customer service with improved timeliness of reviews and communications in clearer language.

Relationship to Job Requirements

The medical standards are designed to relate to job performance. Most standards are consensus based. Factors used in determining whether special consideration should be issued include if an individual is to become impaired due to their medical conditions, the predictability of the impairment, time of onset of impairment, external observability of impairment, and an individual's self-awareness of impairment.

Resource Requirements

A significant amount of medical and staff resources are required to support the ATCS Health Program. This is done primarily by the nine Regional Flight Surgeon offices, several Deputy

Regional Flight Surgeons and Center Flight Surgeons, the Occupational Health Division and the Medical Specialties Division. There are between 400 and 500 AMEs who perform 10,000 ATCS examinations annually.

Advice to the FRA

The FAA advises the FRA to make certain that there are sufficient resources and that medical providers involved are aware of the specific task performed and the relationship with medical concerns.

References

FAA Order 3930.3a, *Air Traffic Control Specialists Health Program*. Retrieved January 10, 2004 from <http://isddc.dot.gov/OLPFiles/FAA/005258.pdf> and <http://isddc.dot.gov/OLPFiles/FAA/005685.pdf> 10.

2.4 U.S. Coast Guard

The U.S. Coast Guard, now a part of the Department of Homeland Security, is responsible for the medical certification of mariners. This section describes the mariner program as well as the Coast Guard's procedures for medical certification of full-time Coast Guard military personnel.

2.4.1 Mariners

The Coast Guard's National Maritime Center is responsible for managing the licensing of mariners. There are 17 Regional Examination Centers that review applications before sending them to the National Maritime Center for final approval. Part of the licensing process includes medical certification.

Who is Covered

There are three categories of mariner rating: licensed, qualified ratings and unqualified or entry level ratings. Licensed includes officers, masters and mates. This category has the strictest set of licensing requirements. Sailors are in the qualified category and have requirements that are similar to those for a licensed position. The entry level rating is for an individual with no mariner skills.

Frequency of Examination

Applicants for the licensed and qualified ratings must have a physical examination but those for the entry level rating must demonstrate the ability to perform physical tasks required onboard a ship. The physical examination report is a part of the initial license application process as well as the renewal process every 5 years. In addition, any individual who pilots a vessel of 1,600 gross tons or over must have an annual physical examination but the report of this examination need not be forwarded to the Coast Guard. However, upon request, such a pilot must provide the Coast Guard with a copy of the report of his or her most recent physical examination.

Development of the Standards/Guidelines

The Coast Guard has always had some type of medical requirement for licensed mariners. Initially, specific standards covered only visual acuity and color vision, which are prescribed by federal regulation (46 C.F.R. § 10, 12, and 13). Other requirements were only generally stated. In 1989, the Coast Guard issued the first set of guidelines on what the physical examination

should address. Based on issues that arose over time, changes were made. Changes to these guidelines reflect review by the National Maritime Center's in-house medical staff as well as public review by outside organizations. Unions, vessel owners, vessel operators, mariners and occupational medicine physicians have all been involved in review of the guidelines.

The Coast Guard's Navigation and Vessel Inspection Circular (NVIC) No. 02-98 provides the current "Physical Evaluation Guidelines for Merchant Mariner's Documents and Licenses." These are *guidelines*, not standards, to provide general direction to the examiner in assessing the applicant's ability to perform the shipboard job for which s/he is seeking a license. The *Merchant Marine Physical Examination Report* requests that "Physicians completing the examination should ensure that mariners:

- Are of sound health.
- Have no physical limitations that would hinder or prevent performance of duties.
- Are physically and mentally able to stay alert for 4 to 6-hour shifts.
- Are free from any medical conditions that pose a risk of sudden incapacitation, which would affect operating, or working on vessels."

Legal Challenges

The Chief, Licensing and Evaluation Branch, is not aware of any legal challenges to either the guidelines or the overall Coast Guard process for medical examinations. Similarly, he is not aware of any collective bargaining or other labor issues related to the medical aspects of the mariner licensing program.

Legal Basis for Medical Fitness

The International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) requires the establishment of medical fitness standards for seafarers. The medical requirements for mariners are contained in 46 C.F.R. § 10, 12, and 13. The provisions of NVIC 02-98 provide detailed information about these standards.

Examiners

For many years Public Health Service (PHS) physicians performed the physical examination. Approximately 20 years ago, the laws were revised and as a result the scope of services performed by the PHS was reduced. Under these new laws, the PHS would no longer conduct physical examinations. As a result, USCG regulations were revised to allow the physical examinations to be performed by doctors, physician's assistants, or licensed practical nurses licensed by any state. There is no formal training or certification for the examiners. Either the applicant or his/her employer is responsible for the cost of the examination.

Application Review and Waiver Process

The Regional Employment Centers (REC) review the application and supporting documents, which include the physical examination report, and make a preliminary determination using the information in the NVIC as to whether or not the requested mariner's credential should be granted. If the REC feels that the applicant is capable of doing the job but the physical examination indicates a medical problem, then the application will be sent to the National Maritime Center for review by the Medical Review Board. The Medical Review Board then examines the report of physical examination and any other pertinent information the applicant

provides. The Board will recommend approval, disapproval, or request additional information. If approval is recommended, there may be a limitation placed on the applicant's credential to allow the applicant to serve in a position where the medical or physical condition will not have significant affect on his or her ability to perform the required duties. The Board's recommendation is returned to the Officer in Charge, Marine Inspection (OCMI)¹¹, the official who makes the final determination to issue or deny issuance of the credential. The REC is the organizational arm that works for the OCMI.

If more information is necessary, the applicant is given the opportunity to provide it. After receiving the additional information, if the REC still denies the application, the applicant may appeal that decision. The first level of appeal is the office where the decision was made. If it is not resolved to the applicant's satisfaction, he or she may appeal to the USCG District Commander, then the National Maritime Center.

The National Maritime Center handles 50,000 to 60,000 applications a year. This includes both new applications and renewals. Of these, 1200 to 1400 require a request for a waiver or conditional approval. Approximately 10 percent of the requests for medical waivers are denied.

Program Evaluation

The Chief, Licensing and Evaluation Branch, National Maritime Center, evaluates the overall process for licensing in terms of how smoothly it runs and the feedback that he receives from the field people in the RECs. He relies on the medical staff and information received from the RECs to make recommendations with regard to the need for changes in the medical guidelines.

Relationship to Job Requirements

The guidelines in NVIC 02-98 relate to the job requirements of a mariner. The standards for visual acuity and color vision are directly related to the requirement that the mariner be able to recognize navigation aids. The "agility, strength and flexibility" standards that all applicants must meet also relate directly to the job. Beyond these two sets of standards, specific job requirements are addressed in the waiver process. For example, if an individual has a physical handicap, including those covered by ADA, but is able to perform selected tasks, the credential granted under the waiver process could specify the type of job that the individual can hold.

Resource Requirements

Approximately 1 percent of the resources required to run the mariner licensing program are devoted to the medical examination process. One MD at the National Maritime Center handles the waivers, which total 1200 to 1400 annually. Occasionally there is need for consultation from a specialist physician.

Advice to the FRA

The Chief, Licensing and Evaluation Branch, National Maritime Center, suggests that the FRA identify the demands of each job and then determine the medical or physical conditions that would prevent an applicant from doing the job.

¹¹ Officer in Charge, Marine Inspection is the person charged by the Coast Guard with the responsibility of enforcing within a specified area the laws and regulations regarding the operation and inspection of vessels, the issuance of credentials to mariners, and the investigation of marine casualties.

References

Navigation and Vessel Inspection Circular (NVIC) 02-98. Retrieved December 10, 2003 from www.uscg.mil/hq/g-m/index.

2.4.2 Coast Guard Military Personnel

The U.S. Coast Guard, formerly a part of the U.S. DOT, is now a part of the Department of Homeland Security. The Coast Guard is considered a part of the Armed Forces of the U.S. and as such its members must be “physically fit and emotionally adaptable to military life.” There are two sets of medical standards that apply to Coast Guard personnel, one for accession to the service and one for retention in the service.

Accession Physicals

The Coast Guard uses the Military Entrance Processing Stations (MEP) for initial screening of all candidates for positions in the U.S. Coast Guard. The same medical standards (DoD Directive 6130.4) apply for all branches of military service, including the Coast Guard.

Frequency of Examination

The Coast Guard requires retention physicals every 2 years for aviators until age 50 when an annual physical is required. Other positions require a physical examination every 5 years. Retention physicals for aviators use the same DoD standards that are used for recruitment. However, there is a separate set of standards for retention physicals that apply to other positions. (See Chap. 3, Medical Manual, COMDTINST M6000.1B)

Development of Standards/Guidelines

About 4 years ago the various branches of the Armed Forces, including the Coast Guard, adopted a common set of medical standards. These standards are used for the Coast Guard accession physicals. With regard to retention physicals, the Coast Guard has its own set of standards and medical guidelines. The Coast Guard tends not to make changes to its medical standards but does revise its guidelines for waivers as new medical information becomes available. For example, until recently depression was a disqualifying condition for retention. Because many types of depression can be controlled with drugs, the Coast Guard now evaluates each case individually rather than categorically disqualifying anyone with depression.

Examiners

MEPs employ civilian physicians, preferably with some prior military experience, to conduct the physical examination. Physicians in the Coast Guard, any branch of the military and some civilian physicians may perform retention physicals. Civilian physicians who perform these examinations must have some working knowledge of military duties. An NP or PA (with oversight from a physician) may also conduct the examination. However, the Coast Guard permits only military flight surgeons or aviation medical examiners (AMEs) who are retired military flight surgeons to perform physicals for aviators.

Waiver Process

The Commander, Coast Guard Personnel Command, oversees the waiver process and makes the final determination as to whether or not a waiver is granted. There are two types of waivers: temporary and permanent. A temporary waiver may be authorized when the condition is not

stable and may change over time. This type of waiver is usually issued for a specific time period and requires medical re-evaluation for an extension. In contrast, a permanent waiver may be authorized when the condition is stable and it has been demonstrated that the condition does not impair the individual's ability to perform his or her duties.

Accession – The MEPS sends the results of the accession physical examination back to the Coast Guard recruiter who submits them to support the candidate's entrance into the Coast Guard. Depending upon the position that the individual is likely to fill, the Recruiting Command may issue a waiver for a candidate who fails to meet some aspect of the medical standards.

Retention – For positions other than aviators, if the individual fails to meet the medical standards for retention, his or her Commanding Officer may request a review of the case from the Coast Guard Personnel Command. The Personnel Command may issue a waiver if the individual can perform the duties of his/her current position. The waiver process for aviators requires review by a Personnel Command Flight Surgeon and, in complicated cases, an evaluation by a Board consisting of at least three flight surgeons and two pilots. The Board reviews the case and makes a recommendation to the Personnel Command.

The Coast Guard handles 2200 waiver requests per year for accession and 450 for retention. Physicians review the waiver requests and recommend the appropriate action. Most requests for waivers involve aviators.

Program Evaluation

The Coast Guard does not have a formal process for evaluating its medical screening program. However, the Division of Operational Medicine keeps abreast of medical developments in the diagnosis and treatment of diseases and seeks to incorporate the latest medical knowledge and practice into the application of the existing standards.

Relationship to Job Requirements

Because Coast Guard personnel can potentially be deployed anywhere in the world on active duty, the Coast Guard adheres to military medical standards for entry into the Coast Guard. The DoD Medical standards are designed to assure that candidates are:

- “Free of contagious diseases that would likely endanger the health of other personnel.
- Free of medical conditions or physical defects that would require excessive time lost from duty for necessary treatment or hospitalization or would likely result in separation from the Army for medical unfitness.
- Medically capable of satisfactorily completing required training.
- Medically adaptable to the military environment without the necessity of geographical area limitations.
- Medically capable of performing duties without aggravation of existing physical defects or medical conditions.” (DoD Directive 6130.3)

Since some medical conditions develop with age or as a result of military activity, the Coast Guard evaluates each retention circumstance individually. Depending upon the individual's duties, a waiver may be issued.

Resource Requirements

Two physicians handle all waiver applications.

Advice to the FRA

The Chief of the Coast Guard's Medical Readiness Branch recommends that a program of medical standards for railroad workers include guidelines to the physician as to appropriate medical examination techniques and lab testing standards. The guidelines should also include the accepted method for making a diagnosis. Guidelines help to assure some consistency in a medical screening program.

References

DoD Directive 6130.4, "Criteria and Procedure Requirements for Physical Standards for Appointment, Enlistment, or Induction in the Armed Forces," December 14, 2000.

Coast Guard Aviation Medicine Manual, COMDTINST M6410.3, May 28, 2003.

Medical Manual, Chap. 3, COMDTINST M6000.1B.

2.5 Comparison of FRA with other Agencies

The current FRA medical standards cover only vision and hearing and, as such, are much less extensive than those of the other DOT modal administrations. Table 6 summarizes the conditions that are covered by each set of modal standards. (The USCG medical standards are more rigorous than the others due to the military readiness requirement. For this reason they are not included in this table.) The FAA's standards for airmen and the USCG's standards for mariners are the most comprehensive. FMCSA's motor carrier standards and the FAA's standards for ATCSs are similar to those for airmen and mariners with the exception of hematological conditions, allergies and infectious disease.

There are a number of differences between the FRA and the other agencies in terms of the way in which the agency administers its medical standards program. The FAA program is the most centralized. The FAA certifies the examiners, reviews the examination results and grants variances from regulations and guidelines. In contrast, the FMCSA and the USCG mariner programs do not certify the examiners and do not review the quality of the examination or its results unless there is a waiver request. The FRA never reviews examination results. The FAA and the USCG each have designated individuals with authority to issue waivers. The USCG uses a similar process for both the mariner program and the military program. At the FAA, Regional Flight Surgeons and the Federal Air Surgeon are involved in this process. In the case of pilots, the individual may take his/her case to the NTSB and eventually the U.S. courts. For FMCSA, approval of a waiver request involves a *Federal Register* announcement with a public comment period. With regard to railroads, the individual railroad's medical officer in consultation with the Supervisor of Locomotive Engineers may determine that, in spite of failing to pass the hearing or vision examination, an individual's job is such that s/he can still work safely. FRA's Locomotive Engineer Certification Board will review disputes regarding the examination procedure but not medical findings.

Table 6. Medical conditions addressed by modal standards

Condition	FRA	FMCSA	FAA Airmen	FAA ATCS	USCG non-military
Vision	✓	✓	✓	ATCSHP	✓
Hearing	✓	✓	✓	ATCSHP	NVIC
Musculoskeletal		✓	AME Guide	ATCSHP	NVIC
Diabetes		✓	✓	ATCSHP	NVIC
Other Endocrine			AME Guide		NVIC
Cardiac		✓	✓	ATCSHP	NVIC
Gastrointestinal			AME Guide		NVIC
Respiratory		✓	AME Guide		NVIC
Sleep Disorders		AC	AME Guide		NVIC
Hypertension		✓	AME Guide	ATCSHP	NVIC
Seizures		✓	✓	ATCSHP	NVIC
Other Neurologic		✓	AME Guide	ATCSHP	NVIC
Psychiatric		✓	✓	ATCSHP	NVIC
Renal			AME Guide		NVIC
Medication Use	✓	✓	✓	ATCSHP	NVIC
Hematological			AME Guide		NVIC
Allergies			AME Guide		NVIC
Infectious Disease			AME Guide		NVIC
Key					
✓	included in CFR				
AME Guide	<i>Guide to Aviation Medical Examiners</i>				
ATCSHP	<i>Air Traffic Control Specialist Health Program</i>				
NVIC	<i>Vessel and Navigation Information Circular 02-98</i>				
AC	<i>FMCSA Advisory Criteria</i>				

Characteristics of the individual modal programs have additional differences. Physicians are responsible for FRA and FAA examinations but the Coast Guard mariner program and FMCSA permit any health care provider who is permitted to perform independent examinations by their state license, to perform the medical examination. Each agency provides some level of guidance to its examiners. The FRA's guidelines are a part of the regulation. The FAA, FMCSA and USCG publish separate guideline documents for the examiners. The FMCSA examination report form also contains limited guidance for the examiner.

3. Medical Standards Programs of Foreign Railroad Agencies/Organizations

Within the past 10 years government agencies in Canada, Australia and the U.K. have instituted medical standards for their railroad workers. In both Canada and Australia, serious accidents caused by the medical condition of an employee were the impetus for the development of the program. The program of the U.K. Rail Safety Standards Board has been in effect since 1994 but prior to that British Rail had its own program, which was the basis for the current standards. Mexico has a program of medical standards for all transportation workers. The Mexican program predates those of the other three countries.

In the absence of government rules for medical screening of railroad workers, the foreign railroads did take the initiative to develop their own standards. Over 50 years ago the European railroad industry on its own began the development medical standards. In 1948 representatives of five European railroads founded the Union Internationale des Services Médicaux des Chemins de fer (UIMC), an association of European railroad medical officers. While not a regulatory agency, this organization developed voluntary medical guidelines for “high safety risk” and “safety risk” employees.

This chapter describes the four foreign government programs as well as the UIMC medical guidelines. Table 7 compares these programs with the current FRA program.

3.1 Transport Canada

The Canadian program for medical examinations of individuals holding safety critical railroad positions has been in effect since November 2001. Because Canadian law allows Transport Canada to approve a rule that is drafted by the railroad industry, an industry-led committee was responsible for the development of the Canadian medical standards program.

Development of Rules/Guidelines

Vision and hearing standards for railway employees have existed in Canada since 1978. The Foisy Commission that investigated the Hinton train collision in 1986 recommended “that the Canadian Transport Commission 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 Railway Transport Committee set out in 1987 to examine the issue of expanded medical examinations. Draft regulations were developed with the requirement for a comprehensive physical examination that included “special investigations if clinically indicated having regard for the examinee’s age and work duties.” The draft regulation also required railway companies to file standards for medical fitness in each of several aspects of medical fitness (e.g., nervous system, cardiovascular system). These regulations were still under development when the Railway Safety Act of 1989 became law. This legislation repealed the regulatory authority under which the medical standards were being developed.

Table 7. Comparison of U.S. and foreign railroad medical standards programs

	U.S.	Australia	Canada
Oversight agency	DOT/FRA	Each state responsible for oversight	Transport Canada
Developers of system	FRA, through RSAC process	State of Victoria through safety branch of Dept. of Infrastructure National Standards by National Transport Commission (NTC)	Industry led committee (Railway Transport Committee)- ultimately approved by Transport Canada
Risk based standards?	No	Yes	Yes
Covered Positions	Locomotive engineers Remote control operators	<ul style="list-style-type: none"> Levels 1,2 (High safety critical and safety critical employees): For any aspect of the tasks identified, ill health could lead directly to a serious incident affecting the public or the rail network Level 3 (Around the track personnel - uncontrolled environment) Ill health would not lead to serious incident affecting public or rail network 	<ul style="list-style-type: none"> Any railway position directly engaged in operation of trains in main track or yard service Any railway position engaged in rail traffic control.
Frequency of exams	Every 3 yr, vision and hearing only	<ul style="list-style-type: none"> Safety critical employee Levels 1,2,3 - upon hire and job change to higher category Levels 1,2 - up to age 49 every 5 yr, 50-59 every 2 yr, and >60 annually Level 3 - every 5 yr beginning at 50 	<ul style="list-style-type: none"> Before safety critical work, and upon promotion or transfer to a safety critical position Every 5 yr until 40 and every 3 yr thereafter until retirement, or until no longer in a safety critical position
Examiners	Physician or PA selected by RR	<ul style="list-style-type: none"> Safety Critical Employees Levels 1,2: Physician Level 3: nurse with occupational health qualifications 	Physician (employed or contracted)
Examiner credentialed by railroad?	No	Yes	Yes
Information given to examiners	Found in standards	Volume 2 of the Standard, <i>Assessment Procedures and Medical Criteria</i> , employee's job description.	Copy of the rules, medical guidelines, employee's job description
Dispute resolution	Locomotive Engineer Review Board	Each railroad responsible for self	Railroad's Chief Medical Officer (CMO) makes final determination
Waivers/exemption	Railroad's Medical Officer in consultation with Supervisor of Locomotive Engineers/Remote Control Operators may waive requirement	Examining physician can determine "Fit-for-duty, subject to review"	CMO can specify limitations

	U.K.	Mexico
Oversight agency	Health and Safety Commission (HSC)	Secretaria de Comunicaciones y Transportes (SCT)
Developers of system	Rail Safety Standards Board (a not for profit company owned by major industry stakeholders) taken largely from British Rail	Servicio de Medicina Preventiva en el Transporte
Risk based standards?	Yes	
Covered Positions	<ul style="list-style-type: none"> • Drivers, signalers (dispatchers), guards, shunters (conductors), and some others. • Track workers must meet basic vision, hearing, and mobility requirements 	<ul style="list-style-type: none"> • Train crew • Dispatchers
Frequency of exams	<ul style="list-style-type: none"> • Before safety critical work. • Under 40 yr every 10 yr 40-49 every 6 yr, 50-59 – 4 yr, >60 – 2 yr 	<ul style="list-style-type: none"> • Every 2 yr • Daily upon reporting for work
Examiners	By or under the supervision of a registered medical practitioner	Physician
Examiner credentialed by railroad?	No	No. Credentialed by SCT.
Information given to examiners	Proprietary	
Dispute resolution	Human Rights legislation requires appeals process, but no process exists yet	SCT physician makes final determination
Waivers/exemption	“Discretion” clause allows employer to set up safe system of work for those failing to meet requirements. Advice comes from occupational physician	

Note: Box is blank if information was not available.

	U.S.	Australia	Canada
Program Evaluation	None	Proposed national review in 2-5 years. Indicators of effectiveness not yet fully developed	Lack of medical issues in accident reports, employee productivity (decreased absenteeism)
Medical record confidentiality	HIPAA	Info cannot be disclosed to employer without employee approval (similar to HIPAA)	Government cannot see medical records
Legal issues	None	Requirements of the commonwealth and state anti-discrimination and privacy statutes	Human Rights Code which prevents dismissal of an employee for drug or alcohol use
Labor concerns	None	Salary maintenance for disqualified workers Blood test (part of cardiac risk assessment)	Salary maintenance for disqualified workers Privacy concern
Resources	No additional staff required.	Annual cost for 40,000 rail safety workers to be \$2,112,770 or \$53 per employee	No additional staff required. Handled by existing railroad inspectors
Medical standards' relation to job requirements	Based on operator requirements per existing DOT standards	Focused on the inherent requirements of the job.	Assessment considers occupational demands of the job and person's ability to meet those demands.
Salary continuance if disqualified	Through Railroad Retirement Board, employee may be eligible for sickness, unemployment or disability benefits	Covered by Commonwealth or State public welfare programs	Covered through existing disability insurance program

	U.K.	Mexico
Program Evaluation	No formal process	
Medical record confidentiality	Information cannot be obtained from family doctors or hospitals or passed on to employers without employees consent. (similar to HIPPA)	
Legal issues	Hearing standards for guards were disputed but failed. Health and Safety law overrode disability legislation.	
Labor concerns	Not an issue. Unions are consulted on prospect of changes, but do not exercise a veto. Challenges to a standard are rare and usually resolved between union and employer	
Resources	No additional staff required, however RSSB says resource levels are inadequate	
Medical standards' relation to job requirements	Link between risks and fitness standards but RSSB says the relevance of link to current operations needs review.	
Salary continuance if disqualified	Varies by Railroad	

Note: Box is blank if information was not available.

The Railway Safety Act of 1989 included three provisions relating to employee medical standards. First, railway employees in positions deemed critical to safe railway operations must undergo *annual* medical examinations, including hearing and vision assessment. This Act further specifies that a physician treating a person in a Safety Critical Position must report to the railway's Chief Medical Officer (CMO) any medical condition that they believe could constitute a threat to safe railway operations. Finally, the Railway Safety Act requires that individuals in a Safety Critical Position must inform their physician or optometrist of their position.

Although this legislation was enacted in 1989, the above provisions were not fully put into practice due to their reliance on a regulation that defined Safety Critical Positions (SCPs). No such regulation existed in 1989. Also, railway industry experts found the provision for annual examinations to be excessive. (Revisions to the Railway Safety Act, which came into effect on June 1, 1999, eliminated the annual requirement.)

An initiative aimed at drafting a new medical rule for Safety Critical Positions commenced in 1996 at the request of Transport Canada. In contrast to the U.S., Transport Canada can request that the railroad industry draft a rule which Transport Canada can review and approve. The Railway Association of Canada's (RAC) Safety and Operations Management General Committee authorized a formal Medical Steering Committee to oversee development of 1) Rules Identifying Safety Critical Positions and 2) Rules Governing Medical Standards for SCPs.

The Steering Committee included representatives of the various RAC member railways and railroad labor. Committee members represented Regulatory Affairs, Medical, Employee Relations, Labor Relations and Law departments. A representative from Transport Canada also participated on the committee. A Medical Working Group consisting of the Chief Medical Officers from Canadian National Railway, Canadian Pacific Railway and VIA Rail Canada was also formed to work with medical specialists in the development of specific medical requirements and the guidelines to support the medical rules. A physician from Transport Canada, and labor representatives were also members of this group. The Medical Working Group sought advice from medical specialists in each specialty area covered by the guidelines and the member railroads shared the related expenses. The medical guidelines that the group developed are in accordance with nationally accepted standards of care.

The Steering Committee's mandate was to develop rules that would provide a means to identify SCPs based on potential risk to public safety. In addition, this Committee was responsible for identifying medical requirements that address those diseases or disorders that have the potential to impact railway safety. In accordance with the Railway Safety Act, the Steering Committee consulted with railway labor organizations throughout the development process.

The RAC developed both the *Safety Critical Position Rules* and the *Railway Medical Rules*. The *Safety Critical Position Rules* became effective on September 30, 2000. The *Medical Rules* went into effect on November 29, 2001. The new rules supersede the old regulations that covered vision and hearing examinations.

Positions Covered

The *Safety Critical Position Rule* defines a Safety Critical Position 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."

Since individual railroads may use different titles for their positions, the rule does not identify specific occupational classifications but instead requires each railroad to identify those positions it defines as “safety critical.” Each railroad must file its list of SCPs with Transport Canada and this list must be updated periodically. A typical list of occupations might include:

- Locomotive engineer
- Conductor
- Assistant conductor (brakeman)
- Yard foreman
- Rail traffic controller (train dispatcher)
- Chief rail traffic controller
- Assistant chief rail traffic controller
- Operators of specialized equipment operating as trains
- Assistant superintendent (trainmaster)

Relationship to Job Requirements

The *Medical Rules for Positions Critical to Safe Railway Operations* state that “In addition to the medical conditions referred to in Section 5.2, the individual assessment of a person’s Medical Fitness for Duty shall also take into consideration...the occupational demands of the person’s job and the person’s ability to meet those demands...” The physician is thus given discretion to consider each job incumbent individually.

Frequency of Examinations

The *Railway Medical Rule* requires a medical evaluation:

- a) “prior to commencement of employment in a Safety Critical Position;
- b) upon promotion or transfer to a Safety Critical Position; and
- c) every 5 years until the age of 40 and every 3 years thereafter until retirement, or until that person is no longer employed in a Safety Critical Position.”

The Chief Medical Officer may require additional assessments if the individual has a medical condition that warrants more frequent monitoring or if the individual is returning to work in a Safety Critical Position after a leave due to illness or injury.

Examiners

Each railroad has discretion to decide whether medical examinations will be conducted by a railroad physician or a private physician. When the rules went into effect, every physician in Canada received a copy of the rules and the medical guidelines. They were also provided with contact numbers for all the major Canadian Railroads. This mailing clearly spelled out the responsibility of every physician when examining a railroad employee.

If the examination is performed by a non-railroad physician, it is the physician’s responsibility to send a report describing the results of the physical examination to the Chief Medical Officer of the employee’s railroad. Physicians in Canada were already familiar with the medical reporting

requirements for commercial drivers so they readily adapted to the new system for railroad workers.

Dispute Resolution

The Railroad's Chief Medical Officer makes the final determination as to whether or not an individual satisfies the medical requirements for a safety critical position. Depending upon the circumstances, the CMO may recommend remedial measures to correct a problem and bring the employee in compliance with the standards.

Program Oversight

Transport Canada performs an oversight role with regard to medical programs of individual railroads. Periodic audits, conducted under the Safety Management System Regulations, include review of overall statistics for the railroad. For example, the railroad must report the number of physicals given, the number of employees disqualified and the remedial actions taken, if any.

Program Evaluation

The two factors that Transport Canada considers in evaluating the success of the medical standards program are a lack of medical issues in accident reports and an increase in railroad employee productivity (decreased absenteeism). Many of the Canadian railroads have undertaken a health education program for their employees so this may be contributing to increased productivity as well.

Transport Canada anticipates that either a union or railroad official would notify them of any problems with either the rules or the medical guidelines. To date this has not occurred.

Legal Issues

Two legal issues arose in the process of developing the medical rules. The first was a privacy concern. No personal medical information could be released to the government. The second issue related to Canada's Human Rights Code which prevents dismissal of an employee for drug or alcohol use. Both requirements were reflected in the final rules.

Labor Concerns

Early in the process of developing the rules and guidelines labor raised one concern. Because the new standards might disqualify some individuals from the jobs that they currently hold, labor wanted assurance that their members would not suffer a loss of income. This issue was resolved by covering this situation through the existing disability insurance program. To date, Transport Canada is not aware of any problems with this provision.

Resources

Transport Canada has not added any additional staff to oversee the implementation of medical standards programs at Canadian railroads. This oversight will become part of the routine work requirements of the agency's railroad inspectors.

The railroads bear the expense of the occupational fitness examination.

Recommendations to the FRA

Representatives from Transport Canada who were involved in the Canadian effort believe that the following will contribute to the successful development of medical standards:

- Get buy-in from all stakeholders—labor, management, regulatory authority and medical community.
- Allow the medical community to draft the guidelines. Include medical representatives from each stakeholder group.

The Chief Medical Officer from a Canadian railroad offered the following advice:

- It is important to adequately compensate the physician for the fitness examination so that a thorough exam is performed.
- There must be a process in place for continuing short term disability if a treating physician releases an employee as fit to work but the chief medical officer does not agree with the determination.
- Education is an important component of a successful program. Canadian medical schools now cover the Railway Safety Act as part of their occupational medicine curriculum.
- There are several players in ensuring that rail employees in safety critical operations are fit to work. All participants in the process must have a well defined role. The employee must notify his/her physicians that they are in a railroad safety critical position. The treating providers have the ongoing relationship with the employee and need to understand the role the medical condition may have on safety.

References

Railway Medical Rules for Positions Critical to Safe Railway Operations, June 2000.

Railway Rules Governing Safety Critical Positions, June 2000.

Canadian Railway Medical Rules Handbook (for positions critical to safe railway operations), Railway Association of Canada, March 2003.

3.2 National Transport Commission – Australia

Three significant accidents since 2001 in which the cause of the accidents were due to medical condition of the operator, has prompted the Australian Transport Council of Ministers to support the development of a national medical standard for rail safety workers.¹² The National Transport Commission, a policy organization, developed the national standard which went into effect on July 1, 2004.

Railroad Regulatory Environment

Over the past decade, Australia's state-based rail network and state-based ownership and management of rail operations has changed significantly as the country evolved to private ownership. There are now some 193 separate rail organizations. Each railroad has adopted its own medical screening program with limited oversight and guidance. As a result there is variation from railroad to railroad. The individual sets of standards do not always reflect current medical developments, may be inadequate to screen for medical conditions relevant for a given position and in some cases may be in conflict with state or commonwealth privacy and anti-discrimination laws.

¹² The ATC consists of the commonwealth, state and territory Ministers of Transport.

Unlike the U.S., there is no commonwealth agency with oversight or regulatory responsibility for railroads. This function exists at the state level and the extent of regulation differs by state. All Australian states now have safety legislation that incorporates an accreditation system. The accreditation system contains the following core requirements:

- Rail organizations wishing to conduct a rail business must seek accreditation from the Regulator.
- The rail organization must have an appropriate Rail Safety Management System developed, resourced and implemented and submitted to the Regulator.

All state regulatory agencies require that the Safety Management System meet the requirements of *Australian Standard AS 4292: Railway Safety Management*. According to this standard, a SMS should include procedures for ensuring health and fitness of rail safety workers.

Development of Rules/Guidelines

Investigation of two rail accidents in Victoria, one in 2001 and one in 2002, found the condition of the driver to be the likely cause of the accident. In one case the driver was impaired by migraine symptoms, and possibly treatment, and stressful personal circumstances. In the other accident, the driver was taking prescription medication, which combined with the early start of his work day and a history of chronically disturbed sleep, may have resulted in a microsleep while driving the train. The Australian Transportation Safety Board investigation of these accidents recommended improvements to the management and quality of medical fitness standards. Following these two accidents, the state of Victoria undertook a process to develop a new set of medical standards.

The State of Victoria, through the Public Transport Safety Branch of its Department of Infrastructure, undertook the task of developing a *Code of Practice for Health Assessment for Rail Safety Workers* and companion *Guidelines for Authorised Health Professionals Conducting Health Assessments*. Under the Victoria Transport Act of 1983, a statutory code of practice provides practical guidance to accredited rail organizations. Its legal force differs slightly from regulations. While compliance with the Code constitutes compliance with the provision of an Act or Regulation to which the code gives practical guidance, a rail organization can implement an equivalent or better method of compliance, but must justify this to the Regulator. Draft versions of these documents were circulated for review and comment in May 2003.

Another accident that occurred in New South Wales in January 2003 prompted the Transport Ministers from both New South Wales and Victoria to encourage the ATC to support the development of a national medical standard for rail safety workers. Since the development of the Victorian standard was already underway, the process for developing a national standard used the draft Victorian guidelines and code of practice as a starting point. The National Road Transport Commission (NRTC), a policy organization, was given responsibility for developing the standards and the Project Manager from the Victoria standards project was appointed to lead this effort. The National Transport Commission (NTC), established in January 2004, includes the former NRTC and has responsibility for oversight of railroad operations.

The primary objective of the proposed National Standard is “to reduce the risk of a serious rail safety incident occurring due to the ill health and fitness for duty of a rail safety worker.” Secondary objectives are:

- a) To improve the technical currency of the medical standards making them a better predictive and preventive management tool for potentially incapacitating medical conditions of rail safety workers.
- b) Ensure the medical standards match the risk of the task to improve safety outcomes and result in cost-effective expenditure for rail organizations.
- c) Improve health assessment management systems and clarify accountability.
- d) Ensure appropriate use of rail safety worker medical information.
- e) Provide consistency in health assessments and improve portability of rail safety workers within risk categories.

The Project Team for the development of the standard consists of:

- Manager, Safety Policy and Planning, Department of Infrastructure, Victoria (overall project manager)
- An NRTC Project Manager
- An Occupational Health Physician
- A Management Systems Consultant

In addition to the Overall Project Manager, the occupational health physician and management systems consultant were involved with development of the Victorian standard.

A *National Reference Group* provided overall guidance and was a source of industry information in the development of the standard. This Group was composed of representatives from three state rail regulatory authorities, three railroad industry health professionals, representatives from the various types of rail organizations and representatives from the Rail, Bus and Tram Union.

In addition, three specialist groups were assembled to deal with specific issues. These three groups were:

- National Risk Analysis Working Group
- National Medical Working Group, consisting primarily of physicians
- National Tourist and Heritage Workshop Representatives

The last group dealt with issues unique to the many tourist and heritage railroads in Australia.

The project team made changes to the draft Victorian standard to further develop the risk guideline and to review the medical conditions and management systems in drafting the proposed national standard. As a result, the package of documents has been recast to comprise:

- *Volume 1: Management Systems* which outlines the responsibilities of the various parties and the provisions for a health risk management approach and administrative systems.
- *Volume 2: Assessment Procedures and Medical Criteria* which contains the medical standards, criteria and tests necessary to perform assessments.
- *Guideline for Health Risk Management*, a supporting document to assist with carrying out the risk analysis of rail safety work as a basis for allocating workers to the appropriate level of health assessment.

The national draft was distributed for national industry comment on December 12, 2003. The comment period closed February 13, 2004. The project team completed the development process by mid-March so that the proposed standard could be considered by the NTC, the Rail Consultative Forum and Transport Agency Chief Executives before submission to the ATC in April. The ATC approved the national standard on April 30. It went into effect on July 1.

During the comment period, representatives from the Project Team conducted briefing sessions in every state with State Rail Regulators and the industry. The purpose of the briefings was to familiarize each state's rail industry as well as labor with the new standard. In addition, during development of the Victorian standard, numerous briefings were conducted for the industry medical practitioners in Victoria as a way to familiarize the medical community with the railroad environment and encourage them to make themselves available to the railroad industry for health assessments. These briefings included a tour of railroad facilities and were conducted in Melbourne and regional centers.

During the consultation process, several issues arose leading to modifications to the draft standard. A variation was made to the privacy arrangements. The Standard was modified to allow the exchange of information between Authorized Health Professionals and Chief Medical Officers in rail organizations on the clear understanding that State and Federal Privacy requirements and health Records Privacy requirements are met. Phasing-in arrangements were also a concern. Some rail organizations argued that the timeframes allowed would place the companies under extreme pressure to complete the first set of assessments within the time allotted. At issue was the likelihood of a serious cash flow burden on their operations and access to the requisite medical resources. To address this issue, the standard now provides for a procedure whereby rail organizations may propose alternative transitional arrangements to the rail safety regulator. The proposal should be based on a risk analysis and should set out how the organization intends to prioritize health assessments to minimize risks and to achieve earliest implementation. With regard to the specific medical assessment procedures and medical criteria, concern was expressed that the procedure for cardiac assessment did not adequately address cardiac risk factors. On the advice of the Medical Working Group, the Industry Reference Group agreed to a modified approach.

As the Victorian development and consultation processes had progressed further than the national processes generally, the Victorian Regulator adopted the National Standard as a statutory code of practice on December 17, 2003 to take effect on that date for all rail organizations accredited to operate in Victoria. The exceptions are the not-for-profit tourist and heritage rail organizations for which the code of practice is effective from March 1, 2004. The changes that resulted from the national industry comment were incorporated into the Victorian code so that it conforms to the national standard.

Positions Covered/Relationship to Job Requirements

The draft Australian medical standard is risk-based. It requires every railroad to perform a health risk management assessment to determine the extent to which the health of a worker may contribute to a serious incident (safety critical work) and especially, the consequences of sudden incapacitation of the worker (high level safety critical work). This requirement to undertake this job analysis that identifies the risk of each task the job entails and the health requirements for each task, are contained in the *Volume 1: Management Systems*. The *Guidelines for Health Risk Management* provide a methodology and examples for carrying out the risk analysis. The risk

analysis process seeks to identify the full range of tasks likely to be performed by the worker and considers the engineering and procedural environment.

The risk analysis process addresses the question, “For any aspect of the tasks identified, could ill health lead directly to a serious incident affecting the public or the rail network?” If the answer is “yes” then the job is safety critical, otherwise it is a non-safety critical job. The safety critical jobs are divided into “High Level Safety Critical Worker” and “Safety Critical Worker.” The differentiating factor is whether or not the sudden incapacitation of the worker could lead to a serious incident affecting the public or the rail network.

Non-safety critical workers are referred to as Around the Track Personnel (ATTP). These are divided into two categories depending upon whether or not the tasks are performed within a “controlled environment.” A controlled environment is one in which controls are in place to ensure that any person working in or transiting the area is not placed at risk from moving trains.

In developing the process for conducting the risk assessment, care was taken to assure that the process, and hence any medical requirements, focused on the *inherent requirements* of the job. By doing this, the resulting requirements would be in conformance with the Australian anti-discrimination legislation. (Note: This is similar to EEOC guidelines in the U.S. that require any testing or job requirements to relate to *bona fide* occupational qualifications.)

The extent of health assessment required depends upon the category of worker. Table 8 presents the required assessments.

It is important to note that the proposed standard does not identify medical requirements for specific jobs but rather a *process* for determining which jobs must have the requirements. The *Guideline for Health Risk Management* explains the risk assessment process and provides examples of risk assessments for various rail safety tasks.

Frequency of Examinations

The proposed standard identifies three situations that require a health assessment:

1. *Pre-placement or change of grade* – Rail safety workers in Categories 1, 2, and 3 require health assessments upon hire or when changing to a higher category job.
2. *Periodic health assessments* – Safety Critical Workers (Categories 1 and 2) must have an assessment every 5 years until age 50, every 2 years between ages 50 and 60, and annually beginning at age 60. Category 3 workers must have a health assessment every 5 years beginning at age 50.
3. *Triggered health assessment* – Special situations that necessitate a health assessment include follow-up assessment for employees found “Fit for Duty Subject to Review” or “Temporarily Unfit for Duty subject to Review,” workers who have been absent from work due to injury or illness, and prolonged or recurrent sick leave patterns.

The frequency of the periodic health assessments was determined based on current medical knowledge. The rationale is documented in a reference paper, “Development of Medical Standards for Rail Safety Workers.”

Table 8. Type of health assessment by risk category

Risk Category	Health Assessment Required
<i>Category 1</i>	Safety Critical Worker Health Assessment including:
High Level Safety Critical Worker	<ul style="list-style-type: none"> • Employee questionnaire and history • Comprehensive physical and psychological assessment • Vision and hearing • Screen-Based Equipment examination if required Plus <ul style="list-style-type: none"> • Cardiac Risk Score
<i>Category 2</i>	Safety Critical Worker Health Assessment including:
Safety Critical Worker	<ul style="list-style-type: none"> • Employee questionnaire and history • Comprehensive physical and psychological assessment • Vision and hearing • Screen-Based Equipment examination if required
<i>Category 3</i>	Track Safety Health Assessment including:
Around the Track Personnel (Uncontrolled Environment)	<ul style="list-style-type: none"> • Vision • Hearing • Mobility
<i>Category 4</i>	No prescribed health assessment
Other than those in Categories 1-3 including Around the Track Personnel in Controlled Environment	

Examiners

Safety Critical Worker health assessments must be performed by a physician (Categories 1 and 2). Track safety health assessments (Category 3) may be performed by a nurse with occupational health qualifications. The *Management Systems* volume of the standard states that, “The health professional must have a qualification in medicine and should have an interest or experience in occupational medicine.” In addition, “The health professional should demonstrate understanding of the rail industry environment including work performed and risks involved” and “should demonstrate familiarity with the Standard and a working knowledge of Volume 2 of the Standard, *Assessment of Procedures and Medical Criteria*.”

Rail organizations are free to either use physicians that are railroad employees or contract for the service.

Dispute Resolution

The Australian standard does not address dispute resolution. Each railroad must establish its own procedures.

Program Oversight

The regulatory agencies in each state will be responsible for assuring that each rail organization has a health assessment procedure in place that meets the requirements of the standard. This includes a management system for notifying employees of the need for them to have a current assessment and tracking the results of the assessment. Australian privacy laws also require that the confidentiality of medical information be maintained. Medical information cannot be disclosed to the employer without the permission of the employee. (Note: This is similar to the new HIPAA requirements taking effect in the U.S.)

Program Evaluation

The project team proposed that a national process under the auspice of the NTC be established to review and revise the standard every 5 years. They further recommended that this review process take account of the review of the national medical guidelines for commercial vehicle drivers. Indicators of effectiveness have not been fully developed at this stage.

Legal Issues

In developing the new medical standard, the committee had to work within the requirements of the commonwealth and state anti-discrimination and privacy statutes. By using a risk-based performance approach the new standard does not violate these statutes. In addition, the new system also had to meet the requirements of privacy legislation that protects the integrity of personal information. Health records must be managed and stored in accordance with the Privacy Principles mandated by law. Workers must be informed of

- the purpose for collecting and storing the health information;
- what information will be stored and where;
- the fact that they can access the information; and
- to whom the information may be disclosed.

Strict adherence to the privacy provisions in the Standard is essential to ensure union acceptance of the standard and worker cooperation with a more intrusive health assessment process.

Labor Concerns

Labor saw the new standard as a benefit to their people and did not object to the new process and standard. They were willing to accept the personal questions involved in the health assessments for Safety Critical Workers (categories 1 and 2) because of privacy guarantees. There was some concern raised about the need for the blood test, which is part of the cardiac risk assessment. Labor was also concerned about salary maintenance for those who did not meet the new health assessment criteria.

Resources

The state regulators will audit implementation of the new health assessment process as a part of their regular safety audit so no additional resources should be necessary. New South Wales,

which will enforce a penalty system for non-compliance, estimates additional expenses of \$50,000.¹³

In terms of cost to the railroad industry, the *Preliminary Impact Statement* estimates that the incremental annual cost to industry for 40,000 rail safety workers will be \$2.12 million. This is an average of \$53 per employee. The Regulatory Impact Statement also estimated expected net annual savings of \$3.78 million from implementation of the standard.

Recommendations to the FRA

The National Project Manager recommends that the FRA consider the Australian standard for application in the U.S. It is a robust standard, in terms of the risk approach, privacy principles and the up-to-date medical criteria.

The system involves a fairly intrusive assessment of psychological as well as physical health and depends on triggered assessments as well as periodic. For this reason, some cultural change in the industry is necessary to encourage trust relationships between management and labor. Additional costs are involved also for management as the Category 1 assessments require pathology and long appointments. The Australian consultation processes have helped to bring unions and management along and the FRA would need to adopt a similar consultation stage to achieve success.

References

National Standard for Health Assessment of Rail Safety Workers, Volume 1: Management Systems (Post-Consultation Draft), March 2004, National Transport Commission.

National Standard for Health Assessment of Rail Safety Workers, Volume 2: Health Assessment Procedures and Medical Criteria (Post-Consultation Draft), March 2004, National Transport Commission.

National Standard for Health Assessment of Rail Safety Workers, Guideline for Health Risk Management (Post-Consultation Draft), March 2004, National Transport Commission.

National Health Assessment Standard Model Forms, April 2004, National Transport Commission.

Development of Medical Standards for Rail Safety Workers, Safety Branch, Public Transport Division, Department of Infrastructure, May 2003 (Reference Paper)

Proposed National Health Assessment Standard for Rail Safety Workers, Preliminary Impact Statement, December 2003, National Transport Commission.

3.3 Rail Safety and Standards Board – U.K.

Railway regulations for safety critical work have been in force since 1994, shortly after railway privatization. Those regulations are documented in the Railway Group Standards created by Railway Safety (now Rail Safety and Standards Board –RSSB). Britain's Health and Safety Commission (HSC) is responsible for oversight.

¹³ Costs are in Australian dollars. \$1 AU = \$.74 U.S.

Railroad Regulatory Environment

Medical standards in the U.K. have both a legal and regulatory basis. The Health and Safety at Work Act of 1974 places obligations on all employers to ensure their staff are sufficiently fit to do the work required of them. This legislation also obliges the employee to take reasonable care for the health and safety of him/herself and others who may be affected by the employee's acts or omissions at work.

The regulations give the U.K.'s Health and Safety Executive (HSE) powers to approve schemes of assessment (of medical fitness and competence), as well as the authority to approve doctors who can medically assess safety critical workers, but these powers have never been exercised and the rail industry has continued largely as if self-regulating.

The European Union (EU) is looking to harmonize medical fitness standards across Europe. The legislation is being written now and is hotly debated, but yet to be ratified. The process would seek to standardize the way in which people can be declared fit, and the requirements of the bodies which can make such a pronouncement. The reasoning behind this is that a train operating company should be able to know that an employee with the right medical certificate is fit for duty, to a recognized standard, regardless of country of certification.

Development of Rules/Guidelines

Before the privatization of railroads, all exams were carried out by Medical Officers employed by the British Railways Board, most of whom had extensive experience with railway medicine. There was therefore no need for prescriptive medical standards, other than for measurable parameters such as visual acuity, color vision, and hearing. In the early 1990's, with privatization on the horizon, the British Rail Safety Directorate started to produce Railway Group Standards (RGS), with input from a medical advisor, as well as consultation with industry, (mainly on issues of cost: the British Rail requirements contained elements relating to pension funding considerations however (i.e. considering long term risks of someone becoming a burden to the pension fund through ill-health retirement, for example), which resulted in some artificially high entry standards for some jobs), covering all aspects of operations and engineering. But at this stage, it was still assumed that medical assessments would continue to be done by occupational physicians with substantial railroad knowledge, and the standards therefore remained non-prescriptive as far as general health was concerned. The standards were introduced by British Rail in 1992/1993 and have remained in place, modified over time, since then, but currently there is still only a general requirement for people who do safety critical work to be medically fit. However, since railway companies are now free to choose their own providers, and little or no control is exercised over the degree of railway knowledge and experience required, unsupported, non-prescriptive standards are no longer appropriate.

Positions Covered

Those covered by national (RGS) standards are drivers, signalers (dispatchers), guards, shunters (conductors), and some others. People who work on the track must also meet some basic medical fitness requirements for vision, hearing, and mobility.

Relationship to Job Requirements

The standards are based on the occupational expertise of the Rail Safety and Standards Board medical advisor, who has over 20 years in railway occupational medicine. There is a link between the risks that safety critical employees carry and the fitness standards but according to

the RSSB, the relevance of the link to current operations needs review in some cases (outdated in relation to technological and medical improvements).

Frequency of Examinations

Railway Group Standards require that a medical assessment be carried out before the first occasion on which a person is permitted to perform a safety critical job. Thereafter the maximum validity of a medical certificate (unless revoked earlier) for a person under 40 years is 10 years. From ages 40-49 it is 6 years, 50-59 – 4 years, and 60 years and over – 2 years.

Examiners

Medical assessments must be carried out by or under the supervision of a registered medical practitioner with:

- experience in occupational medicine.
- knowledge of the hazards of train working and of the environment in which it is performed.
- an understanding of how measures intended to eliminate or reduce risks from those hazards could be affected by lack of medical fitness. For example, a doctor must know how hazard protection measures would be affected by a person's health (e.g., trains are protected by signals, signals are different colors, the doctor must know that color blindness would effect the protection of trains, etc).

If it is not reasonably practicable for a medical practitioner meeting these requirements to conduct or exercise direct supervision over medical assessments, arrangements must be in place to ensure that the medical assessor and employer have access to such a medical practitioner for advice on the interpretation of medical fitness standards and to monitor consistency of their application.

There is no formal process for training medical examiners, but new proposals under accreditation of suppliers (discussions with HSE, etc.) and EU proposals will change this. The U.K. government will not regulate but wishes to see evidence that the industry is managing the issue.

Dispute Resolution

Human Rights legislation requires that a person should have the right of appeal against a decision that he or she is not fit for work because of medical fitness. In the U.K., there is no process for doing this at the moment except to appeal to the employer to overrule the medical examiner's decision. The gap in the current process directly contravenes the Human Rights legislation.

Program Oversight

Britain's Health and Safety Commission and the Health and Safety Executive are responsible for the regulation of almost all the risks to health and safety arising from work activity in the U.K. Local authorities are responsible to HSC for enforcement in offices, shops and other parts of the services sector. HSE's job is to help the Health and Safety Commission ensure that risks to people's health and safety from work activities are properly controlled. Staff from a range of different backgrounds - including administrators, lawyers, inspectors, scientists, engineers, technologists and medical professionals - contributes to this aim.

Program Evaluation

There is no formal process for measuring effectiveness of medical standards within the Rail Safety Standards Board or the Railway Group Standards process, as there is currently no evidence from accident data that medical standards are not effective. RSSB suggests that some standards actually may be considered excessive in relation to the risks they control, particularly where engineering safeguards (i.e. train control systems) or improvements in the management of chronic conditions (such as diabetes) have been introduced.

Legal Issues

The hearing standards for guards were challenged (disability discrimination) in the Employment Tribunal (court of first instance) in 2000, but the challenge failed because the work was safety critical and the Health and Safety law overrode the disability legislation. The challenge was made by someone who had failed the hearing standard when applying for a job as a train guard. In addition to failing on the technical legislative issue, the train operator and Railway Safety were also able to demonstrate that the hearing standard was necessary for the safe operation of trains and safety of passengers.

Labor Concerns

Labor unions are not a major concern to RSSB. Unions are consulted on the prospect of changes, but do not exercise a veto. There is dialogue with trade unions when one of their member's wishes to challenge a standard or its application, but this is rare and is usually resolved between the union and the employer.

Before privatization, an employee under British Rail who was reduced to lighter duties due to medical condition retained their basic rate of pay. Since privatization however, some railway companies have renegotiated terms and conditions of service and the arrangement is no longer universal.

If an employee is retired on health grounds (or dismissed due to incapacity) most railway companies make some ongoing payments for a limited period and, depending on circumstances, the person might also be able to claim incapacity benefits (an 'ill-health pension') from the railway pension fund.

Resources

Current resources are minimal. At present, there are three to five people with the Rail Safety Standards Board who try to manage the issue as part of their other jobs; one being a contracted occupational physician. These individuals also consult with a voluntary organization, the Association of Railway Industry Occupational Physicians (ARIOPS).

Resource levels are inadequate however, and more are in need. RSSB feels there is a need for medical training and review processes, dispute resolution, and program evaluation metrics, as well as access to additional medical specialists, and a method of record keeping.

Recommendations to the FRA

The Rail Safety and Standards Board offers the following suggestions:

- Try to achieve consensus on the framework and process for setting standards (not the standards themselves which are, in the end, medical judgments about risk). Ensure there

is an appeals process which is not bureaucratic to run and is not open to abuse by trivial or vexatious claims.

- From RSSB's point of view, the medical fitness standards should be based on the risks to the safe operation of the railway from performance of the occupation or task by someone who is not medically fit (note: hard though it may seem, the safety of the individual doing the task is secondary and largely the employer's responsibility - e.g. heart pacemakers and electric locomotives).

References

Train Working: Competence and Fitness, Railway Group Standard, GO/RT3255, Issue 2, October, 2000. Published by Safety & Standards Directorate, Railtrack PLC.

Competence Management for Safety Critical Work, Railway Group Standard, GO/RT3260, Issue 2, August, 1998. Published by Safety & Standards Directorate, Railtrack PLC.

3.4 Secretaría de Comunicaciones y Transportes – Mexico

The Secretaría de Comunicaciones y Transportes (SCT) oversees the safety, including medical fitness of employees, of all modes of transportation in Mexico. Regulations for the program, "Regulation of Preventative Medicine Services in Transportation," are published in the *Diario Oficial de la Federación*, which is similar to the C.F.R. in the U.S. The current regulations that went into effect in April 2004 superseded the prior ones that were issued in 1988. (Note: the information in this section is based on a translation of the Mexican regulations and limited contact with one Mexican railroad. The medical director of SCT did not respond to inquiries from the research team.) Each mode of transportation has its own "Medical Profile" or set of medical standards that are the basis for medical examinations.

Positions Covered

The SCT medical requirements apply to all trainmen (conductors, engineers, brakemen) and dispatchers.

Frequency of Examinations

According to the SCT regulations, an employee must undergo a "psychophysical" exam in the following instances:

1. To solicit or renew the Federal License, which occurs every 2 years
2. To detect any psychophysical alteration
3. Following an accident or incident
4. When the employer requests re-evaluation to establish medical fitness to work

The psychophysical exam is composed of the following:

1. Clinical history
2. General medical exam
3. Brief exam of eye
4. Brief hearing exam

5. Brief lung/breathing exam
6. Brief cardiological exam
7. Neurological exploration
8. Psychological study
9. Laboratory studies
10. Toxicological studies

If necessary, the examining physician may use “complementary exams” to substantiate a determination of psychophysical health. SCT maintains permanent and mobile clinics for performing these exams.

The medical certification is valid for 90 days. If the employee does not renew his/her license within that period, then another medical exam must be done.

If the medical examiner finds the employee “of Unsuitable Psychophysical character,” the employee may request re-evaluation within 30 days from the date s/he is notified of the determination. This waiting period may be extended if the employee is on a medical leave of absence.

If the second examination finds the employee “of Unsuitable Psychophysical character,” then the railroad must notify SCT. SCT maintains the “Catalogue of Unsuitability” which is a database of all personnel who are not medically fit for their transportation job. Each railroad is responsible for updating this information on a monthly basis. Railroads must also notify SCT when an employee is involved in an accident.

In addition to the bi-annual examination, every trainman and dispatcher is required to report for a brief “Medical Exam in Operation” before going on duty each workday. This daily exam is performed by SCT physicians on railroad property. If the SCT physician is not available, the employee may still work but the supervisor notes the unavailability of the physician in the record. This exam consists of the following:

1. General Inspection
2. Intentional questioning
3. Evaluation of blood pressure
4. Evaluation of balance
5. Evaluation of visual and hearing reflexes
6. Evaluation of cardiac area
7. Detection of ingested alcoholic beverages

If the medical examiner finds the employee unfit to work, s/he cannot perform his/her normal job duties.

Examiners

A combination of SCT and private physicians, under the direction of SCT, conduct the exams.

Dispute Resolution

Other than the opportunity for re-examination, there is no dispute resolution process.

Reference

Reglamento del Servicio del Medicina Preventiva en el Transporte. *Diario Oficial*. April 21, 2004.

3.5 Union Internationale des Services Médicaux des Chemins de fer (UIMC - International Union of Railway/Railroad Medical Services)

The UIMC was founded in 1948 with the founding members being Swiss Federal Railways, Nederlandse Spoorwegen, Société Nationales des Chemins de Fer Belges, British Rail, and Société Nationales de Chemins de Fer. Other rail services joined later. It became an independent subgroup of UIC (International Union of Railways) in 1995 with its headquarters in Paris.

According to Article 2 of the UIMC statutes, “[T]he task of the International Union of Railway Medical Services is to promote medical advances among railways. This involves not only the organisation of regular scientific conferences, for instance, but also conducting medical research in the railway area, the distribution of specialist publications and the fostering of professional contacts between the medical officers employed by the railway companies with a view to the exchange of information and the provision of advanced training.”¹⁴ There are currently 47 delegates and corresponding members from 28 countries stretching in Europe from Finland to Portugal and from Ireland to Romania, and including delegates from Asia and Africa. Table 9 contains a list of the member countries and railroad organizations.

A working group of the UIMC was established in order to define minimum interoperability criteria for European railway staff concerning medical fitness at in service examinations. These are minimal standards and are used by all members, although member railroads may adopt more stringent criteria. The group considered mainly two interoperating occupations, i.e. train drivers and other train crew.

UIMC separates the operators into two categories:

Group A: high safety risk, i.e. a single person’s responsibility for traffic safety not fully compensated by technical means.

Group B: safety risk, i.e. responsibility for operational safety controlled by group work, supervision by another skilled person or by technical equipment that can maintain a sufficient safety level.

Examinations are performed in accordance with the following schedule:

- Group A: minimum every 5 years until 40, every 3 years from 40 - 62, once a year after 62
- Group B: minimum every 5 years
- Otherwise according to national demand

¹⁴ The human factor in the safety of railway operating, UIMC draft.

Table 9. UIMC country and organization of members

Country	Network/Organization
Austria	Wellcon/ÖBB
Belgium	Société Nationaux des Chemins de Fer Belges
Cameroon	Regie Nationale des Chemins de fer du Cameroun
Czech Republic	České Dráhy
Denmark	Jernbanetilsynet
Finland	Valtionrautatiet
France	Société Nationaux des Chemins de Fer
Germany	BEV, Deutsche Bahn AG, Deutsche Bahn GS
Hungary	Hungarian State Railway
India	Indian Railways
Ireland	Republic of Ireland State Railway
Italy	Ferrovie dello Stato
Japan	East Japan Railway Company
Luxembourg	Chemins de fer Luxembourgeois
Netherlands	Nederlandse Spoorwegen
Nigeria	Nigerian Railway Corporation
Norway	Jernbaneverket, Norwegian State Railways
Poland	Polskie Koleje Państwowe
Portugal	Caminhos de Ferro Portugueses
Romania	Caile Ferate Romane
Russia	Ministry of Railways
Serbia	Jugoslovenske Železnice
Slovakia	Železnice Slovenskej Republiky
Slovenia	Slovenske Železnice
Spain	Ferrocarrils de la Generalitat de Catalunya, Red Nacional de los Ferrocarriles Españoles
Sweden	Bureau Veritas
Switzerland	Swiss Federal Railways
United Kingdom	ET, London Underground Ltd, BUPA, British Rail, Railway Safety

Examinations are also required upon return to duty if there is: any suspicion of neuropsychiatric or sensorial disturbance; any prescription of long-term medication, likely to affect the fitness of the person; any severe acute or chronic disease dependent on diagnosis; or after accidents or incidents at the request of administration.

The following are considered to be absolute exclusions:

- chronic alcoholism
- drug addiction
- any substance dependency
- unstable cardiac disease
- major neurological and psychiatric disorders
- severe respiratory insufficiency
- chronic bowel disease with complications
- liver cirrhosis
- insulin dependent diabetes mellitus
- chronic renal failure requiring dialysis
- homeopathies (a.k.a. blood disorders) with functional deficits and complications
- malignant tumors with functional deficits and complications
- epilepsy

The following are considered to be relative exclusions:

- insufficiently treated cardiac arrhythmia and/or cardiac insufficiency
- insufficiently treated chronic obstructive lung disease
- bronchial asthma
- peripheral arteriosclerosis
- compensated chronic renal insufficiency
- skeletal and articular disorders depending on the resulting deficits and handicaps
- AIDS
- obstructive sleep apnea

The Community of European Railways Working Party of the UIMC prepared the Medical Interoperability Criteria which were ratified by the Directors General of the Community of European Railways and adopted by all member organizations.

UIMC currently has working groups focusing on several areas with plans to update the medical criteria. These include:

- post-traumatic stress syndrome

- vigilance disorders
- criteria of fitness for service, including ophthalmologic standards
- guidelines relating to the consumption of alcohol, drugs and medicines
- recommendations on the structuring of shift and night shift work
- special expert working parties in the areas of cardiology, diabetes mellitus and neurological/psychiatric disorders

References

Recommendations for medical fitness of personal with safety functions, Union Internationale des Services Médicaux des Chemins de fer (UIMC) Interoperability Working Group.

3.6 Comparison of U.S. with other Countries

All of the countries examined have more extensive medical standards programs for their railroad workers than the U.S. The Mexican program is the most centralized with government certified physicians performing the examinations and determining fitness, and a government maintained list of medically unfit workers. The Mexican program requires a periodic comprehensive examination as well as a daily fitness-to-work examination. In contrast, the Australian, Canadian and U.K. programs allow the railroads to select the examiners and the railroad's chief medical officer or examiner makes the final determination of medical fitness to work. Railroad and labor representatives were involved in the development of the medical standards and guidelines in both Australia and Canada. Both systems are risk-based allowing the railroads to identify those positions that are safety-sensitive. Privacy of medical records is a requirement in Australia, Canada and the U.K. Both Australia and Canada have public welfare or disability systems that cover workers who are medically disqualified.

Table 10 compares the medical conditions addressed by each of the foreign programs with the U.S. requirements.

Table 10. Medical conditions addressed by international railroad medical standards

Condition	U.S.	Canada	U.K.	Australia	UIMC	Mexico
Vision	✓	✓	✓	✓	✓	✓
Hearing	✓	✓	✓	✓	✓	✓
Musculoskeletal		✓		✓		
Diabetes		✓		✓	✓	
Other Endocrine		✓		✓		
Cardiac		✓		✓	✓	✓
Gastrointestinal				✓	✓	
Respiratory		✓		✓	✓	✓
Sleep Disorders		✓		✓	✓	
Hypertension		✓		✓	✓	
Seizures		✓	✓	✓	✓	
Other Neurologic		✓	✓	✓	✓	✓
Psychiatric		✓	✓	✓	✓	✓
Renal		✓		✓	✓	
Medication Use	✓	✓	✓	✓	✓	
Hematological					✓	
Allergies						
Infectious Disease						
Pregnancy				✓	✓	
Source of standard						
U.S.	<i>Code of Federal Regulations</i>					
Canada	Railway Association of Canada, <i>Railway Medical Rules</i>					
U.K.	<i>Railway Group Standards</i>					
Australia	National Transport Commission, <i>National Standard for Health Assessment of Rail Safety Workers, Vol. 2: Health Assessment Procedures and Medical Criteria</i>					
UIMC	<i>UIMC Minimum interoperability medical fitness standards</i>					
Mexico	<i>Reglamento del Servicio de Medicina Preventiva en el Transporte</i>					

4. Medical Standards Programs of U.S. Railroads

With the exception of examinations for vision and hearing, U.S. railroads have discretion as to the content, frequency and extent of their medical screening programs. This chapter describes the current approaches used by representative Class 1, short line/regional and commuter railroads. Structured interviews with medical officers, medical directors, claims managers, and HR managers were the means for obtaining the information in the following subsections. There is a subsection for each of the three categories of railroad. Within each subsection there is a summary table followed by descriptions of each railroad's program.

4.1 Class 1 Railroads

Five Class 1 railroads were interviewed. Amtrak was in the process of revising their medical standards program during the time that this information was collected and as a result was unable to provide a description of their program. Table 11 summarizes the features of the five programs described below.

4.1.1 Burlington Northern Santa Fe Railway (BNSF)

Current Requirements

With few exceptions BNSF has no specific medical standards. Guidelines are developed through literature review, comparisons with other transportation modes, rail guidelines from other countries and, internal consensus with legal, medical, labor relations, and operating departments.

All BNSF employees must pass a post-offer medical examination. Locomotive Engineers and Remote Control Locomotive Operators are examined every 3 years to ensure that they meet the FRA standards for hearing and vision. Commercial motor vehicle drivers are examined at least every 2 years per current FMCSA medical standards. Other crafts are not assessed on a routine basis. Aside from engineers, commercial drivers and other mandated examinations such as hearing and respirator fitness, there are no regularly scheduled fitness-for-duty examinations. Fitness-for-duty evaluations are performed as the need arises based on safety, performance, attendance or behavior issues.

All cases are reviewed prior to return-to-work following an illness or injury. Each case is reviewed on an individual basis. A medical exam is required for certain high risk cases. The level of review depends upon the safety risk of the position and the medical diagnosis. There is a minimum 1 year wait for return-to-work for most employees with a seizure, unless they can totally avoid moving or working around moving equipment, at heights or working alone. When an employee changes position, s/he undergoes the complete pre-placement process, including an examination.

Medical examiners for new hire, job change, and commercial drivers are coordinated through a third party vendor. The Engineer Certification department coordinates the engineer examinations. In contrast, the BNSF medical department selects the examiners who perform fitness-for-duty examinations. Examiners performing fitness-for-duty examination are sent a detailed letter including known medical issues. The examiners are not provided with detailed job

Table 11. Summary of Class 1 railroad medical standards programs

	Burlington Northern Santa Fe (BNSF)	CSX Transportation (CSX)	Kansas City Southern (KCS)	Norfolk Southern (NS)	Union Pacific (UP)
Medical guidelines beyond FRA and FMCSA requirements?	Limited	No	Yes	Yes	No
Types of exams beyond FRA and FMCSA requirements	Post-offer Fitness-for-duty Return-to-work Change of position	Post-offer Fitness-for-duty Return-to-work Change to safety- sensitive position	Post-offer Fitness-for-duty Return-to-work Change of position	Post-offer Fitness-for-duty Return-to-work Change to safety- sensitive position Comprehensive periodic examinations performed on scheduled basis for police officers, train and engine crews, hostlers, and bridge tenders	Post-offer Fitness-for-duty Return-to-work Change to safety- sensitive position
Examiners and examination program	Program and examiners coordinated by outside vendor. Fitness-for-duty examinations, both examiners and examination are coordinated by medical department	Program and examiners coordinated by company and are company designated but not under contract. Proposal to coordinate with vendor for examinations	Program and examiners coordinated by company and are company designated, but not under contract.	Program and examiners coordinated by and are company sponsored, but not under contract. Examiners selected, reviewed, credentialed and approved by NS	Program and examiners coordinated by outside vendor
Information given to examiner	Exam protocol Medical information if available	Exam protocol Medical information if available Job functions	Examiners provided with medical standards, regulations, and functional analysis of positions	Fee-for-service provider manual	Varies depending on type of examination

	Burlington Northern Santa Fe (BNSF)	CSX Transportation (CSX)	Kansas City Southern (KCS)	Norfolk Southern (NS)	Union Pacific (UP)
Program Management	Vendor	Company	Company	Company	Vendor
Role of personal health care provider in return-to-work	Provides release to work, subject to review by Medical Department	Provides release to work, subject to review by Medical Department	Provides release to work, subject to review by Human Resources Department and consultation with CMO if indicated	Provides release to work, subject to review by Medical Department	Provides release to work, subject to review by Medical Department.
Information to personal health care provider	Employee expected to discuss job requirements with personal health care provider	Employee expected to discuss job requirements with personal health care provider	Employee expected to discuss job requirements with personal health care provider	Employee expected to discuss job requirements with personal health care provider Additional information is provided as applicable	Employee expected to discuss job requirements with personal health care provider
Prescription/OTC drug reporting policy not related to federal drugs and alcohol testing?	No Advised to discuss with health care provider	Yes	Yes	Yes Advised to discuss with health care provider, except police officers, must report medications	No Advised to discuss with health care provider
Medical condition reporting policy other than for lost time or restrictions?	No, advised not to work if employee believes medical condition impacts ability to perform duties Advised to discuss with health care provider	If employee believes medical condition impacts ability to perform duties	If employee believes medical condition impacts ability to perform duties	If employee believes medical condition impacts ability to perform duties.	If employee believes medical condition impacts ability to perform duties

	Burlington Northern Santa Fe (BNSF)	CSX Transportation (CSX)	Kansas City Southern (KCS)	Norfolk Southern (NS)	Union Pacific (UP)
Job Accommodation	Attempt to accommodate	Attempt to accommodate. Otherwise offered services of in house vocational rehabilitation counselors	Labor agreements do not address job accommodations. Generally do not for an off-duty injury or illness but will try for on duty	Accommodation process in place A rehabilitation function looks for alternate work if employee has restrictions preventing return to current position and no available accommodations	Attempt to accommodate
Health promotion?	Various	No	No	Periodic wellness advice provided in company publications	Extensive
Periodic examination schedule tracking	Commercial driver medical certification examination through outside vendor Engineer Certification Department coordinates engineer medical examinations through outside vendor	Medical Department	Engineer tracked through Transportation Department. Commercial Drivers through Maintenance of Way	Medical department	Outside vendor
Resources	3 physicians, 3 contracted regional medical directors, and 1 physician employed by vendor Approximately 20,000 evaluations/yr	Chief Medical Officer, 1 Medical Affairs Officer, 1 CSX nurse. Exceptions or questions are reviewed by Chief Medical Officer. 10,000 examinations last year.	31 company examiners, 90 percent MDs or DOs. Rest are PAs and Advanced Practice Nurses Director of HR and manager responsible for medical and drug testing Also part-time contracted Chief Medical Officer (CMO)	2 physicians, 1 physician assistant, 2 occupational health nurses and 2 medical standards coordinators in medical department as well as support personnel. About 500-600 fee-for-service examiners throughout the system.	Chief Medical Officer, 1 employed UP nurse, and multiple third party physicians, administrators, and nurses (20+ in shops, 4 – 5 in Omaha, and about 20 working with claim as case managers).

information as they are asked to determine functional abilities with the medical department determining whether an individual can perform a specific job based on those abilities. The vendor provides information, including a brief job description, to the examiner for new hire exams. Examiners are also provided with guidance in performing the commercial driver medical examination.

Review of medical conditions for return-to-work is also coordinated through an outside vendor. Following a medical leave, the personal health care provider has the responsibility for determining whether an individual can work. If the third party reviewer does not agree with the recommendation of the personal health care provider, the medical department will contact the provider to discuss the case. The medical department can overrule the recommendation of the personal provider. Descriptions of job responsibilities are to be given to the provider by the employee. When the diagnosis may be a safety concern, the third party vendor contacts the provider to discuss job responsibilities or, if applicable federal medical standards. Fitness recommendations from personal providers are reviewed in greater detail for individuals in safety critical crafts.

Self-Reporting of Medical Conditions

BNSF empowers their employees to not work if they have a condition that affects their ability to safely perform their job. Employees are currently required to notify the railroad about medical conditions that result in lost time or medical restrictions. For those conditions, the impact of the condition on safety is assessed prior to return-to-work. Employees are instructed to review any medications they may be taking with their treating provider and if more than one, a single provider must be aware of all medications. The employee must ensure that his/her health care provider is aware of the job tasks and the health care provider must determine whether use of the medication is consistent with safe performance of job tasks.

Job Accommodation

BNSF tries to accommodate the employee whenever possible for transitional work. The ability to accommodate long term/indefinite restrictions is limited by the scope of jobs as defined by union agreements

Improvements

BNSF feels that it would be helpful if there was more standardization within the industry for medical standards but still leaving room for individual railroad flexibility.

Health Promotion Activities

BNSF has a health screening and follow up program coordinated through an outside vendor. There is also a system wide program of health promotion communication with mailings and web-based information.

Resources

Within BNSF there are three physicians, two involved in the fitness-for-duty programs on a daily basis. There are three contracted regional medical directors and another physician employed by the vendor involved in reviewing examinations. There are approximately 2000 clinic examiners used throughout the system. Vans are used for hearing assessments, respirator fitness, and lead and Hazardous Material Operator evaluations. Overall about 20,000 evaluations are performed

per year including pre-placement, commercial driver, hearing, job change, engineer certification and fitness-for-duty. Approximately six fitness-for-duty examinations are performed per month.

The Engineer Certification Dept. is responsible for scheduling the periodic vision and hearing screening of engineers.

4.1.2 CSX Transportation (CSX)

Current Requirements

CSX has no formal written medical guidelines. Employees are currently examined upon hire and in accordance with Federal regulations for locomotive engineers and commercial drivers. CSX also requires an examination if an employee has been off work for more than 1 year and is ready to return-to-work. If a supervisor identifies in writing a fitness concern, the medical department will review information provided by the treating health care provider and, if appropriate, a fitness-for-duty examination is ordered.

Medical examiners are currently company approved, but not under contract. Examinations are coordinated through the medical department but there is a consideration to employ a vendor for this purpose.

CSX provides the examiner with examination protocols and, if applicable, medical information which may have been submitted to the medical department by the treating provider. Examiners are also given essential job functions. These job descriptions are currently being revised, with an attempt to make them more site specific.

The personal health care provider's main role in the process is in releasing employees to work. They base the release on what the employee tells them regarding job requirements. Treating providers are requested to provide information on medications or medical conditions when identified.

Self-Reporting of Medical Conditions

The CSX safety rulebook contains a requirement that if the employee is on medication which may impair, s/he is required to report to the medical department but it is suspected that few employees do report. The rule states, "Employees shall neither report for duty nor perform service while under the influence of, nor use while on duty or on CSX property, any drug, medication, or other substance, including prescribed medication that will adversely affect the employee's alertness, coordination, reaction, response, or safety." The medical department has a form for reporting medication use. Review of these forms by the medical department may identify medical conditions that require a fitness-for-duty review.

Job Accommodation

If the railroad is unable to accommodate an employee, the employee is offered the services of the in house vocational rehabilitation counselors, regardless of whether the medical condition is on or off duty. They do have difficulty with employees crossing crafts because of labor agreements and employees losing seniority if changing crafts. Within the same craft, seniority will affect the ability to accommodate.

Improvements

The CSX Medical Department would like to see specific guidance on issues such as diabetes, seizures, similar to what is available for commercial drivers.

Health Promotion Activities

There are currently no health promotion activities.

Resources

CSX performed 10,000 examinations last year. The annual number depends on hiring. The distribution of examinations by type is shown in Table 12.

There are three clerks (one full time and two that have other responsibilities) who review the examinations. If there are any exceptions or questions, the Chief Medical Officer reviews the examination findings. The scheduling of engineer medical examinations is coordinated through the engineer certification department.

Table 12. CSX distribution of exams by type

Type of Exam	Annual Number
DOT exams	2364
FRA exams	2828
Furlough	296
Hazmat	7
Illness return-to-work	2065
Leave-of-absence return-to-work	8
Return-to-work/ on-duty injury	593
Periodic	27
Post-offer	2204
Reinstate	88
Canadian regulations	14
Transfer	115
Special	287
Return-to-work/ 1 yr	212
Other	35

4.1.3 Kansas City Southern Railroad (KCS)

Current Requirements

KCS has medical standards for all crafts and positions. The standards are based primarily on functional requirements. Examinations are performed post-offer, upon change of position,

especially to a more physically demanding one, and upon return-to-work after a medical leave of 7 or more days. When surgery is performed, an examination may be required if the employee is only off 2-3 days. A detailed release from the treating provider is reviewed and must include the following: date of first care or treatment, diagnosis, treatment provided, prognosis and any restriction or whether employee can return to full duty. This is reviewed by an HR manager. At that point the employee is scheduled for an examination with a company designated physician.

When physician assistants or advanced practice nurses perform the examination, the examination results are generally signed off by the physician. Examiners are provided with medical standards, regulations, and functional analysis of the positions. There is also a part-time contracted Chief Medical Officer (CMO) who will review if questions arise.

Periodic examinations are performed as required by regulation for locomotive engineers and commercial drivers. These periodic examinations only include the required aspects.

A Fit for Duty examination may be performed when the supervisor suspects that an employee is not functioning well. If a condition is found that prevents the employee from performing his/her duties then s/he is removed from service and placed on personal medical leave. Depending on medical conditions identified during any medical evaluation, the CMO may require periodic follow up and examinations.

Self-Reporting of Medical Conditions

There is no rule requiring notification if treated for a medical condition, however, KCS requires employees to notify their supervisor if they are receiving any treatment which may prevent them from performing their job. If reported, the employee may be sent to a company designated physician for an examination if there is concern about the ability to perform duties. Employees who are taking medications are required to report this to their supervisor. This information is then forwarded to HR and medication is reviewed using the *Physicians Desk Reference* (PDR). For questions in the review process, the CMO is consulted. There is currently no discipline if an employee fails to report use of a prescription drug.

Internal Review

Medical criteria have been in place since 1994. When applicable they are updated, consistent with federal requirements.

Job Accommodation

KCS labor agreements do not address job accommodations. Generally KCS does not accommodate employees who need restrictions for an off-duty injury or illness. If an employee misses time, they will be covered through the RRB sickness benefits. Some crafts also have short term disability insurance through Unum.

Improvements

KCS would like to see guidelines on vision testing updated to include new equipment which can be used for vision testing.

Health Promotion Activities

There are no on-site health promotion activities. Employees are encouraged to participate in community health promotion activities.

Resources

There are a Director of HR and a manager responsible for the medical and drug testing programs. Scheduling for engineer certification examinations is through the transportation department and for commercial drivers through maintenance of way. In addition to the part-time CMO, there are 31 company-designated examiners. Approximately 90 percent of the examiners are MDs or DOs.

4.1.4 Norfolk Southern Railroad (NS)

Current Requirements

NS has medical guidelines for various medical conditions (and medications) potentially impacting the safe work performance of essential job functions for individuals in safety-sensitive and/or non-sedentary positions. Medical guidelines have been developed by medical directors based on scientific literature, discussion with experts in the field and review of current practices of providers in the community. There is an ongoing review and updating of the guidelines.

All qualification determinations are based upon an individualized assessment, including the individual's medical condition, essential job functions and any available reasonable accommodations. Most of the medical guidelines are not craft specific except where specified by federal regulation, i.e. locomotive engineers and commercial motor vehicle operators.

Post-offer exams are performed on all employees. Comprehensive periodic physical examinations are performed on a scheduled basis for police officers, commercial drivers, train and engine crews, hostlers, and bridge tenders. Return-to-work from illness or injury also necessitates a medical examination. The interval of time off work which would require a medical examination is currently under review. Examinations are also performed for employees changing from a non-safety-sensitive to a safety-sensitive craft. The Medical Director authorizes fitness-for-service examinations. These exams evaluate a current employee's physical and mental ability to safely perform the essential functions of his/her job. This type of exam may be triggered by receipt of medical reports and findings, and employee's, coworker's and/or supervisor's observations and/or concerns that substantially support the need to address the individual's medical fitness-for-duty.

NS manages its own examination program. Medical examiners are physicians, or PAs and NPs under the direct supervision of a physician. NS selects, reviews, credentials and approves its examiners. NS provides manuals to its fee-for-service providers to assist them in evaluating the fitness for service of applicants and employees. Each physical examination report is reviewed within the medical department for thoroughness. Any discrepancies or concerns are followed up with the providers by the medical department staff and the NS Medical Director renders the final qualification determination. NS removes providers whose services are not adequate.

The employee's personal physician provides the release to work which is subject to the review of the Medical Department. Depending upon the medical condition and job function, additional medical information may be required. In some cases, NS Medical Department will work directly with the treating provider where additional information, follow up and/or clarification is needed. The NS Medical Department may advise providers of medical guidelines or regulations if applicable. The Medical Department may also provide clarification of job duties. Personal providers are made a part of this process as appropriate.

Self-Reporting of Medical Conditions

NS requires an in-service employee to notify his/her supervisor if s/he sustains an off-duty personal injury or illness adversely affecting his/her ability to perform regularly assigned duties. NS' safety and general conduct rule book states that, "An employee who sustains an off-duty personal injury or illness adversely affecting his ability to perform his regularly assigned duties must inform his supervisor of the injury/illness before reporting for his next shift or tour of duty."

The employee must determine whether or not s/he needs to notify the supervisor. The NS Medical Department has an 800 number which employees can call to determine what types of information may be required upon return-to-work following a medical absence. The medical department reviews return-to-work and examination documentation and may contact the individual and/or his/her provider for additional information as appropriate.

Police officers are required to report any medication they are taking. Other crafts may be covered under drug policy and 49 C.F.R. § 219.103. All examination forms include questions about medications and these are also reviewed and followed up as appropriate. On the 800 number, employees are advised that controlled substances are prohibited by federal law unless the medication is prescribed by a provider and its use at the prescribed dose does not interfere with safe performance of their duties. Opiates are not permitted while on duty or within a minimum of 6 hours prior to duty in any safety-sensitive or non-sedentary position. Employees are advised to discuss with their provider any medication they might be taking and any potential impairment. The 800 number offers the option for the personal health care provider to review with the Medical Department any questions they might have.

Job Accommodation

All qualification determinations are based upon an individualized assessment, including the individual's medical condition, essential job functions and any available reasonable accommodations. There is a rehabilitation function in the Company that looks for alternate work if an employee has restrictions preventing the employee from returning to his/her current position and there are no available reasonable accommodations. The inability of an employee to hold a position that would meet his requirements due to insufficient seniority would be handled as a labor issue rather than a medical one. Labor agreements generally do not specifically address accommodations.

Improvements

NS feels its program is operating satisfactorily.

Health Promotion Activities

There are no system wide health promotion programs, other than periodic wellness advice provided in Company publications. Health promotion activities occur at the local level, where safety committees have health material available including community based resources such as the American Heart Association and the American Cancer Society.

Resources

There are two physicians, one physician assistant, two occupational health nurses and two medical standards coordinators in the medical department as well as support personnel. There

are about 500-600 fee-for-service examiners throughout the NS system. The Medical Department schedules all periodic medical examinations.

4.1.5 Union Pacific Railroad (UP)

Current Requirements

Union Pacific does not have any specific medical standards. Attempts to have specific standards have been met with rejection under EEOC arguments. The UP feels that ADA considerations have prevented the industry from having specific blanket medical standards. Additionally, they feel guidelines must be generic and have to be approached on an individual case by case basis.

Union Pacific uses the medical standards of federal regulatory agencies. This includes those required for truck drivers as well those for the locomotive engineers. Employees are examined on a periodic basis according to the regulations. In addition, UP has OSHA regulatory examinations for its respiratory protection program and hearing conservation program.

All employees must have a post-offer examination. Other than the post-offer exam, there are two other circumstances that necessitate medical evaluation. Employees returning to work from illness or injuries may be subjected to return-to-work evaluations. If an individual has been off work for more than a year, or there is an issue of regulatory fitness, the individual may be subjected to a return-to-work examination. Otherwise, if an employee has been off work for less than a year and provides adequate documentation from his/her doctor clearing a return-to-work, the railroad would not necessarily order an examination. An examination may also be ordered if the railroad has concerns about the return-to-work recommendation from the treating provider.

Employees may be required to undergo medical examinations for fitness-for-duty purposes. This type of examination occurs when the health services department is made aware of observed behavior which raises concerns about the individual's ability to do his/her job. Managers are encouraged to contact the health services department and discuss the case with a fitness-for-duty nurse before making a determination that such an examination is warranted.

UP uses a third party vendor to coordinate a network of medical examiners throughout the system. Depending on the type of examination required, information may be provided by the medical department asking them to address specific questions. The third party vendor or the UP fitness-for-duty nurses in Omaha review the results of all examinations.

Self-Reporting of Medical Conditions

An employee is responsible for notifying the railroad when s/he develops a medical condition which may impact safe performance of his/her position. There are no specific guidelines for which conditions must or must not be reported, but if the employee believes it may impact his/her ability to do his/her job, UP medical rules require the employee to advise the health services department. It is the employee's obligation to provide that information to the health services department. They may do it through their manager in advising them that they have a condition that may require restrictions or accommodations for, or it may be done in conjunction with a return-to-work.

UP does not require individuals to report prescription or over-the-counter drug use as it is not manageable for the railroad. UP policy requires employees to discuss the use of the medications with their doctors. If the employee is in a safety-sensitive position (covered by Hours of

Service), they need to maintain documentation on their person that they have discussed such with their personal doctor and they feel that they are safe to do their work.

Internal Review

Medical Rules are currently being reviewed.

Job Accommodation

UP job descriptions include certain physical requirements for some positions. For those employees who do not meet the physical requirements, restrictions will be determined by the medical department and accommodations will be referred to the supervising managers. If an individual cannot be accommodated, then UP will utilize other services to try and find another job that meets the individual's abilities.

Improvements

UP would like to see an industry standard for safety-sensitive jobs.

Health Promotion Activities

Union Pacific has an extensive health promotion program.

Resources

UP has computer databases to track employees who may be due for periodic physical examinations. The railroad notifies each employee when s/he is due for an examination and refers the employee to the medical provider.

The railroad has a Chief Medical Officer, multiple physicians in the field, third party administrators who help with physical examinations, and close to 50 nurses in its clinics. About 20 nurses are in the shops, four or five are based in Omaha and about 20 work with the claims department as case managers. Data on the number of individuals involved in the program, other than nurses, was not available.

4.2 Commuter Railroads

Two commuter railroads, Metro-North Railroad and NJTransit, provided information. Table 13 summarizes the features of their programs.

4.2.1 Metro-North Railroad

Current Requirements

Metro-North has medical standards in place for all crafts. This includes federally regulated standards for locomotive engineers and CDL drivers, standards for other Hours of Service employees including conductors and rail traffic controllers, and further standards for positions such as: B&B mechanic, carman, coach cleaner, lineman, signal maintainer, skilled trades, track worker; TCU categorization by job family; and general information guidelines divided into categories such as clerical/secretarial, ticket seller, custodial, customer service representative.¹⁵

¹⁵ Metro-North refers to their dispatchers as "rail traffic controllers."

Table 13. Summary of commuter railroad medical standards programs

	Metro-North	NJTransit
Medical guidelines beyond FRA and FMCSA requirements?	Yes	No
Types of exams beyond FRA and FMCSA requirements	Post-offer Change to safety-sensitive position Return-to-work Fitness-for-duty Locomotive engineers, conductors and rail traffic controllers require full exams every 3 yr	Post-offer Change to safety-sensitive position Return-to-work Fitness-for-duty Conductors, assistant conductors and trainmen must have exam every 3 yr until 50, then every 2 yr thereafter
Examiners and examination program	Examiners are designated by outside vendor	Either part-time employed physicians of NJT, or designated fee-for-service physicians
Information given to examiner	Job description Employee medical records Policy and procedures regarding examination Medical guidelines Exam protocol	Job descriptions Employee medical records Certificates of license Exam protocol
Program Management	Company	Company
Role of personal health care provider in return-to-work	Not available	Provide return-to-work certificate. Medical department reviews certificate and authorizes work
Information to personal health care provider	Not available	Job description and other information per request
Prescription/OTC drug reporting policy not related to federal drug and alcohol testing ?	Yes	Yes
Medical condition reporting policy other than requiring lost time or restriction?	Yes	Yes
Job Accommodation	Attempt to accommodate; work with limitations	Attempt to accommodate; work with limitations
Health promotion?	Yes	Yes
Periodic examination schedule tracking	Occupational Health Services Department	Not available
Resources	Two physicians, two PA's, two RN's and one LPN Approximately 500 exams/yr	856 periodic, 359 post-offer, 52 pulmonary and audio, and 21 change of job exams

A vendor group worked with Metro-North's Testing and Validation Unit of the Human Resources Department to develop the medical standards as they relate to the job description.

All employees must pass a post-offer medical examination. Locomotive engineers require full exams every 3 years, as do conductors and rail traffic controllers. Commercial motor vehicle drivers are required to be examined every 2 years. Other positions do not require periodic review. Change of craft exams are performed when an employee changes crafts into a safety-sensitive position.

Employees will also undergo a medical exam between regular evaluations if they are out of work for 14 days or more; or if the supervisor thinks there is a medical and/or safety concern such as multiple short absences, work place safety, or a potential communicable disease. The supervisor/manager makes the determination. They may also call the OHS (Occupational Health Service Dept.) for advice.

Physicians and Certified Physicians Assistants perform all exams. As of October 2003, Metro-North has contracted their Occupational Health Service to CHD Meridian. The vendor conducts examinations at the Metro-North Railroad Occupational facility. Exams are tracked by the department. They are scheduled on or near the employee's birth month.

Examiners are given policy and procedures regarding examination, medical guidelines, employee medical files, and job descriptions.

Self-Reporting of Medical Conditions

General rules for the self-reporting of medical conditions are set forth in the MTA/Metro-North Railroad "Rules of the Operating Department" book. It is the employee's responsibility to report any medication use or problems to his/her supervisor who will then refer the employee to OHS. OHS will contact a company appointed physician or Medical Review Officer and they make the decision as to whether the medication is impairing enough to restrict them from duty. Job descriptions are given to the examiners.

An employee with a question regarding medication or illness will call OHS to speak with the health professional. Some employees bring prescriptions to OHS for review, to question if it is okay to be on duty.

Job Accommodation

Employees may be placed in a "not qualified" or "restricted duty" status until qualified. Employees in the "not qualified" category are not working and will be seen weekly or biweekly in OHS. Following an injury, an employee will be "not qualified." Some departments can accommodate restricted duty. If the employee cannot perform the essential functions of the job, s/he is referred for vocational assistance. The employee is not laid off, and can collect sick benefits.

Improvements

None at this time.

Health Promotion Activities

Prior to CHD Meridian, Metro-North Railroad OHS conducted glaucoma testing, blood pressure evaluation and skin cancer screening programs.

Resources

Resource requirements for the medical program are the following: two Physicians – one full time, one part-time; two certified physician assistants, two RN's and one LPN. There were 508 medical examinations last year.

4.2.2 NJTransit

Current Requirements

NJTransit does not have medical standards or guidelines. Other than government-based standards, standard medical practices of medicine are followed.

All NJTransit job candidates must have a post-offer physical exam. Labor agreements between the union and NJTransit specify the frequency of physical examinations for safety-sensitive employees beyond the post-offer exam. Conductors, assistant conductors and trainmen between the ages of 18 and 49 are required to have a periodic physical examination every 3 years in the quarter of the month of their birth. Those 50 and above must have an examination every 2 years. Locomotive engineers must also meet the federal standards for vision and hearing. Employees who are exposed to noise and dust have examinations in accordance with OSHA requirements.

In addition to the periodic examination requirements, there are three other occasions on which NJTransit may require a medical examination: 1) After 30 days absence, employees are cleared for return-to-work by the Medical Department staff physician for all job categories as a matter of company policy. 2) The supervisor has the right to request a fitness examination of any of his/her employees at any time. 3) Movement from non-safety to safety jobs is considered a job change through personnel and requires a physical and drug and alcohol testing.

The examining physician has job descriptions, certificates of license, and employee medical records for each employee that s/he examines. A review of work is done by in-house physicians and the nurse staff of the medical department.

In accordance with the company's medical policy, railroad employees are required to provide a doctor's certificate after a 30-day absence. The employee's personal physician provides this certificate. If the personal physician requests a job description or any other background information prior to certifying the employee to return-to-work, NJTransit will provide the information. The NJTransit Medical Department's examiner must review the information from the treating physician before the employee is authorized to return to his/her position.

Medical examiners are part-time employees of NJTransit or fee-for-service physicians. When specialist services are required, employees are referred to acknowledged board certified and licensed physicians in the region.

Self-Reporting of Medical Conditions

The employee is responsible for notifying the railroad when s/he develops a medical condition which may impact safe performance of his/her job.

The core policy of the company's drug and alcohol - free workplace policy has standards of conduct including prohibited behaviors, use of prescription drugs and self-reporting.

Job Accommodation

Employees are “qualified” to do their job if they meet the essential functions of the job. If there are limitations, they may apply through the ADA coordinator who discusses the limitations with the Labor Relations Department which oversees the union contracts.

Improvements

NJTransit does not see the need for any improvements.

Health Promotion Activity

NJTransit has a variety of health promotion activities. These include lunch and learn speaker programs, wellness seminars, family days with baseline testing for family members present, and an open door policy to discuss any kind of health or medical issues of the employee.

Resources

Table 14 shows the number of annual physical examinations in a recent year by type of exam.

Table 14. NJTransit distribution of exams by type

Type of Exam	Annual Number
Post-offer	359
Job change	21
Periodic	856
Pulmonary and audio	52

4.3 Short Line/Regional Railroads

Five short line/regional railroads provided information. One of these five requested that their name not be included in this report. This railroad is referred to as “Holding company.” Table 15 summarizes the features of the five short line/regional railroads.

4.3.1 Belt Railway of Chicago (BRC)

Current Requirements

The Belt Railway (BRC) does not have any specific medical guidelines. As a condition of employment, BRC requires all new hires to have a general health physical that includes a back x-ray, and hearing and vision assessments. This examination is performed by a local clinic (third party) under an arrangement with the railroad. The railroad provides the examining physician with a job analysis for the job that the candidate will perform. The job analyses were developed by Conrail in the mid-1980s. Other than the FRA requirement for periodic hearing and vision assessments for locomotive engineers and trainmen working as remote control operators, the Belt does not require any periodic health assessments.

After receiving a release to work from the treating physician after an illness or injury, in all cases, regardless of amount of time lost, an employee must report to the local clinic for an examination. The clinic physician reviews the treating physician’s report and conducts an independent medical evaluation of the employee. The clinic physician may refer the employee to an occupational specialist if s/he has reservations about the employee’s ability to return-to-

work. The clinic has some specialty capabilities, but where a third opinion is necessary, the railroad usually engages the services of a specialist not affiliated with the clinic, the clinic's hospital, or the employee's treating physician. A specialist is most likely to be consulted in cases that involve cardiopulmonary conditions or joint problems, regardless of whether or not the condition is work-related. If the clinic physician concurs with the treating physician's report, then the employee may return to work.

Infrequently, the Director Risk Management, Manager Human Resources, the employee's supervisor and the railroad's labor lawyer may review the case to insure that the appropriate decision has been made on a return-to-work case. As an example, this process was used with an employee who was conditionally returned by his physician from a non-work related back condition. In this particular case, the employee wanted very much to return to work, but could not be accommodated. The railroad used the approach to evaluate conditional returns relative to the job.

Self-Reporting of Medical Conditions

Employees self-report medication as a preventative to a positive finding on a random drug and alcohol screen under company policy or FRA-mandated testing. BRC's Drug and Alcohol Use Policy prohibits the use of any drug, including prescription medication, that may adversely affect safe performance on the job. Avoidance of a potentially positive test result has prompted self-report by covered employees.

The company has no other written policies covering prescription drugs or self-reporting of medical conditions.

Job Accommodation

Provision for light duty following an injury or illness is handled on a case by case basis. The railroad will consider light duty once the employee is in the recovery, not treatment, phase, if 1) it is clear the light duty tasks are relevant and are associated with the employee's normal work, and 2) it is likely that the employee will eventually be able to return to their regular job by a date fixed by the treating physician.

Improvements

The Director Risk Management feels that the railroad could provide more guidance to its employees on the types of illnesses and non-workplace injuries that should be self-reported to the railroad. He is interested in receiving guidelines for entry to service examinations from other carriers to refine or modify his procedures.

Health Promotion Activities

The Belt Railway conducts a variety of health promotion activities on a regular basis. This includes periodic literature with the employees' pay slips. This informational material covers topics such as fatigue, blood pressure and diet. They also have the third party provider (medical clinic) do blood pressure checks and body fat analysis at company picnics and other safety-related promotional events. As a result of these health promotion events, several people have been identified with undiagnosed hypertension and referred to their physicians for follow-up.

Table 15. Summary of short line/regional railroad medical standards programs

	Belt Railway of Chicago (BRC)	Florida East Coast (FEC)	Holding Company
Medical guidelines beyond FRA and FMCSA requirements?	Yes	No	No
Types of exams beyond FRA and FMCSA requirements	Post-offer, includes back X-ray Return-to-work Fitness-for-duty	Post-offer, position may require back exam Return-to-work Fitness-for-duty	Post-offer Return-to-work Fitness-for-duty
Examiners and examination program	Examiners are designated but not employed	Examiners are designated but not employed	Each location designates an occupational physician or clinic to perform exams
Information given to examiner	Job descriptions	Job descriptions Exam protocol	Job descriptions
Program Management	Company	Company	Company
Role of personal health care provider in return-to-work	Provides return-to-work certificate. Designated physician reviews and conducts independent evaluation	Provides return-to-work certificate. Designated physician reviews and conducts independent evaluation	Provides return-to-work certificate. Designated physician reviews
Information to personal health care provider	None	None	Job descriptions
Prescription/OTC drug reporting policy not related to federal drug and alcohol testing?	No	Yes	No
Medical condition reporting policy other than for lost time or restrictions?	No	No	No

	Montana Rail Link	RailAmerica
Medical guidelines beyond FRA and FMCSA requirements?	No	No
Types of exams beyond FRA and FMCSA requirements	Post-offer Return-to-work Fitness-for-duty	Post-offer Return-to-work Fitness-for-duty
Examiners and examination program	Examiners are designated but not employed	Examiners are designated by outside vendor
Information given to examiner	Job descriptions	Job descriptions Treatment records Physical capacity requirements
Program Management	Company	Vendor
Role of personal health care provider in return-to-work	Provides return-to-work certificate. Local clinic physician reviews and conducts independent evaluation	Provides return-to-work certificate. IME reviews
Information to personal health care provider	None	None
Prescription/OTC drug reporting policy not related to federal drug and alcohol testing?	No	Yes, if determined to impair performance by employee and personal health care provider
Medical condition reporting policy other than for lost time or restrictions?	No	No

	Belt Railway of Chicago (BEC)	Florida East Coast (FEC)	Holding Company
Job Accommodation	Provision for light duty is case by case	Provision for light duty is case by case	None
Health promotion?	Yes	No	Yes
Resources	215 employees requiring tri-annual vision and hearing	Three designated physicians	Between \$100,000 – 150,000 annually for 1300 employees
Periodic examination schedule tracking	Manager of Operating Practices	Safety Department	Transportation Department

	Montana Rail Link	RailAmerica
Job Accommodation	Attempt to accommodate; work with limitations	Attempt to accommodate with light duty work
Health promotion?	Yes	Various
Resources	Budget is \$100,000 per year and covers: new hire, return-to-work, fitness-for-duty, respirator clearance, and hazmat responders exams	Not available
Periodic examination schedule tracking	Training, Rules and Safety Department	Outside vendor

Resources

The Belt Railway has 215 employees who must have the FRA-mandated tri-annual vision and hearing assessments. The breakdown for annual exams is shown in Table 16. The Belt's Manager Operating Practices tracks employees who must have vision and hearing exams to assure compliance with the requirement for tri-annual exams.

Table 16. Belt Railway distribution of exams by type

Type of Exam	Annual Number
FRA (vision and hearing)	70
Return-to-work	35
New hire	40

4.3.2 Florida East Coast Railway (FEC)

Current Requirements

Florida East Coast Railway (FEC) does not have specific medical standards or guidelines. As a condition of employment, FEC requires all new hires to have a general health physical that includes hearing, vision, and drug assessments. Post-offer back exams are also given based on the position being applied for. Other than the FRA requirement for periodic hearing and vision assessments for locomotive engineers, FEC does not require any periodic health assessments. However, if an employee shows signs of illness or injury, or is otherwise suspected of being sick or injured, s/he may be recommended for a medical evaluation by their supervisor, and ultimately sent by the Director of Human Resources and Labor Relations. In addition, employees requesting medical leave must have a physical examination before returning to work, regardless of how long they have been away. An employee is also sent for a return-to-work physical if at any time s/he experiences a serious head, back or knee injury, whether on the job or not.

All examinations are performed by one of three third party physicians that are regularly contracted by the railroad. The railroad provides the examining physician with a job description for the job that the candidate will perform. Some of these job descriptions are currently being rewritten however, as the physicians feel that they are insufficient.

Self-Reporting of Medical Conditions

All Hours of Service and safety-sensitive employees are responsible for insuring that they inform the treating physician that they are subject to performing safety-sensitive duties. As part of FEC's drug and alcohol policy, employees are also responsible for notifying the railway of any prescription drugs they are taking. However, there is currently no written policy stating that employees are required to notify the company if they develop a condition that affects their ability to work safely.

Job Accommodation

Provision for light duty following an injury or illness is handled on a case by case basis. Often times, the railroad is not able to accommodate an injured employee because the individual does not possess the necessary skills required for an alternate position.

Improvements

The Director of Human Resources and Labor Relations feels that the current system of standards is working, but that FEC would of course be willing to adopt any changes in regulation.

Health Promotion Activities

Although currently there is a hearing test that is being offered to employees, there is no general program of health promotion activities.

Resources

There are three physicians that are regularly contracted by Florida East Coast. These physicians handle new hire and return-to-work physicals. Not all of these doctors meet the FRA requirements to give the tri-annual vision and hearing exams, however, so these exams are typically contracted out to other qualified physicians.

The Safety Department is responsible for keeping track of vision and hearing exam dates for locomotive engineers, as well as other requirements for certification.

4.3.3 Holding Company

As a holding company with railroads that operate globally, the medical programs are administered separately in each country where the holding company operates. There are several operating regions in the U.S. Each of these operating regions is responsible for implementing their medical program in accordance with overall company policy. Each location selects an occupational medicine physician or clinic in their respective areas to provide this service for the railroad.

Current Requirements

The Company has no formal written medical standards other than those currently required by the FRA. Every employee must have a post-offer physical. On occasion the examining physician may identify a condition, such as untreated hypertension, that if brought under control would make the candidate fit for a position. The report from the physician to the railroad will indicate whether or not the individual is medically fit for the position and does include the specifics of the individual's medical conditions or medication use. The railroad does maintain medical information concerning the *results* of its employees' post-offer physicals.

The only periodic examination is the tri-annual vision and hearing screening for locomotive engineers. Many of the company's locations arrange for a van with appropriate screening equipment to visit the work site every 3 years and test every operating employee. The Company finds this an efficient and cost-effective means to perform the required exams. As is the case with any medical evaluation, the report from the provider to the railroad merely states that the individual meets the FRA standards. This is then kept in a company file and the employee's recertification file.

Employees returning to work following an absence exceeding 3 days for medical reasons must be evaluated by the company's (if related to the Federal Employers Liability Act - FELA) or the employee's personal (if not related to FELA) medical provider. The 3-day criterion is based on the Company's process for Family and Medical Leave Act absences. As is the case with pre-employment exams, the railroad provides a description of the employee's duties. If the company is not satisfied with the employee's provider, the company will send the employee for a second opinion with an independent medical examiner (IME). In either case, a physician's return-to-work form is required. The company's labor agreements do not specifically address resolution of a disputed medical fitness examination.

In situations where a supervisor observes behaviors or excessive absences that might suggest that a medical condition is impeding the employee's ability to work safely, the supervisor will consult with the safety department. If both the supervisor and the safety department deem it appropriate, then the employee will be asked to have a medical fitness-to-work examination. As is the case with all other medical fitness examinations, this examination is done at the railroad's expense.

The railroad provides the examining physician with a job description for the position that the candidate will perform. Because the same physician (or group of physicians) performs all of the medical fitness examinations, over time they become familiar with the requirements of the various railroad crafts and jobs at the location. The regions rely on the physician's medical knowledge and understanding of the job requirements to assess fitness-to-work.

Self-Reporting

Due to HIPAA requirements, the company has no requirement for employees to report a disease or medical condition unless medical leave is involved. Even in cases where medical leave is involved, the company only requires their examining physician to certify whether or not the individual is fit to work. The nature of the condition is not disclosed as part of the return-to-work medical examination report.

Similarly, employees only report the use of over-the-counter and prescription drugs if they are selected for a random drug screen. As is the case with medical condition information, the organization conducting the drug screening does not report the use of medically supervised drugs.

The Company feels that if a system requiring self-reporting of over-the-counter (OTC) drugs were implemented, it would be difficult to enforce and of no benefit to the railroad. Such a system, they believe, would not relieve the company of liability in the event of an accident attributed to OTC drug usage, and in fact the liability may be increased.

Job Accommodation

The Company does not use light duty as a strategy for accommodating employees who are fit to work but cannot resume their normal job.

Improvements

The Senior Vice President Human Resources does not see the need for any changes in the current system for medical evaluations.

Health Promotion Activities

The Company circulates health promotion information to its employees through bulletins and employee-accessible web sites. In some regions, the company has sponsored health fairs for its employees.

Resources

The Company's corporate budget for medical fitness examinations totals between \$100,000 and \$150,000 annually. Approximately half of this amount covers pre-employment and fitness-to-work examinations. The remainder is for engineer re-certification examinations.

The Transportation Department is responsible for assuring that engineers have the required tri-annual vision and hearing screening and is overseen by the Safety Department.

4.3.4 Montana Rail Link

Current Requirements

Montana Rail Link has no formal written medical standards or guidelines. As a condition of employment, Montana Rail Link requires every employee to have a post-offer employment physical. In addition to a general health assessment, track workers and switchmen must have a functional capacity evaluation that involves testing for the essential functions of the position such as overall mobility and lifting. Montana Rail Link provides the examining physician with a job description for the job that the candidate will perform. It is up to the physician to determine whether or not the individual is fit to perform the job. Montana Rail Link contracts with local physicians for this service.

Other than the post-offer physical examination, other periodic examinations are the tri-annual vision and hearing screening for locomotive engineers, and the respirator clearance examination for maintenance of way (MOW) workers. (MOW workers who handle ballast must use respirators.) Montana Rail Link has engaged the services of a local occupational medicine provider to develop and administer its respirator program. This program conforms to OSHA requirements. Each of the 150 MOW workers has an initial examination and a follow-up every 3 years. Depending upon the results of the examination, an employee may be required to have more frequent re-examinations. Truck drivers must have bi-annual exams as required by FMCSA regulations.

Employees returning to work after an illness or injury must obtain a work release from their treating physician and then have a return-to-work examination with the railroad's contract clinic. If the clinic does not agree with the treating physician's assessment and does not certify the employee to return-to-work, the employee may request review of his/her case by a neutral medical authority agreed to by the employee and the clinic. This will usually be a specialist. The railroad and the employee share the expense of the third party review. The decision of the third party physician is final. The third party review process is part of all of Montana Rail Link's labor agreements.

If a supervisor questions an employee's medical fitness-for-duty, s/he may request a fitness-for-duty examination. This may arise due to the supervisor's observations or the observations of a co-worker. The examination is done at the railroad's expense by the local clinic.

A consultant to Montana Rail Link conducted a jobsite evaluation and analysis and prepared the job descriptions. Several years ago the railroad hired an ergonomist to review all of the railroad's operations and identify situations that have specific physical requirements and could potentially cause occupational problems. Based on this job analysis, the job description for each position was developed. The job analysis included risk factors as well as physiological demands of the jobs.

Self-Reporting

In accordance with the General Code of Operating Rules (GCOR), employees must report to their supervisor any injury or illness that results in lost work time. Depending upon the nature of the injury or illness, the supervisor may request a fitness-for-duty evaluation. Under the same rule, employees must also report the use of any prescription drug to the Medical Review Officer for the drug and alcohol testing program.

Job Accommodation

Occasionally the treating physician will release an employee for work with limitations on work activity. If possible, the railroad will accommodate these limitations.

Improvements

The Claims Manager does not see the need for any changes or improvements at this time.

Health Promotion Activities

Montana Rail Link sponsors a health fair once a year at four different field locations. Periodically the company distributes health promotional materials to its employees.

Resources

The Claims Department oversees all medical screening programs with the exception of the engineer vision and hearing screening. The budget for these programs is \$100,000 per year and covers the exams shown in Table 17.

Table 17. Montana Rail Link distribution of exams by type

Type of Exam	Annual Number
DOT (CDL)	150
New Hire	75
Return-to-work	150
Fitness-for-duty	20
Respirator clearance	100
Hazmat Responders	10

The hazmat exams are the most costly at \$350 per exam.

Approximately 125 engineer vision and hearing exams are done per year at a cost of \$75 per exam. The budget of the Training, Rules and Safety Department covers these exams.

The Training, Rules and Safety Department assures that locomotive engineers receive the required tri-annual vision and hearing screening.

4.3.5 RailAmerica

Current Requirements

RailAmerica's hiring process requires that each potential employee have a post-offer physical examination. There is no requirement for periodic examinations other than the FRA mandated vision and hearing tests for locomotive engineers.

All employees returning to work following an illness or injury must have an examination prior to their return-to-work. The employee must obtain a return-to-work approval from the treating physician. The railroad's IME will have a description of the employee's job and related physical capacity requirements. The IME reviews the treatment records and the treating physician's assessment and then either approves or disapproves the return-to-work.

RailAmerica engages the services of a third party vendor to arrange for the physical examinations at various locations where its subsidiary railroads operate. The periodic vision and hearing screenings for engineers are performed by local vendors that are selected by each subsidiary railroad.

Self-Reporting of Medical Conditions

In accordance with GCOR, RailAmerica employees must report the use of prescription drugs that may "adversely affect safe performance." It is up to the employee to determine, in consultation with his/her physician, if any prescribed medication should be reported.

Job Accommodation

In the event that an employee returns from a medical leave but does not meet the medical standard for his/her prior position, the railroad may offer a lighter duty position, or another position for which the individual qualifies. If none is available, then the employee will remain disqualified pending medical improvement. Labor agreements do not address this issue other than to allow the employee to continue on medical leave.

Health Promotion Activities

RailAmerica uses regular safety meetings and safety/family outings to promote wellness. The railroad's group health plan also distributes periodic health wellness updates.

Resources

This information was not available.

4.4 Summary

There are several similar aspects to existing medical practices among U.S. railroads. Every railroad requires a medical examination on three occasions: 1) post-offer, 2) upon promotion to a safety-critical position, 3) when medical fitness-to-work is questioned. In addition, return-to-work following a medical leave of absence requires review of the treating physician's report. In some instances, the railroad may require an examination by their medical examiner.

Current practices vary from railroad to railroad in the following respects:

- Only NJTransit, Metro-North and NS require periodic medical examinations in addition to the mandatory vision and hearing screening.
- Length of medical leave that necessitates return-to-work review varies from 3 days to 1 year.
- Some railroads provide a job description to the examiner; others do not.
- Most railroads have no written standards.
- Process for reporting of medical conditions does not clearly define conditions that must be reported.
- Process for reporting use of prescription drugs does not clearly define those that must be reported.
- Extent of health promotion activities varies by railroad.

5. Review of Accident Data

Review of railroad accidents provides an indication of the potential risk and consequences of sudden incapacitation of the employee while performing a safety critical function. Five sources of accident and casualty data were examined: NTSB railroad accident reports, FRA Accident/Incident data, FRA Illness/Injury data, FRA Employee-on-Duty Fatality reports, and FRA survey data on use of prescription and over-the-counter drugs.

5.1 NTSB Reports

Review of NTSB accident reports for the period 1989 to 2003 identified a total of eight rail accidents in which the medical condition of the operator was either related to the cause of the accident or put the operator at risk of sudden incapacitation. Five of these accidents involved Class 1 or commuter railroads and the remaining three involved rail transit operations. Table 18 summarizes the railroad accidents and Table 19 summarizes the transit accidents.

5.1.1 Railroad Accidents Investigated by NTSB

From 1989 to 2003, NTSB accident investigations have revealed two cases in which medical condition of a crew member was the probable cause of the accident. In two other accidents, NTSB believed medical condition was related to probable cause, but not the probable cause itself. In a fifth case, the NTSB discovered undiagnosed medical conditions in the process of conducting its investigation. While the medical conditions were not directly linked to the probable cause of the accident, they did create a safety risk.

On November 15, 2001, Canadian National/Illinois Central Railway (CN/IC) southbound train 533 and northbound train 243 collided near Clarkston, Michigan. Train 533 continued through a stop indication before proceeding onto the mainline track, while train 243 was operating on a proceed signal on the single main track when the trains collided. Both crewmembers of train 243 were fatally injured, while the two crewmembers of train 533 sustained serious injuries. The total cost of the accident was approximately \$1.4 million. The NTSB determined that the probable cause of the accident was the train 533 crewmembers' fatigue, which was primarily due to the engineer's untreated and the conductor's insufficiently treated obstructive sleep apnea.

The second occurrence in which medical condition of the operator was directly linked to probable cause involved a head-on collision between two commuter trains. NTSB attributed the accident to the failure of the engineer to perceive correctly a red signal aspect because of his diabetic eye disease and resulting color vision deficiency. The engineer failed to report a vision problem during annual medical examinations. Contributing to the accident was the contract physician's use of an eye examination not intended to measure color discrimination. The engineers on both trains and one passenger were killed, and there were a total of 158 injuries, ten of which were serious. Total cost was estimated at \$3,328,624 (Secaucus, NJ, February 9, 1996).

Two accidents occurred in which the NTSB believed medical condition was related to probable cause, but not probable cause in itself. The first involved the collision of two freight trains due to the failure of one engineer to stop at the stop signal because he was asleep, distracted, or inattentive. The NTSB investigation discovered that the engineer had not been medically

Table 18. Railroad accidents investigated by NTSB (1989-2003)

Report Number	Location and Date	Description	Probable Cause	Related Medical Issue
NTSB/RAR-02/04	Clarkston, MI November 15, 2001	Collision of two Canadian National/Illinois Central Railway Trains	Failure to stop at signal due to crewmembers' fatigue	Engineer's untreated and conductor's insufficiently treated obstructive sleep apnea
NTSB/RAR-97/01	Secaucus, NJ February 9, 1996	Near Head-On Collision and Derailment of Two New Jersey Transit Commuter Trains	Failure of engineer to perceive correctly a red signal aspect	Operator's diabetic eye disease and resulting color vision deficiency
NTSB/RAR-91/02	Sugar Valley, GA August 9, 1990	Collision and Derailment of Norfolk Southern Train 188 with Norfolk Southern Train G-38	Failure of engineer to stop because he was asleep, distracted, or inattentive	Engineer and crew members being treated for hypertension and/or diabetes. Not known or monitored by railroad's medical department
NTSB/RAR-93/02/SUM	Palatka, FL December 17, 1991	Derailment of Amtrak Train 87, Silver Meteor	Failure of engineer to maintain full attention to train location and failure to slow for speed restriction	Engineer's combination of prescription and over-the-counter medications, illness, and poor sleep
NTSB/RAR/01/04	Syracuse, NY February 5, 2001	Rear-End Collision of National Railroad Passenger Corporation (Amtrak) Train P286 with CSX Freight Train Q620 on the CSX Railroad	Engineer's inattention to the operation of his train, which led to his failure to comply with the speed limit	Minor visual changes and/or mild cognitive dysfunction resulting from unrecognized and untreated diabetes

examined in 5 years, a violation of company rules, which required a medical examination every 2 years. He and his three other crew members were being treated for hypertension and diabetes, diseases that were not being monitored by the railroad's medical department. Of the seven collective crew members on both trains, both conductors and one engineer were fatally injured. The trainmen on both trains, and the other engineer received minor injuries. The total cost was estimated at \$1,260,680 (Sugar Valley, GA, August 9, 1990).

The second accident in which medical condition was related to probable cause was linked to inattention of the engineer, not maintaining full awareness of the train location, and failing to slow for the speed restriction in enough time to turn the curve. As a result, the train derailed and struck two homes and blocked off a local street. It was later discovered that the engineer had taken a number of over-the-counter and/or prescription medications days before, and the night before the accident. One conclusion drawn by the NTSB was that carrier reliance on its employees to contact physicians about "questionable medication use" requires the employees to interpret the term "questionable," which may be beyond the capability of employees. Eleven people sustained serious injuries and 50 received minor injuries. Total damage was estimated at \$1.4 million (Palatka, FL, December 17, 1991).

Finally, there was one accident in which medical condition was not directly linked to probable cause, but later led to investigations which revealed unknown medical conditions of the operator. A rear-end collision of a passenger train with a freight train was caused by the engineer's inattention to the operation of his train, which led to his failure to recognize the speed limit. The

physical condition of the engineer at the time of the accident was not believed to significantly affect his ability to perceive and respond to the signals or properly control the train. However, during post accident medical evaluations, the engineer told examining physicians that he had been experiencing symptoms of diabetes for several months including burning of his feet and increased thirst, but did not alert the railroad or his physician. The NTSB stated that in general the engineer may have been suffering from some minor visual changes and even some mild cognitive dysfunction as a result of his unrecognized and untreated diabetes. The accident resulted in injuries to all four crew members and 58 of the passengers. Damages totaled \$280,600 (Syracuse, NY, February 5, 2001).

5.1.2 Rail Transit Accidents

Although the FRA is statutorily excluded from regulating urban rapid transit operations (that are not connected to the general railroad system of transportation), accidents involving this type of rail operation were a part of the accident review because the consequences of sudden operator incapacitation are similar to those for railroad operations.

On August 15, 2000 a light rail vehicle accident involved a train failing to stop at an airport station, continuing through, and striking a hydraulic bumping post at the end of the track, ultimately derailling. Seventeen of the 22 people on the train (including the operator) were injured, although none of the injuries were life-threatening. The NTSB stated that the probable cause was the operator's severe fatigue, resulting from undiagnosed obstructive sleep apnea. The estimated cost of the accident was \$935,000 (Baltimore, MD).

The use of illicit drugs by an operator was the probable cause of a similar transit accident. Impairment due to the use of cocaine caused the engineer of a light rail vehicle to run a stop light before it struck a bumping post at the end of the track. Eighteen of 26 people (including the operator) were injured – five of them seriously. The estimated cost of the accident was \$924,000 (Baltimore, MD, February 13, 2000).

A third transit accident involved the collision of one train into a second standing train. This was reportedly due to the failure of management and board of directors to fully understand and address the design features and incompatibilities of the automatic train control system before establishing it as the standard operating mode at all times. As a result of the investigation however, it was discovered that the engineer was taking Tylenol 3 which contains codeine, as well as a number of other over-the-counter cold medications. The train operator's medical records contained no documentation of a warning of possible side effects or interactions with other medications. The Safety Board was concerned with the medical office that permitted the train operator to use Tylenol 3 while on duty. The operator of the train was killed in the accident. The train's two passengers were uninjured. Total damages were estimated between \$2.1 and \$2.6 million (Gaithersburg, MD, January 6, 1996).

5.2 FRA Accident/Incident Data

The data in Table 20 and Table 21 was drawn from the FRA accident/incident database. The information retrieved from the database was limited to those accidents indicating that the physical condition of the employee was the cause of the accident. The FRA codes the physical condition of the employee as follows: H101 – impairment of efficiency or judgment because of drugs and alcohol; H102 - incapacitation due to injury or illness; H103 – employee restricted in

Table 19. Rail transit accidents investigated by NTSB (1989-2003)

Report Number	Location and Date	Description	Probable Cause	Related Medical Issue
NTSB/SIR-01/02	Baltimore, MD August 15, 2000	Light Rail Vehicle Accident at Baltimore-Washington International Airport Transit Station	Failure to stop train before it struck bumping post	Severe fatigue of operator resulting from undiagnosed obstructive sleep apnea
NTSB/SIR-01/02	Baltimore, MD February 13, 2000	Light Rail Vehicle Accident at Baltimore-Washington International Airport Transit Station	Failure to stop train before it struck bumping post	Operator impairment by illicit and/or prescription drugs
NTSB/RAR-96/04	Gaithersburg, MD January 6, 1996	Collision of Washington Metropolitan Area Transit Authority Train T-111 with Standing Train at Shady Grove Passenger Station	Failure of management and board of directors to fully understand incompatibilities of automatic train control system before establishing it as the standard operating mode at all times	Operator was using Tylenol 3, which contains codeine, while on duty. No education program in place for employees in safety-critical positions dealing with the use and effects of medications

work or motion; H104 – employee asleep; or H199 – employee physical condition, other. Only accidents containing these codes were examined. The comment field in the database was reviewed to help identify the cause of the operator’s condition.

Of the 50 FRA reportable accidents since 1989 with primary causes tied to employee physical condition, six are linked to drug and alcohol use, one was the result of a diabetic coma, 42 were categorized as “employee asleep” – with one being a blackout, and finally one was a blackout due to high blood pressure – categorized as “employee physical condition/other.” From the information available in the database, it is unclear whether the incidents listing “employee asleep” as the primary cause were a direct result of a medical condition, or simply due to lack of sleep.

Of these 50 incidents, only three can be positively tied to medical condition of the employee (one diabetic coma and two blackouts). The NTSB did not investigate any of these accidents.

Of the 31 FRA reportable accidents since 1989 with secondary cause tied to employee physical condition, 17 are linked to drug and alcohol use, one was from incapacitation due to injury or illness, nine were categorized as “employee asleep,” and four were categorized as “employee physical condition/other.” From the information available in the database, it is unclear whether the incidents listing “employee asleep” as the secondary cause were a direct result of a medical condition, or simply due to lack of sleep.

None of these 31 incidents can be positively tied to medical condition of the employee. The NTSB did not investigate any of these accidents.

Table 20. FRA Accidents/Incidents due to employee physical condition by primary cause code (1989-2003)

FRA Cause Code	Definition	Number of accidents/incidents	Nature of Condition
H101	Impairment of efficiency or judgment because of drugs or alcohol	6	1 due to alcohol 1 due to cocaine 4 unclear
H102	Incapacitation due to injury or illness	1	Diabetic Coma
H104	Employee asleep	42	1 blackout 41 fell asleep ¹⁶
H199	Employee physical condition/other	1	Blackout due to high blood pressure
Total		50	

5.3 FRA Injury and Illness Data

The data in Table 22 was retrieved from the FRA Injury/Illness data base. This information was limited to those accidents indicating that the probable reason for injury/illness was due to either impairment from substance use (Circumstance Code 07), or impairment related to physical condition or fatigue (Circumstance Code 08). Only injuries/illnesses containing these codes were examined.

Of the 975 FRA reportable injury/illness reports since 1997 linked to substance use or physical condition and fatigue, five were positively related to medical condition, 30 were questionably related, and the remaining 940 are incomplete or unclear. The five reports that were directly connected to medical condition include three substance abuse cases, one seizure, and one heart attack. Those reports considered questionably related to medical condition listed the following causes: sleep; asthma attack; blurred vision; degenerative disk disease; disintegrated ligaments; chest pains; emotional stress; and the aggravation of a pre-existing condition – including elbow/arm/shoulder, back, knee, and groin related injuries. Nine hundred forty reports lacked sufficient information to link the injury/illness to a medical condition.

¹⁶ It is not possible to determine whether sleep resulted from a medical condition or fatigue.

Table 21. FRA Accidents/Incidents due to employee physical condition by secondary cause code (1989-2003)

FRA Cause Code	Definition	Number of accidents/incidents	Nature of Condition
H101	Impairment of efficiency or judgment because of drugs or alcohol	17	4 due to alcohol; one conductor found to be taking Rx Tricor (cholesterol), and Lipracore (blood pressure) 1 due to cocaine 12 unclear
H102	Incapacitation due to injury or illness	1	Unclear
H104	Employee asleep	9	Operator fell asleep ¹⁷ In one of these cases, conductor was found to be taking Rx Lotrel, and Propel (for blood pressure)
H199	Employee physical condition/other	4	Unclear
Total		31	

5.4 FRA Employee-on-Duty Fatalities

In January 2003, the FRA began collecting data on employee-on-duty fatalities.¹⁸ This data is separate from both FRA accident/incident data as well as injury/illness data. From January to December 2003, 20 of 36 total employee-on-duty fatalities were a result of medical condition. Seventeen were caused by a heart attack, one from a stroke, one from illness, and one undetermined cause. All but two of these medically caused fatalities involved personnel holding positions with safety-sensitive functions. Sixteen of these were caused by heart attacks, and two were undetermined. From January to October of 2004, 10 of 22 employee-on-duty fatalities were the result of a medical condition; all suffered a fatal heart attack. Eight of the 10 worked in jobs with safety-sensitive functions. Although these individual fatalities did not lead to accidents, the potential for catastrophe existed. These figures shed further light on the prevalence of potentially incapacitating medical conditions in the industry.

¹⁷ It is not known whether sleep was due to medical condition or fatigue

¹⁸ Data available at <http://www.fra.dot.gov/Content3.asp?P=1425>.

5.5 Use of Performance Degrading Drugs

In April 2002, FRA regional investigators began to administer post-accident prescription/ over-the-counter (OTC) drug questionnaires to those involved in accidents attributed to human factors causes. The information is self-report, and is separate from any drug/alcohol testing that may be conducted. Individuals involved voluntarily report any prescription/OTC drug use, and may choose not to report. Between April 9, 2002 and July 30, 2004 there were 78 regionally investigated, human factors caused accidents, involving 175+¹⁹ individuals, in which prescription/OTC questionnaires were voluntarily completed. Of this group, there were 15 accidents involving 17 employees who were taking prescription/OTC drugs that had the potential to affect alertness and/or cognitive ability. (Table 23 provides a summary of these individuals). Fifteen of these employees held safety-sensitive positions at the time of the incident, one was a track inspector, and a second position was unlisted. In the same timeframe there were an additional 27 human factors caused accidents in which prescription/OTC questionnaires were not completed. From the available data, it is not possible to determine how many employees were involved in these additional accidents. (FRA Office of Safety, personal communication, August 3, 2004). Based on the available data, approximately 10 percent of the employees involved in human factors accidents were taking drugs that had the potential to degrade performance.

¹⁹ Four of the 78 accidents were refusals to report, so did not list the number of employees. One accident report is currently incomplete.

Table 22. FRA Injury and Illness Reports for which operator impairment was probable reason (1997-2003)

Link between Medical Condition and Injury/Illness	Medical Condition	Number	Probable Reason (Circumstance Code)
Clear	Substance Abuse	3	07 ²⁰
	Seizure	1	08 ²¹
	Heart Attack	1	08
Questionable	Sleep	1	08
	Asthma Attack	1	08
	Blurred Vision	1	08
	Degenerative Disk Disease	1	08
	Disintegrated Ligaments	1	08
	Chest Pains	1	08
	Emotional Stress/ Work Stress	2	08
	Aggravation of Pre-Existing Condition:	22	08
	• Arm/Shoulder/Elbow	3	
	• Back	12	
	• Knee	4	
	• Groin	3	
Incomplete	Unclear or Unknown	940	Unclear
Total		975	

²⁰ 07 - impairment due to substance use

²¹ 08 - impairment due to physical condition or fatigue

Table 23. Use of prescription and over-the-counter medications by employees involved in human factors accidents (April 9, 2002 – July 30, 2004)

Accident Type	Position	Medication(s)
Impact w/ injury (head on collision)	Engineer	Rebetol 1200mg 2xday Peginterfron Alfazb 1xweek
Major - Fatality	Engineer	Rx Flexaril daily on/off 3yrs Rx Zanaflex daily
Major - \$1 M	Engineer	Rx Vicprofen 200/75 as needed
Major - Fatality	Engineer	Rx Zoloft 50 mg (depression)
Impact w/\$150,000	Position unlisted	Rx Lithobid 1200 mg Rx Lorazepan 1 mg Rx Celexa 20 mg
RCL switching collision	Foreman	Antihistamine/day Ambien 3xweek
Impact w/\$150,000	Brakeman	Rx Darvocet 100/650 tab daily for 3 weeks
	Engineer	Rx Effexor XR 75 mg daily for 3 months
Major – Fatality	Track Inspector	OTC Sleeping pill
	Switchman	Rx Prozac 40 mg daily Rx Thorazapan since 1998 as needed, last taken 2 days before
Impact w/ Injury	Dispatcher	Rx Klonopin 3xday for dizziness since 1992 and now taking Paxil since 2000
Impact w/ Injury	Conductor	Rx Effexor 1 daily for 3 months
Fatal Train Incident	Engineer	Rx Atrovane .5 mg anti-psychotic daily Rx Seroguel 2.5 mg anti-psychotic (dealing with fatality)
Impact w/ Injury	Engineer	Rx Zoloft 100 mg daily
Impact w/\$150,000	Engineer	Rx Ambien 10 mg as needed (2xmonth) less than a year Rx Adderall 10 mg as needed (20xmonth) less than a year
Major - Fatality	Engineer	Bupro 100mg
Impact with Injury	Engineer	Cylert 10mg for ADD

6. Medical Literature Review

This section reviews the medical literature that addresses the relationship between operator medical conditions, incapacitation and accidents. For many medical conditions, there is either inconclusive or inconsistent data on the direct relationship between accidents and that condition. Any condition that causes sudden incapacitation may result in an accident. The literature appears to support a direct causal relationship between sleep disorders, certain medications, and hypoglycemia and the increased risk of incapacitation that could result in an accident. There is also a relationship between the risk of impairment or sudden incapacitation and poorly controlled or end stage medical conditions. Articles focusing on the natural progression of diseases that may lead to impairment are beyond the scope of this review.

The first six subsections are organized by organ system. The literature search did not identify any relevant articles for hearing loss. The literature on syncope, sleep disorders and attention deficit disorders are each reviewed separately. The final three subsections cover medications, health care provider knowledge and risks posed by the presence of multiple medical conditions. Appendix C contains the abstracts for the articles supporting the information in each subsection along with a glossary of relevant medical terminology. The references cited in this section are summarized in Appendix C. While the search for relevant literature focused on all modes of transportation, the majority of available research focuses on automobile drivers and commercial motor vehicle operators. Some literature is available from the aviation community, but there is no literature for railroad environments.

6.1 Blood Pressure

High blood pressure (hypertension) is very common and correlates with an increased risk of developing additional cardiovascular diseases. The Joint National Committee on Prevention, Detection and Evaluation and Treatment of High Blood Pressure reports that hypertension affects approximately 50 million individuals in the U.S. and approximately 1 billion people worldwide (Chobanian, 2003). Chobanian further reports that anti-hypertensive therapy has been associated with a 35 to 40 percent reduction in the incidence of strokes, a 20 to 25 reduction in myocardial infarction and more than a 50 percent reduction in heart failure. The medical literature substantiates that adequate treatment decreases the risk of heart attack, stroke and congestive heart failure.

A cohort study of over 10,000 men found that elevated blood pressure in young adult men is significantly related to increased long-term CHD, CVD and all cause mortality (Miura et al., 2001). The direct relationship between hypertension and accidents has not been well-addressed in the medical literature.

6.2 Diabetes

People with type 1 diabetes are at risk for hypoglycemia (low blood sugar) which can result in impaired driving performance and sudden incapacitation. Cox et al. (2000) conducted a simulator study that found driving to be significantly impaired during hypoglycemia. Although the literature is not conclusive, diabetics appear to have an increased risk of accidents compared to non-diabetic populations. Several studies, each with different driver populations, have led to

this conclusion (Cox et al., 2003; Dionne, Desjarding, Laberge-Nadeau, and Maaz, 1995; Hansotia and Broste, 1991; Koepsell et al., 1994; Laberge-Nadeau, Dionne, Ekoe and Hamet, 2000; Yslander, 1966). The Dionne et al. (1995) and Laberge-Nadeau et al. (2000) studies examined truck drivers, Koepsell et al. (1994) focused on drivers 65 years or older, and the other three studies did not limit the type of driver. The Hansotia and Broste study (1991) addressed both diabetes and epilepsy. They found slightly increased risk of traffic accidents for drivers affected by either condition.

While many diabetics are aware when they are hypoglycemic and take appropriate action, there are also many that have hypoglycemic unawareness. In a study conducted by Weinger (1999), a significant number of diabetic drivers were unable to recognize that they were impaired. Clarke, Cox, Gonder-Frederick and Kovatchev (1999) found that people with type 1 diabetes may not judge correctly when their blood glucose level is too low to permit safe driving and may continue to drive beyond where it would be safe.

6.3 Hepatic (Liver)

The single study identified and reviewed was insufficient to determine the risk of impairment from hepatic disease. A simulator study conducted by Srivastava et al. (1994) found no deficiencies in the driving performance of patients with cirrhosis and abnormal neuropsychological test results when compared to patients with cirrhosis and normal neuropsychological test results.

6.4 Cardiac (Heart)

The American Heart Association's 2003 Statistical Fact Sheet reports that one in five American males has cardiovascular disease, with coronary heart disease the leading cause of death. Data on general aviation accidents indicates that approximately three accidents per 1,000 (15 per 1,000 fatal accidents) result from the incapacitation of the pilot from all causes (Booze, 1987). Coronary heart disease is the most important cause of sudden incapacitation or death among diseases likely to be diagnosed in general aviation accidents.

Studies show that arrhythmias and ischemia can occur while driving and are associated with accidents (Antecol and Roberts, 1990; Christian, 1988; Halinen and Jaussi, 1994) and that individuals with heart disease are at higher risk of accidents (Hansotia and Broste, 1991). However, these accidents are uncommon and tend to have minor consequences (Christian, 1988; Ostrom and Eriksson, 1987). Drivers with chronic stable heart disease were found to have an increase in heart rate and ventricular arrhythmias as well as ischemia upon driving into a speed trap (Cocco and Iselin, 1992). Drivers age 60 and over with unstable angina are advised by Wielgosz and Azad (1993) to wait one month before resuming driving.

While arrhythmias are the immediate cause of cardiac syncope, coronary heart disease is usually the underlying cause. Ventricular fibrillation and ventricular tachycardia are life-threatening causes of syncope. While supraventricular tachycardia is rarely life-threatening, it can be a significant cause of syncope. Among patients with supraventricular tachycardia, Dhala et al. (1995) found that while syncope can occur and result in impairment in driving ability, voluntary restriction of driving is uncommon. These researchers point out that the best predictor of future syncope is a history of syncope.

There is not a consensus of opinion regarding return to driving after receiving an implantable defibrillator. Some studies suggest that drivers with implantable defibrillators should not be restricted from early return to driving (Akiyama, Powell, Mitchell, Ehlert and Baessler, 2001). Others have indicated that individuals who have this device are still at risk of syncope and death (Kou, 1991). Bansch et al. (1998) reported that 54 percent of individuals had recurrent ventricular tachycardia/ventricular fibrillation and 15 percent had syncope after implantation of a defibrillator.

Results from the Framingham Heart Study (Cupples, Gagnon and Kannell, 1992) suggest that short-term vulnerability to sudden cardiac death is determined more by intrinsic cardiac factors than by predisposing risk factors. In the long term, overall cardiac risk factors are more important.

Most of the relevant research focuses on private drivers. But even the low risk seen in this population may be unacceptable for locomotive engineers. Drivers who experience a cardiac event while driving have adequate warning and can pull off the road. This would not be an option for a locomotive engineer in control of a train.

6.5 Vision

Decreased visual acuity and decreased visual fields are associated with an increased risk of accidents. In aviation studies, airmen who were monocular, amblyopic or had an aphakic lens implant had higher accident rates than did the total airmen population (Dille and Booze, 1983). Ivers and Mitchell (1999) drew similar conclusions using self-reported data for automobile accidents. Those who have had refractive surgery have higher accident rates, but the difference is not statistically significant and refractive surgery is not identified as a causal factor (Nakagawara, Montgomery and Wood, 2002). Ophthalmic devices, such as corrective lenses or lens implants used by pilots have contributed to aviation accidents and incidents (Nakagawara, Montgomery and Wood, 2001). Nakagawara, Montgomery and Wood (1993) recommend that aphakia pilots applying for either a class 1 or class 2 certificate be considered on a case by case basis while third class pilots may be certified. A study of the effects of age and compromised vision on driving-related skills and on-road accidents found that the older groups had poorer driving-related skills than the younger groups, but no significantly higher on-road accident rates. Statistical analyses showed that compromised vision and visual field loss predicted real-world accidents in the study population (Szlyk, Seiple and Viana, 1995).

6.6 Neurology

A number of studies report an increased risk of accidents in individuals with seizures. One recent U.S. study reported that 55 percent of patients who have seizures while driving have motor vehicle crashes. This same study also observed that patients with intractable seizures often continue driving. Among these drivers, 39 percent had a seizure at the wheel and 27 percent crashed because of a seizure (Krauss, Ampaw and Krumholz, 2001). Factors that significantly decrease the risk of patients with epilepsy having motor vehicle crashes due to seizures are long seizure-free intervals, reliable auras, few prior non-seizure related accidents and not having had their antiepileptic drugs reduced or switched (Krauss et al., 1999). In contrast, Taylor, Chadwick and Johnson (1996) found no overall increased risk of accidents in drivers with a history of epilepsy but there was evidence of an increased risk of more severe accidents in this population.

Other neurological conditions are also associated with increased accident risk. Drivers with cognitive impairment from Alzheimer's and multiple sclerosis (MS) have an increased accident risk (Dubinsky, Stein, and Lyons, 2000; Schultheis, Garay and DeLuca, 2001). Migraine headaches also lead to a higher incidence of motor vehicle crashes. Norton et al. (1997) concluded that migraine may be associated with a 50 percent increase in the risk of a motor vehicle driver injury.

McKiernan and Jonathan (2001) recommend that drivers with vertigo or other disorders which may cause sudden attacks of dizziness should not drive and that commercial motor vehicle operators should have a waiting period absent of symptoms before resuming driving.

Many drivers with head injuries return to driving, including those who report difficulty with behavior, memory, concentration, attention or vision. Few drivers received guidance from their health care provider on driving after the injury. Stroke and Parkinson's disease patients have difficulty with driving tasks and the patients and their families overestimate their ability to drive safely (Heikkila, Purkk and Korpelainen, 1998).

6.7 Non-cardiac Syncope

Non-cardiac factors can also cause syncope. Regardless of the cause, syncope is associated with an increased risk of accidents and the best predictor of future syncope is a history of syncope. The incidence of syncope during driving is unknown, although one study concluded that vasovagal syncope during driving may not be uncommon in patients referred for syncope evaluation (Li, WQeitzel, Easley, Barrington, and Windle, 2000). Individuals with non-cardiac syncope often do not have warning prior to the event (Bhatia et al., 1999).

6.8 Attention Deficit Disorders

Attention deficit disorder (ADD) with or without hyperactivity has been found to be associated with an increased risk of accidents and traffic violations in young adults as well as teenagers (Barkley, Guevremont, Anastopoulos, DuPaul and Shelton, 1993; Barkley, Murphy and Kwasnik, 1996; Jolly and Todd, 1997). Attention deficit hyperactivity disorder (ADHD) patients appeared to perform better in a driving simulator and view themselves as driving better when on medication (Cox, Merkel, Kovatchev and Seward, 2000).

6.9 Sleep Disorders

The literature indicates that there is an increased risk of accidents in individuals with sleep disorders. Although road accidents due to loss of consciousness cause few serious accidents, sudden loss of consciousness from going to sleep is more likely to lead to an accident with fatal trauma than a condition in which the individual has some warning of impending incapacitation (Parsons, 1986).

Stoohs, Guillemineault, Itoi and Dement (1994) conducted a study of 90 commercial long haul truck drivers and found that those with sleep disordered breathing had a two-fold higher accident rate per mile than drivers without sleep disordered breathing. A number of studies have documented the association between sleep disorders and highway accidents. Teran-Santos, Jimenez-Gomes and Cordero-Guevara (1999) found a strong association between sleep apnea, as measured by the apnea-hypopnea index, and the risk of traffic accidents. Shiomi et al. (2002) observed that the automobile accident rate among patients with severe obstructive sleep apnea

was significantly higher than the rate among those who simply snored. In 1998 Barbe et al. reported on a study that compared patients with sleep apnea syndrome (SAS) with a control group. The SAS patients had more accidents than the control group. In addition those in the SAS group were more likely to have had more than one accident. A questionnaire study conducted by Horstmann, Hess, Bassetti, Gugger and Mathis (2000) found that 12.4 percent of the SAS respondents had accidents compared to 2.9 percent for the control group.

Occupational accidents may also result from excessive daytime sleepiness (EDS). Lindberg, Carter, Gislason and Janson (2001) conducted a prospective study to explore this issue. They found that men who reported both snoring and EDS at baseline were at increased risk of an occupational accident during the following 10 years. Snoring alone was not predictive of increased risk of accident.

Treatment does decrease the risk of accidents. Findley et al. (2000) used traffic records to conclude that patients that were treated with nasal continuous positive air way pressure (CPAP) had a lower crash rate while being treated than before treatment. Unfortunately, research is needed to identify those with sleep disorders who are at highest risk of accidents and to evaluate adequate treatment.

6.10 Medications

There is a clear relationship between certain medications such as the sedating antihistamines, neuroleptics, benzodiazepines, tricyclic antidepressants and some psychoactive drugs, and traffic accidents (Adelsberg, 1997; Barbone et al., 1998; Grabe, Wolf, Gratz and Laux, 1999, 1998; Kay, 2000; Logan, Case and Gordon, 2000; Wylie, Thompson and Wildgust, 1993). Recent literature suggest that chronic stable usage of opioids may not impair performance (Fishbain, Cutler, Rosomoff, Steele and Romanoff, 2003; Galski, Williams and Ehle, 2000).

Review of aviation accident data revealed over-the-counter drugs to be the most frequently found drugs in fatal aviation accidents (Canfield et al., 2000). Many of these are known to impair a pilot's ability to safely fly an aircraft. Similar to impairment by alcohol and medical conditions, individuals are poor judges of their degree of impairment caused by medications.

6.11 Provider Knowledge

Health care providers are often unaware of regulatory and legal requirements regarding driving (Cable, Reisnes and Salwa, 2000). In addition, they often have difficulty assessing whether an individual is able to drive safely. Many drivers with head injuries return to driving, including those who report difficulty with behavior, memory, concentration, attention or vision. Few drivers received guidance from their health care provider on driving after an injury or medically disabling condition (King, Benbow and Barrett, 1992).

6.12 Multiple Medical Conditions / Other

Some research has examined the risk associated with multiple medical conditions. Koepsell et al. (1994) compared drivers who were 65 years and older with a matched control group. They found that injury risk was 2.6-fold higher in older diabetic drivers, especially those treated with insulin or oral hypoglycemic agents, those with diabetes for over 5 years and those with both diabetes and coronary heart disease. Sjogren, Eriksson and Ostrom (1996) examined autopsy results of 480 car drivers who died within 3 days of a crash. Almost one quarter had medical

conditions such as heart disease, seizures or diabetes. They estimate that in 6 percent of the cases, the medical condition was the underlying cause of the crash. For drivers over 60, 19 percent of the cases were due to a medical condition. A third study by Vernon et al. (2002) examined all drivers licensed in the state of Utah who reported a medical condition on their license application. The medical conditions group had modestly elevated rates of adverse driving events compared with the control group from the entire driving population. These researchers did not find an increased rate of accidents in drivers with multiple medical conditions. Research conducted by Marshall, Spasoff, Nair and Van Walraven (2002) showed that drivers with a restricted license due to medical condition have a higher crash rate than those without restrictions but have a lower traffic violation rate. However, underreporting of medical conditions and inaccurate assessment of exposure rates may have been weaknesses in this study. In contrast, Yslander (1966) found that the risk of road accidents in Sweden directly caused by chronic diseases, primarily diabetes, cardiovascular disease and renal disorder, or its treatment may be satisfactorily offset by driving restrictions.

One study examined the age, flight experience and risk of crash involvement of a cohort of commuter air carrier and air taxi pilots (Li et al., 2003). The researchers found that flight experience, as measured by total flight time, showed a significant protective affect against the risk of crash involvement. They also commented that the lack of a relationship between age and crash involvement was probably due to the rigorous medical standards and periodic physical examination required for pilots.

7. Legal Considerations

Any medical standards program for railroad workers must comply with the Americans with Disabilities Act (ADA), the Railway Labor Act, the recently implemented Health Insurance Portability and Accountability Act of 1996 (HIPAA), and in so far as possible, existing labor agreements. This chapter describes the laws and summarizes how to best accommodate them in a medical standards program. In addition, this chapter presents the benefit programs provided by law for railroad workers and administered by the Railroad Retirement Board (RRB).

7.1 Provisions of Current Labor Agreements

A review of labor agreements on file with the National Mediation Board provides an indication of the extent to which existing railroad agreements address medical disqualification. While all labor agreements are supposed to be on file with the National Mediation Board, their files are not complete because it is the responsibility of the negotiating parties to submit a copy of their agreement. There are 35 agreements available for labor organizations that represent safety-sensitive railroad employees. The types of provisions in these agreements are the following:

- An employee may be removed from service if his/her medical fitness is considered deficient.
- Seven agreements provide for a tripartite medical panel to arbitrate. This panel consists of three physicians: one selected by the employee, one selected by the railroad and a neutral physician selected by both the employee and the railroad. The majority opinion determines whether or not the employee is medically fit to work.
- Some agreements require a medical specialist for the neutral physician.
- Some agreements require that the neutral physician be familiar with the nature of the employee's job.
- Two agreements reference corporate policy setting forth detailed medical standards.
- None of the agreements establish when medical examinations could be required although each indicates they are normally given upon an employee's return-to-work from a medical leave of absence.

7.2 Americans with Disabilities Act of 1992

The ADA prohibits discrimination against "qualified individuals with a disability." One aspect of this complex statute governs medical examinations of employees and as such, is relevant to a medical standards program. According to ADA Guidelines an employer may conduct post-offer medical examinations, regardless of whether they are related to the job, as long as it does so for all entering employees in the same job category. After employment begins, an employer may require medical examinations only if they are *job-related* and *consistent with business necessity*. This means that the employer must have a reasonable belief that the employee will be unable to perform the essential functions of the job because of a medical condition or the employee will pose a direct safety threat because of the condition. The Guidelines also permit periodic medical examinations for employees who work in positions affecting public safety. Even in this

circumstance, the examination must address specific job-related concerns. The Guidelines also permit an employer to ask employees in positions affecting public safety about their use of medications that may affect their ability to perform essential functions and thereby result in a direct safety threat.

The ADA also addresses how medical information must be stored. The ADA strictly prohibits an employer from keeping medical information with the employee's regular personnel files. This information must be filed separately and kept confidential.

References

U.S. Equal Employment Opportunity Commission. *Questions and Answers: Enforcement Guidance on Disability-Related Inquiries and Medical Examinations of Employees Under the Americans with Disabilities Act*. Retrieved February 12, 2004 from <http://www.eeoc.gov/policy/docs/qanda-inquiries.html>.

7.3 Health Insurance Portability and Accountability Act of 1996

As part of the Health Insurance Portability and Accountability Act of 1996 new safeguards were put in place to protect the security and confidentiality of patient health information. Most health insurers, pharmacies, doctors and other health care providers were required to comply with these federal standards beginning April 14, 2003. The regulations protect medical records and other individually identifiable health information, whether it is on paper, in computers or communicated orally.

According to the U.S. Department of Health and Human Services *Questions and Answers*, "The public health provision permits covered health care providers to disclose an individual's protected health information to the individual's employer without authorization in very limited circumstances. The following three conditions must be met: 1) the covered health care provider must provide the health care service to the individual at the request of the individual's employer or as a member of the employer's workforce, 2) the health care service provided must relate to the medical surveillance of the workplace or an evaluation to determine whether the individual has a work-related illness or injury, 3) the employer must have a duty under the Occupational Safety and Health Administration (OSHA), the Mine Safety and Health Administration (MSHA), or the requirements of a similar State law, to keep records on or act on such information..."

If the above conditions are met, then the health care provider may share the protected health information with the employer without authorization from the employee. Covered health care providers who make such disclosures must provide the individual with written notice that the information is to be disclosed to his or her employer. When a health care service does not meet the above requirements, covered entities may not disclose an individual's protected health information to the individual's employer without an authorization. However, nothing prohibits an employer from conditioning employment on an individual providing an authorization for the disclosure of such information.

HIPAA should not be an impediment to new medical standards in the railroad industry. If an FRA regulation requires periodic medical examinations, then HIPAA would permit the medical examiner to provide the results of the examination to the railroad and/or the FRA.

References

United States Department of Health and Human Services. (2003). *Fact Sheet: Protecting the Privacy of Patients' Health Information*. Retrieved July 19, 2004 from <http://www.hhs.gov/news/facts/privacy.html>.

United States Department of Health and Human Services. *Questions and Answers: Can I disclose the findings of employee fitness-for-duty exams, and the like, to the employer?* Retrieved December 9, 2003 from <http://answers.hhs.gov>.

7.4 Implications for Railroad Medical Standards Program

The FRA should be able to promulgate medical standards related to safety without running afoul of the Railway Labor Act (45 U.S.C.151 et seq.). The Railway Labor Act requires that wages, hours and conditions of employment be collectively bargained between management and the various unions representing railroad employees. However, the obligation to collectively bargain is subject to the moratoriums, if any, on serving section 6 notices. Thus, when the government passes regulations, railroad management is required to collectively bargain with the unions on the manner in which the regulations will affect the employees' conditions of employment. Needless to say, any newly promulgated regulations will have an impact on and will be impacted by existing collective bargaining agreements. Because the promulgation of new regulations will have a broad effect on existing working conditions and on existing collective bargaining agreements, it is important that the unions participate in whatever committee is charged with developing the medical standards program. Union participation in program development will comply with any obligations under the Railway Labor Act and will facilitate acceptance in future negotiations.

It is imperative that the medical standards program bears a rational relationship to the statutory mandate of railroad safety, specifically, that it be drafted with an eye to addressing a direct or significant threat of substantial harm to the health and safety of others. Not only must the regulations address the FRA's statutory mandate, but they must also be drafted so that they do not run afoul of the Americans with Disabilities Act.²² The regulations cannot, therefore, address general employee health concerns, but must only disqualify those employees whose continued employment will pose a direct or significant threat of substantial harm to the safety of others. Similarly, the regulations should bear a rational relationship to the job duties of specific classes of safety-sensitive employees. For example, medical requirements that are necessary for the safe operation of a freight locomotive may be overly restrictive when applied to a different class of safety-sensitive employee, for example, a conductor on a passenger train.

Following the promulgation of the regulations, the likely disputes that will arise will occur following the decertification of an employee due to his or her failure to meet the required medical standards or guidelines. An employee might attempt to bring a claim pursuant to the ADA, although the likelihood of success is probably low. As noted by the Supreme Court in the

²² In *Albertson's Inc. v. Kirkingburg*, 527 U.S. 555, 573-574 (1999), the Supreme Court noted that Congress had requested that the Secretary of Transportation review its rules with respect to truck drivers to ensure they were not more demanding than safety required, thus frustrating the purposes of the ADA. (See Appendix D for a summary of this case.)

Albertson's case, cited above, "[w]hen Congress enacted the ADA, it recognized that federal safety rules would limit application of the ADA as a matter of law." Other Supreme Court cases in the transportation industry have further limited the applicability of ADA claims.²³ Even apart from properly promulgated regulations, employees face an uphill battle when bringing claims pursuant to the ADA. The ADA prohibits discrimination against "qualified individuals with a disability." A disability is a physical or mental impairment or disorder that substantially limits the person's ability to perform a "major life activity" such as seeing, working, hearing, etc. Many courts, including the Supreme Court, have taken a restrictive view of what qualifies as a "major life activity," resulting in findings of no disability.²⁴ Additionally, the employee must show he or she is "qualified," that is, is able to perform the essential functions of the job with or without reasonable accommodations. To date railroad employees have had little success in bringing cases under the ADA. (Appendix D contains a summary of lower court cases referencing the ADA in the context of the railroad industry.)

A decertified employee might be expected to seek redress through the arbitration or other existing dispute resolution processes, such as those under the collective bargaining agreement. Currently, many carriers have in place a procedure for a tripartite medical panel for the resolution of disputes arising out of medical diagnoses. Based upon matters that have previously been arbitrated under the vision and hearing standards, it can be anticipated that employees will not only challenge the correctness of medical diagnoses, but will also challenge the application of those diagnoses to their actual job functions. For example, an employee may argue that, while his medical condition would disqualify him for his position as described in the official job description, in reality, the employee only performs a subset of the described functions, including the essential jobs functions, and has been safely doing so for a number of years. Such an employee should be provided with a mechanism for challenging his decertification. It is possible that the grievance/arbitration process now in place could address this type of issue.

It is inevitable that employees will be decertified pursuant to the new medical standards, and that many, if not most, of those employees will challenge the decision through tripartite medical panel and established grievance/arbitration procedure. The legal administration of the medical standards by the carriers will be enhanced through the avoidance of decertification disputes based on questionable job descriptions or medical examinations. Based on the kinds of issues that have arisen in the past, it is likely that disputes will arise where the employee has learned to adapt to and compensate for his impairment to such a degree that it poses no safety hazard beyond that of an unimpaired individual. Providing the medical examiner with a copy of the employee's job description minimizes the grounds for subsequent dispute if the employee is decertified.

7.5 Railroad Retirement Board

The Railroad Retirement Board administers three programs for railroad workers. These are sickness benefits, unemployment benefits and disability annuity. The RRB has a detailed set of standards for determining medical disability. Railroad workers who become medically

²³ For example, see *Sutton v. United Airlines*, 527 U.S. 471, (1999) and *U.S. Airways v. Barnett*, 535 U.S. 391, (1999) which are summarized in Appendix D.

²⁴ For example, see *Toyota Motor Manufacturing, Ky., Inc. v. Williams*, 534 U.S. 184, (2002) and *Murphy v. United Parcel Service, Inc.*, 527 U.S. 516, (1999) which are summarized in Appendix D.

disqualified from their positions may be eligible for these benefits. The provisions of the RRB programs are the following:

- *Sickness Benefits*

If a current employee is found unfit to work, s/he may be eligible for sickness benefits after a 7 day waiting period. Employees can receive up to 130 days of benefits annually. Employees with 10 or more years of service qualify for an additional 65 days. In cases where the RRB did not grant sickness benefits, the employee would generally be eligible for unemployment benefits.

- *Unemployment Benefits*

Unemployment benefits can be received for as many as 130 days a year. If an individual has 10 or more years of service and exhausts their normal unemployment benefits, they may be eligible to receive extended benefits up to 65 days. The waiting period for eligible compensation for unemployment benefits is 7 days.

- *Disability Annuity*

A disability annuity can be paid after a five-month waiting period for:

- a) *Total disability*, at any age, if an employee is permanently disabled for all regular work and has at least 10 years of creditable railroad service. A reduced disability annuity is provided to employees with 5-9 years of creditable railroad service, if at least 5 years were performed after 1995.
- b) *Occupational disability*, at age 60, if an employee has at least 10 years of railroad *service* or at any age if the employee has at least 20 years of service, when the employee is permanently disabled for his or her regular railroad occupation.

Regulations governing the RRB (20 C.F.R. § 220.10) provide for the establishment of an Occupational Disability Advisory Committee made up of two physicians, one from recommendations from rail labor, and one from recommendations of rail management. This committee reviews, from time to time, the disability standards developed by this regulation and the Occupational Disability Claims Manual which supports this regulation.

References

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8. Program Options

The medical standards programs of the U.S. DOT modal administrations and foreign countries suggest a number of options that could be incorporated into an FRA medical standards program. This chapter discusses the feasibility of these options. In some cases the appropriate option is clear but in others the choice is not as clear cut and will require input from stakeholders (unions, railroad management, railroad medical specialists) to make a decision.

8.1 Program Components

The overall objective of a medical standards program for railroad workers is to reduce the risk of a serious rail incident precipitated by the medical incapacitation of a railroad worker in a safety-sensitive job. Table 24 summarizes the feasible options for each component of a program with this objective. These options were developed keeping in mind existing laws (e.g., ADA, EEOC guidelines) and the dispute provisions of current labor agreements. Some components have options. In these cases, the options are numbered in the table. In other cases, where there appears to be only one option, the items are bulleted. The following subsections describe the various components and the advantages and disadvantages of each option.

Positions covered – Since the objective of a medical standards program is safety-related, there are two primary ways to identify the positions that are covered by the program. One option is to include those positions that the FRA defines as having safety-sensitive functions in 49 C.F.R. § 209.303. The alternative is to require each railroad to identify the job functions that it determines to be safety-sensitive. This second option, based on the Australian system, puts the responsibility on each railroad, one that would be especially burdensome to short line and regional railroads. If this option were adopted, it may be possible for the smaller railroads to collaborate through the American Short Line and Regional Railroad Association in identifying the positions with safety-sensitive functions. A less burdensome third option is similar to that used in Canada. Under this option the FRA provides a procedure that allows the railroad to justify why a specific function is not safety-sensitive and should not be subject to the medical standards.

Definition of medical criteria – All regulatory medical standards programs are comprised of regulatory language, which sets general criteria (e.g., “has no clinical diagnosis of high blood pressure likely to interfere with the ability to operate a motor vehicle safely”). These criteria are usually supplemented and supported by guidelines, which represent the most current state of medical knowledge on specific conditions.

Unlike regulations, guidelines are not binding. They provide guidance to an examining physician and may provide a carrier some discretion when evaluating whether an employee, performing a function, poses a safety risk. (For example, blood pressure guidelines could set out specific blood pressure readings that should disqualify a locomotive engineer or call for a medical certificate with a shorter duration period subject to reevaluations.)

Generally stated regulations with more specific guidelines permit flexibility in updating guidelines consistent with changes in medical practice. Changing regulations/standards requires going through the rule making process while updating guidelines does not.

Table 24. Options for medical program components

Component	Option(s)
Positions covered	<ol style="list-style-type: none"> 1. All functions defined as safety-sensitive by 49 C.F.R. § 209.303 2. Require each railroad to conduct a risk analysis to identify safety-sensitive functions 3. All functions defined as safety-sensitive by 49 C.F.R. § 209.303 with procedure available for a railroad to justify otherwise
Definition of medical criteria	<ul style="list-style-type: none"> • Contained in regulations that are supported by guidelines
Development of medical criteria	<ol style="list-style-type: none"> 1. Done by railroad medical specialists 2. Done by independent panel of medical specialists
Timing of examinations	<ul style="list-style-type: none"> • Post offer • Return-to-work following medical leave of absence • Fitness to work based on triggering event • Change to safety-sensitive or covered position • Periodically <ol style="list-style-type: none"> 1. At fixed interval 2. Interval based on age
Examiners	<ol style="list-style-type: none"> 1. Any licensed health care professional 2. Physician only <hr/> <ol style="list-style-type: none"> 1. Examiners trained and certified by organization that is approved by the FRA 2. Examiners, with knowledge of railroading, selected by the railroad
Guidance for examiners	<ul style="list-style-type: none"> • Standards and guidelines available via FRA web site • FRA issues update to railroad medical officers who are responsible for distributing to their examiners • FRA Medical Director/resource person available for health care practitioners with questions
Waivers	<ol style="list-style-type: none"> 1. FRA Medical Officer grants waiver 2. FRA Medical Review Board grants waiver 3. Railroad CMO makes decision in accordance with guidelines
Transferability of medical certification	<ol style="list-style-type: none"> 1. Medical certification for current employer only 2. Medical certification for railroad industry 3. Medical certification for railroad industry but employer may request re-examination
Dispute resolution	<ul style="list-style-type: none"> • Tripartite medical panel • Arbitration
Transition to new system	<ul style="list-style-type: none"> • Phase-in period for periodic exams for current employees • All other exams use new standards immediately
Audit of examinations	<ol style="list-style-type: none"> 1. Allow railroad personnel to do quality control on their examiners 2. Third party administrator hired by railroad does quality control
Program oversight	<ul style="list-style-type: none"> • FRA industrial hygienists check that process is properly implemented (e.g., documentation that timely exams are done and that examiners have knowledge of railroading)
Review of medical standards	<ul style="list-style-type: none"> • Done by medical specialists on periodic basis
Program evaluation	<ul style="list-style-type: none"> • Reduction in accidents

Note: Options are numbered for components with multiple options. Where there is only one option, items are bulleted.

Development of medical criteria – Medical specialists are the only people qualified to develop the medical criteria that are contained in *guidelines*. Either a group of railroad medical specialists or an independent panel of medical specialists is suitable for this important task. Canada's medical criteria were developed by a committee convened by the Railway Association of Canada that included railroad medical officers. A panel of independent medical specialists developed the FMCSA guidelines. FRA regulatory specialists must be responsible for drafting the *regulations* but the medical standards should be developed by medical professionals who are familiar with the safety-sensitive functions that the regulations and guidelines cover.

Timing of examinations – Most carriers in the railroad industry already perform medical assessments on four occasions: 1) post-offer, 2) return-to-work following medical leave, 3) fitness-to-work based on a triggering event, and 4) change to a safety-sensitive position. In addition, locomotive engineers have tri-annual vision and hearing screening. The proposed medical standards program adds a periodic medical assessment and standardizes the absence period that necessitates a return-to-work assessment. The frequency of the periodic assessment can either be a set interval for all employees, as is done for motor carrier operators and mariners, or be a function of age, which is the case for all of the other programs reviewed as part of this study. Regardless of whether the interval is fixed or determined by age, there should be a provision allowing the medical examiner to perform more frequent examinations, where necessary, to monitor the progression of a disease or condition. The decision as to the frequency of examination should be made by the medical specialists who develop the medical criteria. Since vision and hearing screening of engineers is currently done every 3 years, complete medical evaluation could also be done at this time.

Examiners – The medical examiner can be either a physician or other licensed health care provider. For example, commercial driver and mariner medical examinations can be performed by any health care professional whose state license permits them to perform independent examinations. This includes physicians (MDs and DOs), advanced practice nurses, physician assistants and in some states chiropractors. To maintain some control over the qualifications of the examiners, the examiner should be selected by the railroad and the railroad should be responsible for ensuring that the examiner understands both the railroad medical standards and the nature of the job that the employee performs. The employee should not be permitted to select the examiner because then there would be no guarantee that the examiner was familiar with the relevant medical standards. A program, such as the FAA's, where the examiners are trained and certified by an organization approved by the FRA would introduce an additional cost to the government which does not appear to be justified. This type of certification system may lead to a limited number of certified examiners who charge a higher examination fee to reflect the time that they invest in maintaining their certification. In addition, this type of system would take longer to implement than one that builds on medical resources that railroads already use.

Guidance for examiners – The FRA Office of Safety should be responsible for maintaining and distributing the standards and guidelines to the railroads' medical officers, or other designated individuals, who in turn will be responsible for ensuring that the medical examiner is updated. The details could be posted on the FRA website but there needs to be a mechanism to notify the railroads that new material is posted. The FRA should maintain a list of individuals at each railroad to whom they send program updates. In addition, the FRA will need either a part-time Medical Officer or other resource person who is available to answer questions from the railroads' health care practitioners.

Waivers- A waiver allows an employee to work when s/he fails some aspect of the medical regulations but is judged qualified to continue in his/her position either because s/he has demonstrated through experience or additional medical assessment that the specific demands of his/her job are not jeopardized by his/her condition or, s/he has or can demonstrate that physical adaptations to his/her impaired condition permit him/her to perform the job safely. In the latter instance the waiver might be conditioned on more frequent medical exams or other criteria.

The agency issuing the regulations usually grants a waiver from the regulations. The determination whether or not a waiver will be granted may be made by the FRA, the agency responsible for the regulations, through either an FRA Medical Officer or a FRA Medical Review Board.

The volume of waivers may be related to the degree of specificity of the regulation. More generally stated regulations will result in a need for fewer waivers. If the supporting *guidelines* allow some discretion to the railroad's chief medical officer, then there will be fewer requests for waivers. This discretionary authority would allow exceptions to be made depending upon the employee's safety history and the job that s/he performs. (This is the procedure that is currently used with respect to the FRA vision and hearing regulations. See subsection 2.2.1.) The advantage to allowing the carriers to exercise some discretion in applying the medical guidelines is their superior knowledge of the employee and the job in question. A disadvantage is the lack of national consistency and FRA oversight. By allowing the railroads more discretion, they will bear more liability for the consequences of a variance from the guidelines.

Transferability of medical certification – Medical certification can be for either the entire railroad industry or for only the employee's current employer. Medical certification for U.S. motor carrier operators, airmen and mariners allows the certificate holder to use that certification with any employer, although a new employer may require an examination with an examiner they approve. This type of system requires that the oversight agency handle any requests for a variance from the medical standards. A system where the employee is medically-certified for only his/her current employer allows the employer to develop position specific requirements. For example, a medical standards program where the certificate is employer-specific might allow the railroad's medical officer to certify a controlled diabetic to a position that permits regular hours, breaks and mealtimes.

An employer-based medical standards program is feasible for railroad workers but would not work for pilots, motor carrier operators or mariners. With regard to pilots, the majority of the medical certificates are for private pilots who are not affiliated with an airline or other flight service. Similarly, there are many owner-operator and independent truckers who are not employees of a trucking company, and mariners frequently change employers. In contrast, everyone who operates a locomotive or is involved with train movements works for a railroad. There is no equivalent of the private pilot or independent trucker in the railroad industry.

Dispute Resolution - There are two kinds of situations that will require a dispute resolution process. The first occurs when an employee does not agree with the determination that s/he does not meet the position's medical regulations/guideline(s). Since many labor agreements already provide for a tripartite medical panel, it is the preferable dispute resolution mechanism when this occurs. (A tripartite panel has a neutral doctor, selected by the employee's and employer's doctors. The neutral physician has the final word on the employee's fitness.) The second situation occurs when an employee concedes he does not meet the medical standard but claims

that s/he is entitled to a waiver or more lenient application of the discretionary guidelines because a) his/her body has adapted and compensated for the condition over time and he can and has demonstrated that he poses no unacceptable safety risk or, b) the specific demands of his/her individual assignment do not place him/her in a situation where s/he poses an unacceptable safety risk. In accordance with current labor agreements, an employee protesting his/her disqualification on these grounds would file a grievance and go to arbitration. Both railroad labor and management are familiar with these processes and might oppose a new dispute resolution mechanism. Medical specialists are the individuals who are qualified to resolve medical issues. This must be considered if additional dispute resolution mechanisms are examined.

Transition to new system – Post-offer, return-to-work, fitness-to-work and change of position medical evaluations can begin using the new standards immediately. A phase-in period will be necessary for the periodic exams for current employees and will be based on the frequency set in the regulations. (For example, if medical reviews occur every 3 years, then one third of the employees will be selected for examination in each of the first 3 years after inception of the program.) Since older employees are most at risk, prioritization of employees for medical evaluation could be done by age. A combination of new and old requirements would be confusing for the medical examiners and probably should be avoided for this reason.

A major consideration in planning for transition to a new system of medical review is accommodating current employees who do not meet the new standard. Some employees may be eligible for disability retirement under the Railroad Retirement Board system. These employees may or may not choose this option. For those who choose not to retire or are ineligible, there are three options to consider. They are 1) restricted duty in current craft (e.g., working a daylight yard job rather than a road crew job), 2) alternate placement (e.g., transfer to a clerical job), and 3) variance from the guidelines based on demonstrated job performance but subject to more frequent re-examination than the regulation prescribes. Seniority provisions of Collective Bargaining Agreements limit options for restricted duty or alternate placement. Input from stakeholders is needed before a determination is made as to how to handle the current employee who is medically disqualified.

Audit of examinations – The railroads rather than the FRA should oversee the quality of the examinations. The railroad's medical department can perform this function or can hire a third party administrator to perform this quality control function. Because this is a medical function, it is not suitable for FRA safety inspectors. However, FRA safety inspectors can check to ensure that the railroad has a process in place to assure the quality of its medical examinations.

Program oversight – As part of a routine safety audit, the FRA industrial hygienists working in the field could check that the appropriate processes are in place to administer the medical program in accordance with the regulations and guidelines.

Review of medical standards – To assure that the guidelines reflect current medical standards of practice, a panel of medical specialists, should review the guidelines and update them as necessary. The FRA Medical Program Manager or the FRA Medical Officer can be responsible for assuring that this review is performed.

Program evaluation – Evaluating the success of a medical standards program is difficult. Both Canada and Australia will look at incidence of accidents and injuries where the medical condition of the employee was the cause or a contributing factor. The FRA could do likewise.

The railroads could also look at the rate of absenteeism due to medical conditions and overall expenses for employee health care.

8.2 Candidate Medical Standards

The medical standards of the DOT modal administrations and the foreign railroad organizations have potential application to U.S. railroad positions with safety-sensitive functions. Table 25 summarizes the extent to which each is applicable to selected positions. The similarity of the non-railroad job to a railroad job was the basis for determining applicability. For example, the job of an air traffic control specialist is similar to that of a railroad dispatcher so the FAA ATCS standards should be considered as applicable for only dispatchers. None of the standards listed in Table 25, including those from foreign railroad programs, cover positions similar to railroad signalmen or mechanical department functions. Since both the Canadian and Australian medical standards programs are risk-based, their standards could be applied. The RSSB standards address MOW workers.

Table 25. Applicability of existing medical standards to selected U.S. railroad positions

Agency	Position				
	Locomotive Engineer	Conductor/ Trainman	Dispatcher	Signalman	Other MOW/Mech
FMCSA	✓				
FAA - Airman	✓				
FAA - ATCS			✓		
USCG - Mariner	✓	✓			
Transport Canada	✓	✓	✓	✓	✓
NTC – Australia	✓	✓	✓	✓	✓
RSSB – U.K.	✓	✓	✓		✓
UIMC	✓	✓	✓		

8.3 Resource Requirements

FRA resource requirements will be a function of the level of control and involvement that the agency has in the overall medical standards program. It is difficult to make a precise resource projection until all of the program decisions, described in 8.1 above, have been made. However, it is possible to estimate the FRA staffing levels for three alternative levels of FRA involvement. Table 26 defines three alternative models of FRA involvement in a medical standards program for railroad workers. All three models assume that 1) there are generally stated regulations with more specific guidelines, 2) the FRA convenes a panel of medical specialists to draft the medical guidelines, and 3) existing dispute resolution mechanisms, specifically the tripartite panel and arbitration, are used. Additional variations on these three models are possible. These models were formulated to illustrate the range of FRA staffing levels that each type of medical standards program would require.

Table 26. Alternative models of FRA involvement in medical standards program

Activity	Model		
	A	B	C
Certify examiners	✓	Audit process	Audit process
Review results of exams	✓		
Review and permit employees not meeting regulations/guidelines to work	✓	✓	
Advise on resources examiner should use in making determination	✓	✓	
Convene medical panel to develop initial guidelines and update periodically	✓	✓	✓
Perform process oversight	✓	✓	✓

Model A

This option is similar to the FAA's program. The FRA certifies the examiners, reviews the results of exams and makes decisions in cases where the employee does not meet with regulations/guidelines. Extensive agency resources are required. Employees covered by the Hours of Service Law are a subset of the positions with safety-sensitive functions. Based on the current U.S. railroad labor force, there are approximately 102,000 employees in Hours of Service positions which would require medical review. Assuming each of the 102,000 safety-sensitive employees must be re-examined every 3 years, there would be approximately 33,000 exams per year. If each certified medical examiner handled 100, then there would be a need for 330 FRA-certified railroad medical examiners. The FRA would be responsible for initial certification as well as periodic re-certifications. This model would also require the FRA to have medical staff, either FRA employees or fee-for-service contractors, to review the results of each exam. Clerical staff would be responsible for managing the various files and databases to keep track of examination results. Both medical and legal staff would be involved in review of requests and approval for employees who do not meet the regulations/guidelines to work. Until the regulations and guidelines are written, it is not possible to estimate the number of requests that will occur for these special approvals. Implementing this model would likely take several years once the rulemaking process concluded. Using the ratio of the likely number of required railroad medical examiners relative to the number of AMEs that the FAA has, the FRA resources for this type of program would be the following:

- 3 form reviewers (non-medical)
- 10 support staff
- 1 manager, examiner certification

330 medical examiners

1 part-time physician in each region to review examination results

1 FRA Medical Officer (analogous to Federal Air Surgeon, to oversee program and review requests for employees not meeting regulations/guidelines to work)

The FRA Medical Officer is responsible for convening and participating on a panel of medical experts for initial development of the guidelines as well as for periodic review to update the guidelines.

Model B

Under Model B the railroads have a significant role in the program but the FRA staff members are involved in some medical decisions. The railroads are responsible for selecting and qualifying the medical examiners. The FRA Medical Officer is responsible for reviewing requests and giving approval for employees who do not meet the regulations/guidelines to work. Resource people at the FRA are available to provide guidance on both procedural issues and resources the examiner should use in making the qualification determination. The FRA industrial hygienists, as part of their routine duties, assure that the railroad has procedures in place 1) to select medical examiners with an understanding of the FRA medical standards and 2) to examine safety-sensitive employees at the prescribed interval. This type of program would require the following FRA resources:

1 FRA Medical Program Manager (not an MD)

1 FRA Medical Officer (full-time for 6 months until program is set up, then part-time)

1.5 fulltime equivalent support staff

The FRA Medical Officer is responsible for convening and participating on a panel of medical experts for initial development of the guidelines. S/he is also responsible for periodic review to determine if the guidelines must be updated. The panel members are resources that the FRA Medical Officer uses when specific medical issues require specialist input.

Model C

Model C is similar to Model B except that the FRA is not involved with any medical decision making. The railroads are responsible for selecting and qualifying the medical examiners. The railroad's CMO in conjunction with the employee's management resolves situations where the railroad's medical examiner does not find the employee unconditionally fit for work. Resource people at the FRA are available to provide guidance on procedural issues. Since there is no FRA Medical Officer, staff people provide the guidelines but do not interpret them. The FRA industrial hygienists, as part of their routine duties, assure that the railroad has procedures in place 1) to select medical examiners with an understanding of the FRA medical standards and 2) to examine safety-sensitive employees at the prescribed interval. There is no need for an FRA process to evaluate employees who do not meet the regulations/guidelines because the railroad's CMO has the authority to make these decisions. This type of program would require the following FRA resources:

1 FRA Medical Program Manager (not an MD)

1 support staff

The FRA Program Manager is responsible for convening a panel of medical experts for initial development of the guidelines as well as for periodic review to update the guidelines.

9. Conclusions and Recommendations

This chapter summarizes the major conclusions of this study, recommends the next steps in the development of a medical standards program for U.S. railroad workers and highlights critical issues that must be resolved in developing the program.

9.1 Conclusions

Review of existing medical programs of the DOT modal administrations, foreign organizations and existing railroad programs led to the following conclusions:

- There is a need for a *consistent* industry-wide medical standards program for railroad workers performing safety-sensitive functions.
- This need will increase due to the aging work force.
- The FRA medical program is significantly less comprehensive than that of other DOT modal administrations and other countries.
- There is a lack of consistency across U.S. railroads in determining medical fitness of employees in positions with safety-sensitive functions.
- There have been several accidents and injuries due to the medical condition of the employee. A medical standards program could likely have prevented these accidents.
- There appears to be a definite relationship between hypoglycemia, sleep disorders, and certain medications, and risk of sudden incapacitation that could result in an accident.
- There is also a relationship between the risk of impairment or sudden incapacitation and poorly controlled or progressive medical conditions. Specifically, cardiovascular disease has been identified and will increase as a risk for aging workers in with safety-sensitive functions.
- Individuals and their health care providers are often unable to assess the degree of impairment.
- Health care providers are often unaware of existing relationships, regulations and guidelines regarding medical conditions and the risk of driving accidents. It is likely that their knowledge of current railroad requirements and the nature of railroad occupations is limited.
- A medical standards program for railroad workers can be implemented building on the processes already in place in the railroad industry.
- Regulations and guidelines from other countries and other modal administrations, as well as the RRB disability standards, provide a basis from which to develop a medical standards program for U.S. railroads.

9.2 Recommendations

The FRA should proceed to develop a medical standards program for the railroad industry in accordance with the following recommendations:

- The need for a medical program exists, and this need will increase due to the aging work force. Therefore the FRA should expedite the development process to the extent possible.
- The FRA should identify a group which will recommend a medical standards program. The FRA should ensure that this group obtains input from all interested stakeholders.
- The medical standards program should have generally stated regulations with supporting guidelines.
- Use of existing resources and processes will facilitate program development and implementation.
- The program must assure that the medical examiners understand the safety-sensitive functions of railroad jobs.

9.3 Critical issues

Development of the railroad medical standards program must address the following critical issues:

- What options are available for employees not meeting the new criteria at the inception of the program?
 - Continue in current job through waiver/exemption to guidelines
 - Alternate placement
 - Restricted duty
 - Disability retirement through Railroad Retirement Board
- What can be challenged and what process is used for resolving the dispute?
 - Whether the individual meets the regulatory standards or guidelines
 - Whether the individual is entitled to a variance from the regulations or guidelines
 - Who is the ultimate decision maker (tri-partite medical panel, FRA Medical Officer, arbitrator)?
- What is the scope of the medical standards?
 - Medical conditions addressed
 - Level of specificity of the regulations
 - Details of the guidelines
 - Positions covered

Appendix A – Summary of NTSB Recommendations Regarding Medical Conditions, Medications and Fitness-for-Duty

A.1 Medical Conditions and Fitness-for-Duty

To the Federal Railroad Administration:

R-88-028 - Amend 49 C.F.R. § 219 to require periodic medical examinations (return-to-work, return-from-furlough, and others as appropriate) for all railroad employees in safety-sensitive positions, and to require that alcohol and drug screening be made a part of those examinations.

R-88-030 - Require a federal medical certificate for all railroad employees in safety-sensitive positions. In developing a medical certificate program, establish medical standards similar to programs already used by the federal aviation administration and the federal highway administration.

R-91-024 - Establish uniform medical requirements for train crewmembers that are based on reasonable standards consistent with current medical practices, and require carriers to provide their train crewmembers with periodic medical examinations based on these standards.

To the United States Coast Guard:

M97-42 - Review, in consultation with experts in occupational health, your medical standards, guidelines and examination forms to ensure that they require the disclosure and appropriate evaluation of the history or presence of any medical conditions, symptoms, or medication use that would affect an individual's fitness to pilot a vehicle.

To the Federal Transit Administration:

R-01-25 – Authorize and encourage rail transit systems to require their employees in safety-sensitive positions to inform the rail transit system about their use of prescription and over-the-counter medications so that the rail transit systems can have qualified medical personnel determine the medication's potential effect on employee performance.

R-01-27 – Ensure that your fatigue educational awareness programs includes the risks posed by sleeping disorders, the indicators and symptoms of such disorders and the available means for detecting and treating them.

To the Federal Highway Administration/Federal Motor Carrier Safety Administration:

H-88-24 - Revise Part 391 of the Federal Motor Carrier Safety Regulations to require a motor carrier to verify the authenticity of a medical examiner's certificate if the certificate has been prepared by a physician who has not been selected by the motor carrier to perform the examination. Information concerning the fact that verification was made should be retained as part of the driver's qualification file.

H-89-031 - Revise section 49 C.F.R. § 391.43 of the federal motor carrier safety regulations to: incorporate a provision that will prohibit the omission of medical information in connection with a medical certification physical examination; require that when commercial drivers are examined, they sign a statement certifying that the medical history they have provided is both

complete and accurate and that the motor carrier has the authority to obtain information on the bus drivers' medical history from their personal health care providers; and require that the medical history form elicit more complete information on drivers, using commonly understandable terminology.

H-90-024 - Amend 49 C.F.R. § 391.43 to require more extensive and frequent state of the art cardiac screening tests and examinations of older commercial truck drivers (age 40 and above) and for all commercial drivers with cardiac conditions. Commercial drivers with a cardiac history or condition should be disqualified until cleared by a competent medical authority.

H-90-025 - Develop a clear set of medical standards for cardiac risk assessment and require physicians to use them in qualifying older commercial truck drivers and for commercial drivers with cardiac conditions. Medical certification should include medical state of the art cardiac risk factors.

H-90-026 - Provide for criminal penalties for physicians who deliberately qualify commercial truck drivers with serious medical conditions in spite of contradictory medical evidence and for physicians, commercial drivers, and others who falsify the medical examiner's certificate.

H-90-027 - Improve the medical examination form in 49 C.F.R. § 391.43 to ensure that the examining physician is aware of truck operation risk factors and of the physical and other stress producing requirements of commercial truck operation. Provide for a means for physicians to acknowledge that they understand the rigors of commercial truck operation and that the driver being examined is qualified for such commercial truck operations. The physician should also certify that he understands the penalties for deliberate and/or false statements on the medical certificate and for medical certificate falsification.

The National Transportation Safety Board has investigated several highway accidents where medical conditions were felt to possibly be related to or a probable cause of the accident. Recommendations from many of these were issued in conjunction with the report of the May 9, 1999 Motorcoach Run off the Road Accident which occurred near New Orleans, LA. The NTSB recommended that the Federal Motor Carrier Safety Administration develop a comprehensive medical oversight program for interstate commercial drivers that contains the following program [elements]:

H-01-17 - Individuals performing medical examinations for drivers are qualified to do so and are educated about occupational issues for drivers.

H-01-18 - A tracking mechanism is established that ensures that every prior application by an individual for medical certification is recorded and reviewed.

H-01-19 - Medical certification regulations are updated periodically to permit trained examiners to clearly determine whether drivers with common medical conditions should be issued a medical certificate.

H-01-20 - Individuals performing examinations have specific guidance and a readily identifiable source of information for questions on such examinations.

H-01-21 - The review process prevents, or identifies and corrects, the inappropriate issuance of medical certification.

H-01-22 - Enforcement authorities can identify invalid medical certification during safety inspections and routine stops.

H-01-23 - Enforcement authorities can prevent an uncertified driver from driving until an appropriate medical examination takes place.

H-01-24 - Mechanisms for reporting medical conditions to the medical certification and reviewing authority and for evaluating these conditions between medical certification exams are in place; individuals, health care providers, and employers are aware of these mechanisms.

H-01-25 - Develop a system that records all positive drug and alcohol test results and refusal determinations that are conducted under the U.S. Department of Transportation testing requirements, require prospective employers to query the system before making a hiring decision, and require certifying authorities to query the system before making a certification decision.

A.2 Medication Use

To the Federal Railroad Administration:

R-00-1 - Establish, with assistance from experts on the effects of pharmacological agents on human performance and alertness, procedures or criteria by which train operating crewmembers who medically require substances not on the U.S. Department of Transportation's list of approved medications may be allowed, when appropriate, to use those medications when performing their duties.

R-00-2 - Develop, then periodically publish, an easy-to-understand source of information for train operating crewmembers on the hazards of using specific medications when performing their duties.

R-00-3 - Establish and implement an educational program targeting train operating crewmembers that, at a minimum, ensures that all crewmembers are aware of the source of information described in Safety Recommendation R-00-2 regarding the hazards of using specific medications when performing their duties.

R-00-4 - Establish, in coordination with the U.S. Department of Transportation, the Federal Motor Carrier Safety Administration, the Federal Transit Administration, and the U.S. Coast Guard, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to ensure the identification of the role played by common prescription and over-the counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.

To the U.S. Department of Transportation:

I-00-1 - Establish, in coordination with the Federal Motor Carrier Safety Administration, the Federal Railroad Administration, the Federal Transit Administration, and the U.S. Coast Guard, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to ensure the identification of the role played by common prescription and over-the counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.

I-00-2 - Develop, with assistance from experts on the effects of pharmacological agents on human performance and alertness, a list of approved medications and/or classes of medications that may be used safely when operating a vehicle.

I-00-3 - Expressly prohibit the use of any medication not on the U.S. Department of Transportation's list of approved medications (described in Safety Recommendation I-00-2) for twice the recommended dosing interval before or during vehicle operation, except as specifically allowed, when appropriate, by procedures or criteria established by the applicable modal administration (the Federal Aviation Administration, the Federal Motor Carrier Safety Administration, the Federal Railroad Administration, the Federal Transit Administration, or the U.S. Coast Guard).

I-00-4 - Evaluate the applicability of the restrictions (for vehicle operators) described in Safety Recommendations I-00-2 and -3 to transportation employees in all safety-sensitive positions. If appropriate, implement such restrictions within 2 years of their implementation for vehicle operators.

To the Federal Aviation Administration:

A-00-4 - Establish, with assistance from experts on the effects of pharmacological agents on human performance and alertness, procedures or criteria by which pilots who medically require substances not on the U.S. Department of Transportation's list of approved medications may be allowed, when appropriate, to use those medications when flying.

A-00-5 - Develop, then periodically publish, an easy-to-understand source of information for pilots on the hazards of using specific medications when flying.

A-00-6 - Establish and implement an educational program targeting pilots that, at a minimum, ensures that all pilots are aware of the source of information described in Safety Recommendation A-00-5 regarding the hazards of using specific medications when flying.

To the Federal Motor Carrier Safety Administration:

H-00-12 - Establish, with assistance from experts on the effects of pharmacological agents on human performance and alertness, procedures or criteria by which highway vehicle operators who medically require substances not on the U.S. Department of Transportation's list of approved medications may be allowed, when appropriate, to use those medications when driving.

H-00-13 - Develop, then periodically publish, an easy-to-understand source of information for highway vehicle operators on the hazards of using specific medications when driving.

H-00-14 - Establish and implement an educational program targeting highway vehicle operators that, at a minimum, ensures that all operators are aware of the source of information described in Safety Recommendation H-00-13 regarding the hazards of using specific medications when driving.

H-00-15 - Establish, in coordination with the U.S. Department of Transportation, the Federal Railroad Administration, the Federal Transit Administration, and the U.S. Coast Guard, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to ensure the identification of the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.

To the Federal Transit Administration:

R-00-5 - Establish, with assistance from experts on the effects of pharmacological agents on human performance and alertness, procedures or criteria by which transit vehicle operators who medically require substances not on the U.S. Department of Transportation's list of approved medications may be allowed, when appropriate, to use those medications when operating transit vehicles.

R-00-6 - Develop, then periodically publish, an easy-to-understand source of information for transit vehicle operators on the hazards of using specific medications when operating transit vehicles.

R-00-7 - Establish and implement an educational program targeting transit vehicle operators that, at a minimum, ensures that all operators are aware of the source of information described in Safety Recommendation R-00-6 regarding the hazards of using specific medications when operating transit vehicles.

R-00-8 - Establish, in coordination with the U.S. Department of Transportation, the Federal Motor Carrier Safety Administration, the Federal Railroad Administration, and the U.S. Coast Guard, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to ensure the identification of the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.

To the United States Coast Guard:

M-00-1 - Establish, with assistance from experts on the effects of pharmacological agents on human performance and alertness, procedures or criteria by which vessel operating personnel who medically require substances not on the U.S. Department of Transportation's list of approved medications may be allowed, when appropriate, to use those medications when performing their duties.

M-00-2 - Develop, then periodically publish, an easy-to-understand source of information for vessel operating personnel on the hazards of using specific medications when performing their duties.

M-00-3 - Establish and implement an educational program targeting vessel operating personnel that, at a minimum, ensures that all operating personnel are aware of the source of information described in Safety Recommendation M-00-2 regarding the hazards of using specific medications when performing their duties.

M-00-4 - Establish, in coordination with the U.S. Department of Transportation, the Federal Motor Carrier Safety Administration, the Federal Railroad Administration, and the Federal Transit Administration, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to ensure the identification of the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.

Appendix B – FMCSA Handling of Vision and Diabetes Waivers

This appendix describes the procedure that the FMCSA has developed for handling applications for vision and diabetes waivers. These procedures became necessary because the FMCSA regulations prohibit the issuance of a medical certificate to individuals with these conditions but current standards of medical practice make it feasible for some individuals with these conditions to operate a commercial.

B.1 Vision waiver/exemption and Commercial Drivers

As a result of the Americans with Disabilities Act (ADA), the Congress directed the Federal Highway Administration (FHWA) to perform a thorough review of the physical qualifications. An announcement that a study was proposed to consider the feasibility of relaxing the vision standard was published in the *Federal Register* in 1992 [1]. Some commercial drivers with at least a 3-year safe driving record and at least 20/40 vision corrected or uncorrected in the better eye would be eligible for the vision-waiver program.

A suit filed by the Advocates for Highway and Auto Safety [3] requested a review of the issuance of waivers to individuals who otherwise did not meet the federal standard. In 1994, the U.S. Court of Appeals for the D.C. Circuit found that the “agency’s determination that the waiver program(s) will not adversely affect the safe operation of CMVs is devoid of empirical support” [2]. New applications for these waiver programs are not currently being accepted, but those drivers currently holding waivers were grandfathered to continue to operate in interstate commerce provided they continue to meet requirements [4, 5].

A 1996 Eighth Circuit Court decision, in *Rauenhorst v. United States Department of Transportation*, required the agency to consider granting a waiver to a driver who met the criteria for a waiver prior to the program being closed [6]. Since this decision, a number of drivers, initially only in the area covered by the jurisdiction of the Eighth Circuit Court and now expanded, have been granted waivers and more recently exemptions. In 1998, the FHWA described formal procedures for waivers, exemptions, and pilot programs [7]. The term waiver had been used to describe a variance from either the orthopedic, vision or diabetes standards and was valid for up to 2 years. In the new procedure, waiver and exemptions may provide temporary relief from one or more of the Federal Motor Carrier Safety Regulations. The waivers are valid for up to three months, while exemptions may be valid for up to 2 years and are renewable. Exemptions would be granted for variances from the medical standards. Before an exemption would be approved, information on the applicant must be published in the *Federal Register* and a public comment period provided.

In 1996, Jeffrey Parker applied for a vision waiver and was denied because in addition to the visual impairment, he was missing his left arm. Drivers were considered to only be eligible for a waiver if they met the other medical criteria. A petition was filed with the U.S. Court of Appeals for the sixth Circuit and the agency’s decision was found to be arbitrary and capricious and a violation of the Rehabilitation Act [8, 9]. The agency is now considering exemption applications from drivers with multiple impairments.

Another petition to the Court was submitted by John Anderson. His application for a vision waiver was denied as he had less than 3 years experience driving a commercial motor vehicle

with his vision deficit. The Court of Appeals, held that the decision by the FHWA to require 3 years of driving experience with monocular vision as prerequisite to granting vision waiver to driver who had lost sight in one of his eyes, was not arbitrary or capricious, an abuse of discretion, or contrary to law [10].

As of January 1, 2004, there have been 3533 applications for vision exemptions. A total of 851 exemptions have been granted and 1274 have been rejected. The remainder are under review.

References

1. Qualification of drivers: Waiver applications—Vision. Fed Reg 1992;57(March 25):10295–10297.
2. Qualification of drivers: Vision deficiencies—Waivers. Fed Reg 1994;59(Nov. 17):39386–39390.
3. Advocates for Highway and Auto Safety v. FHWA, 28 F.3d 1288 (1994).
4. Qualification of drivers: Vision and diabetes—Limited exemptions. Fed Reg 1996;61(Jan. 8):606–611.
5. Qualification of drivers: Vision and diabetes—Limited exemptions. Fed Reg 1996;61(March 26):13338–13347.
6. Qualification of drivers: Waiver application—Vision. Fed Reg 1998;63(Jan. 8):1524–1537.
7. Federal Motor Carrier Safety Regulations: Waivers, exemptions, and pilot programs—Rules and procedures. Fed Reg 1998;63(Dec. 8):67600–67612.
8. Parker v. U.S. DOT, 207 F.3d 359 (2000).
9. Application for exemption from driver physical qualification standards from Jeffrey Parker. Fed Reg August 22, 2002;67(163):54525-54527.
10. Anderson v. U.S. DOT, FHWA, 213 F.3d 422 (2000).

B.2 Commercial Motor Vehicle Operators and Diabetes

Since the final rule on medical standards for commercial drivers became effective in 1970, the use of insulin for control of diabetes has been considered disqualifying [1]. The standard requires that the driver “(b)(3) Has no established medical history or clinical diagnosis of diabetes mellitus currently requiring insulin for control.”

As a result of the Americans with Disabilities Act (ADA), the Congress directed the Federal Highway Administration (FHWA) to perform a thorough review of the physical qualifications. An announcement that studies were proposed to consider the feasibility of relaxing the diabetes standard was published in the *Federal Register* in 1993 [2]. The diabetes waiver program would permit some drivers with at least a 3-year record of safe commercial vehicle driving to drive a CMV in interstate commerce. Several other conditions were set, including blood sugar monitoring and the reporting of any accident, whether or not it normally would have been reportable. Some commercial drivers with at least a 3-year safe driving record were eligible for the diabetes waiver program.

A suit filed by the Advocates for Highway and Auto Safety requested a review of the issuance of waivers to individuals who otherwise did not meet the federal standard. In 1994, the U.S. Court of Appeals for the D.C. Circuit found that the “agency’s determination that the waiver program will not adversely affect the safe operation of commercial motor vehicles is devoid of empirical support.” FHWA no longer accepted new applications for the diabetes waiver programs at that point but those drivers currently holding waivers were grandfathered to continue to operate in interstate commerce provided they continue to meet requirements [3, 4].

A 2000 report to Congress on the feasibility of qualifying individuals with Insulin treated diabetes reviewed the issue and offered suggestions on how to permit some drivers on Insulin to operate commercial vehicles in interstate commerce [5]. A Request for Comments was published in the July 31, 2001 *Federal Register* on the possibility of issuing exemptions to those commercial drivers requiring insulin for control of their diabetes [6].

On September 3, 2003 the FMCSA announced that they will be accepting applications for exemptions from some commercial drivers operating in interstate commerce who are taking insulin for control of their diabetes. Only applicants who meet specific criteria and agree to comply with the requirements of the program will be considered. The exemption is valid for up to 2 years (although the driver must have a medical certification examination annually) and it can be renewed [7].

The process for applying for the exemption is described in the C.F.R. FHWA Waivers Exemptions and Pilot Programs (1999) [8]. The applicant must explain how a level of safety could be achieved that is equivalent to, or greater than, the level of safety that would be obtained by complying with the regulation. Prior to an exemption being granted, information on the application must be published in the *Federal Register*. It is anticipated that it may take up to 180 days from submission of a complete application for the agency (now FMCSA) to make a final determination.

Drivers must have operated a commercial motor vehicle while their diabetes is controlled with insulin for a three year period immediately preceding application and have no other disqualifying conditions including diabetic complications. They must not have had any:

- recurrent (two or more) hypoglycemic episodes with loss of consciousness or seizure within past 5 years;
- recurrent episodes requiring assistance within 5 years or;
- recurrent episodes with cognitive impairment without warning within 5 years.

If they had one episode of any of the above, there must be at least a one year period of stability before consideration. The driving record will be reviewed and the driver will not be considered if certain incidents have occurred.

The application must include the results of a comprehensive examination by a board certified or eligible endocrinologist and a report which includes the following:

- date insulin use began;
- diabetes diagnosis and disease history;
- hospitalization records;

- consultation notes for diagnostic examinations;
- special studies;
- reports of any hypoglycemic episodes within the past 5 years;
- two measures of HbA1C, the first 90 days before the last and most current measure; and
- insulin dosages, types, and diet.

The examination must indicate that the presence or absence of peripheral neuropathy or circulatory insufficiency of the extremities was addressed. The report must state that the endocrinologist is familiar with the individual's medical history for the past 5 years, either directly or through consultation with prior providers. The report must also indicate that the applicant has been using insulin for the 3 years prior to the date of the application, has been educated in diabetes and its management, and has the ability and has demonstrated willingness to monitor and manage his diabetes appropriately.

A signed statement from an ophthalmologist or optometrist indicating that there is no diabetic retinopathy must be submitted. If diabetic retinopathy is present the note must indicate whether there is unstable proliferative diabetic retinopathy. The statement must also indicate that the applicant meets the vision standards of C.F.R. FMCSA Physical Qualifications for Drivers (1998) [9] or has been issued valid medical exemption.

Once an exemption has been granted, the individual must agree to comply with monitoring and management criteria. While driving, the applicant must carry a glucose monitor with memory and a source of rapidly absorbable glucose, and must have food available.

The driver must do the following while working:

- Must check sugar prior to driving
 - If <100 mg/dl, eat or take sugar and recheck in 30 minutes
 - Do not drive if < 100 mg/dl
- Check every 2-4 hours and keep between 100 and 400 mg/dl
 - If <100 mg/dl, eat or take sugar and recheck in 30 minutes.
 - Do not drive if < 100 mg/dl.
 - If glucose is greater than 400 mg/dl, stop driving until glucose returns to the 100 to 400 mg/dl range.
 - If more than two hours after last insulin injection and eating, take additional insulin.
 - Recheck glucose in 30 minutes.
 - Do not resume driving until glucose < 400 mg/dl.

The endocrinologist must submit a quarterly written confirmation to FMCSA that glucose measurements and glycosylated hemoglobin are in an adequate range based on daily glucose measurements taken with the glucose monitoring device and correlated with the daily records of driving time. A current glycosolated hemoglobin must also be submitted. An annual

comprehensive evaluation by the endocrinologist and ophthalmologist or optometrist is also required.

Once granted an exemption, the individual must report all episodes of severe hypoglycemia, significant complications, or inability to manage diabetes. They must also report any involvement in an accident or any other adverse event whether or not they are related to an episode of hypoglycemia.

The medical certification examination for those who have been granted an exemption has two parts. First the endocrinologist must evaluate the individual and indicate that the driver is free of insulin reactions as defined in the application process. The endocrinologist must signify that the driver is able to and has demonstrated willingness to properly monitor and manage his/her diabetes,

The second part of the examination must be conducted by a medical examiner who attests that the individual is physically qualified under C.F.R. FMCSA Physical Qualifications for Drivers (2002), [10] or holds a valid exemption. The examination must be performed annually and the individual must provide the glucose records to both the endocrinologist and examiner. A copy of the reports from the endocrinologist and the ophthalmologist or optometrist report must be provided to the examiner at the time of the annual recertification examination.

The complete *Federal Register* announcements can be found in PDF or html version respectively at; http://www.fmcsa.dot.gov/rulesregs/fmcsr/final/Diabetes_Notice_09-03-2003.pdf, .or http://www.fmcsa.dot.gov/rulesregs/fmcsr/final/Diabetes_Notice_09-03-2003.htm.

To date the FMCSA has not approved any exemptions from the diabetes standards.

References

1. Qualification of drivers of commercial motor vehicles. Fed Reg 1970;35(April 22):6458–6467.
2. Qualification of drivers: Waivers—Diabetes. Fed Reg 1993;58(July 29):40690–40697.
3. Qualification of drivers: Vision and diabetes—Limited exemptions. Fed Reg 1996;61(Jan. 8):606–611.
4. Qualification of drivers: Vision and diabetes—Limited exemptions. Fed Reg 1996;61(March 26):13338–13347.
5. A Report to Congress on the Feasibility of a Program to Qualify Individuals with Insulin Treated Diabetes Mellitus to Operate Commercial Motor Vehicles in Interstate Commerce as Directed by the Transportation Equity Act for the 21st Century - July 2000
6. Notice of intent to issue exemptions and request for comments; Qualification of Drivers; Exemption Applications; Diabetes; Fed Reg 2001;66(July 31):39548-39553.
7. Qualification of Drivers: Exemption Applications: Diabetes. Notice of Final Disposition. Fed Reg. September 3, 2003; 52441-52.
8. FHWA Waivers Exemptions and Pilot Programs 49 C.F.R. § 381.300 – 330 (1999).
9. FMCSA Physical Qualifications for Drivers 49 C.F.R. § 391.41(b)10 (1998).
10. FMCSA Physical Qualifications for Drivers 49 C.F.R. § 391.41 (2002).

Appendix C – Medical Literature Abstracts

This appendix contains abstracts for the articles that are summarized in section 6. The last subsection contains definitions for the medical terminology used in the abstracts.

C.1 Blood Pressure

Chobanian AV, Bakris GL, Black HR. The 7th Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. JAMA. 2003;289:2560-2572.

Hypertension affects approximately 50 million individuals in the U.S. and approximately 1 billion people worldwide. The relationship between blood pressure and the risk of cardiovascular disease is consistent and independent of other risk factors.

The blood pressure levels are: Normal - less than 120/80, pre-hypertension - 120-139 or 80-89, Stage I - 140-159 or 90-99, Stage II – diastolic greater than or equal to 160 or systolic greater than or equal to 100. The risk of cardiovascular disease, beginning at 115/75, doubles with each increment of 20/10. In clinical trials, anti-hypertensive therapy has been associated with a 35 percent - 40 percent mean reduction in stroke incidences, a 20 to 25 percent decrease in myocardial infarction and more than a 50 percent reduction in heart failure.

Miura K, Daviglus ML, Dyer AR, et al. The Relationship of Blood Pressure 25-Year Mortality Due to Coronary Heart Disease, Cardiovascular Disease and all Causes in Young Adult Men. The Chicago Heart Association Detection Project in Industry. Archives of Internal Medicine. 2001;161:1501-08.

This cohort included 10,874 men aged 18-39 years at baseline between 1967 and 1973, not receiving anti-hypertensive drugs and without coronary heart disease (CHD) or diabetes. The relationship of baseline blood pressure, and 25-year CHD, cardiovascular disease (CVD) and all-cause mortality was assessed. The age-adjusted association of systolic blood pressure to CHD mortality was continuous and graded. Multi-variant adjusted CHD hazard rates show for one standard deviation higher systolic blood pressure (15mmHg) and diastolic blood pressure (10mmHg) were 1.26 and 1.17 respectively. In young adult men blood pressure above normal is significantly related to increased long-term CHD, CVD and all cause mortality. Compared with the Joint National Committee (JNC) sixth report, the stratum with high normal blood pressure and Stage I hypertension had 25-year absolute risks of death of 63 and 72 per 1,000 respectively; absolute excess risk of 10 and 20 per 1,000 respectively; and accounted for 59.8 percent of all CHD, CVD and all course mortality.

C.2 Diabetes

American Diabetes Association. Position Statement. Hypoglycemia and Employment/Licensure. Diabetes Care. 2003;26:S141-S142.

People with diabetes should be individually considered for employment based on the requirements of a specific job. Factors to be weighed in this decision include the individual medical condition, treatment regime, and medical history particularly in regard to the occurrence of incapacitating hypoglycemic episodes. This position statement indicates that the greatest risk is hypoglycemia. This is often not a concern in those patients treated with only medical nutrition therapy (MNT) and exercise and rare in people treated with α -glucosidase inhibitors, biguanides, or thiazolidinediones. Most diabetics are aware of when they are hypoglycemic and are able to take appropriate action. Based on this ADA recommends that there should be no limitations on the employment or licensure of diabetics.

American Diabetes Association. Implications for Diabetes Control and Complications Trial. *Diabetes Care*. 2003;26(Supplement 1)S25-S27.

This study determined that a reasonable goal is a mean glucose 155 and hemoglobin A1C of 7.2. The major danger from tight control of blood glucose is hypoglycemia, especially in people with type 1 diabetes.

Clarke WL, Cox DJ, Gonder-Frederick LA, Kovatchev B. Hypoglycemia and the decision to drive a motor vehicle by persons with diabetes. *JAMA*. 1999;282:750-754.

This study examined type 1 diabetic subjects' decisions to drive during their daily routine based on perception of blood glucose (BG) levels compared with actual measured BG levels. The researchers recruited two groups of patients, all of whom were adults with type 1 diabetes, who were drivers and performed at least two BG tests per day. Subjects stated they would drive 43 percent to 44 percent of the time when they estimated their BG level to be 3.3 to 3.9 mmol/L (60-70 mg/dL), and 38 percent to 47 percent of the time when their actual BG level was less than 2.2 mmol/L (40 mg/dL). Logistic regression analysis demonstrated that number of autonomic symptoms, degree of impairment on cognitive function tests, and BG level estimate predicted 76 percent to 80 percent of decisions to drive. Approximately 50 percent of subjects in each group decided to drive at least 50 percent of the time when their BG level was less than 3.9 mmol/L (70 mg/dL). The authors concluded that people with type 1 diabetes may not judge correctly when their BG level is too low to permit safe driving and may consider driving with a low BG level even when they are aware of the low level.

Cox DJ, Gonder-Frederick LA, Kovatchev BP, Julian DM, Clarke WL. Progressive hypoglycemia's impact on driving simulation performance: occurrence, awareness and correction. *Diabetes Care*. 2000;23(2):163-170.

This study evaluated the blood glucose (BG) levels at which driving was impaired, impairment was detected, and corrective action was taken by subjects, along with the mechanisms underlying these three issues. Thirty seven adults with type 1 diabetes drove a simulator during continuous euglycemia and progressive hypoglycemia. Driving was found to be significantly impaired during hypoglycemia and subjects were aware of their impaired driving. However, corrective actions did not occur until BG was <2.8 mmol/l.

Cox DJ, Penberthy JK, Zrebiec J, Weinger K, Aikens JE, Frier B, Stetson B, et al. Diabetes and driving mishaps, frequency and correlations from a multinational survey. *Diabetes Care*. 2003;26:2329-2334.

This study investigated whether diabetes is associated with an increased risk of driving mishaps and the correlates of such a relationship. During routine visits to diabetes specialty clinics, consecutive adults with type 1 diabetes, type 2 diabetes, and non-diabetic spouse control subjects (n = 341, 332, and 363, respectively) completed an anonymous questionnaire concerning diabetes and driving. Type 1 diabetic drivers reported significantly more crashes, moving violations, episodes of hypoglycemic stupor, required assistance, and mild hypoglycemia while driving as compared with type 2 diabetic drivers or spouse control subjects. Type 2 diabetic drivers had driving mishap rates similar to non-diabetic spouses, and the use of insulin or oral agents for treatment had no effect on the occurrence of driving mishaps. Crashes among type 1 diabetic drivers were associated with more frequent episodes of hypoglycemic stupor while driving, less frequent blood glucose monitoring before driving, and the use of insulin injection therapy as compared with pump therapy. One-half of the type 1 diabetic drivers and three-quarters of the type 2 diabetic drivers had never discussed hypoglycemia and driving with their physicians.

Dionne G, Desjarding D, Laberge-Nadeau C, Maaz U. Medical conditions, risk exposure, and truck drivers' accidents: an analysis with count data regression models. *Accident Analysis and Prevention*. 1995;27:295-305.

Recent studies do not agree on the possible relationship between medical conditions and traffic safety; most of them do not control for exposure factors. This problem has become more pertinent for scientific studies because of litigation that showed that present regulations about access to driver permits might contravene human rights legislation. This study estimates the effect of different medical conditions on truck drivers' distributions of accidents. The data and models permit simultaneous control for age; medical conditions; exposure factors measured by hours, kilometer, and qualitative factors; and other characteristics of truck drivers. The results show that diabetic truck drivers of the permit class for straight trucks have more accidents than drivers in good health. No other studied medical condition has a significant effect on individual accident distributions. Many risk exposure variables are also significant. The effect of age is discussed in detail.

Hansotia P, Broste SK. The Effect of Epilepsy or Diabetes Mellitus on the Risk of Automobile Accidents. *New England Journal of Medicine*. 1991;324:22-6.

This study was a population based retrospective cohort study of 30,420 subjects, 16-90 years of age with and without epilepsy or diabetes mellitus. All subjects lived in the area around the Marshfield Clinic and St. Joseph's Hospital in Marshfield, Wisconsin. The conclusion was that drivers with epilepsy or diabetes mellitus had slightly increased risk of traffic accidents as compared with persons who are unaffected.

Koepsell TD, Wolf ME, McCloskey L, Buchner, Louis D, Wagner EH, Thompson RS. Medical Conditions and motor vehicle collision injuries in older adults. *Journal of the American Geriatric Society*. 1994;42:695-700.

This was a case control study to determine whether medical conditions that can impair sensory, cognitive, or motor function increase the risk of injury due to motor vehicle collision in older drivers. Drivers who were 65 years or older and injured were matched with controls by age, gender and county of residence. Injury risk was 2.6-fold higher in older diabetic drivers, especially those treated with insulin or oral hypoglycemic agents, those with diabetes for over 5 years, and those with both diabetes and coronary heart disease. There was also an increased risk for those older drivers with coronary artery disease, depression, alcohol abuse, or falls but these were not statistically significant.

Laberge-Nadeau C, Dionne G, Ekoe JM, Hamet P, Desjardins D, Messier S, Maag U, Impact of diabetes on crash risks of truck-permit holders and commercial drivers. *Diabetes Care*. 2000;23(5):612-7.

This study reviewed analyses of crash risks for users and nonusers of insulin among diabetic truck-permit holders in Quebec, Canada. Diabetic truck-permit holders were group-matched by age to a random sample of healthy permit holders. Information on a total of 13,453 permit holders in 1987-1990 were extracted from the files of the public insurer for automobile injuries in Quebec. Additional health status data were obtained from the provincial public health insurer and a telephone survey was conducted to collect data on driving patterns and exposure. Risk ratios for crashes were found to vary by category of diabetes. Permit holders who are diabetic without complications and not using insulin have an increased crash risk of 1.68 when compared with healthy permit holders of the same permit class. If controlled for risk exposure, they are found to have an increased risk of 1.76. Insulin use is not associated with higher crash risk. The finding that lack of consistent increases in crash risks among diabetic commercial drivers with complications or who use insulin may be a “healthy worker effect.”

Weinger K, Kinsley BT, Levy CJ, Bajaj M, Simonson DC, Cox DJ, Ryan CM, Jacobson AM. The perception of safe driving ability during hypoglycemia in patients with type 1 diabetes Mellitus. *AM J. Med* 1999;107:246-253.

Thirty men and 30 women with uncomplicated type 1 diabetes (age [mean +/- SD] 33 +/- 9 years, duration 9 +/- 3 years, hemoglobin A1C level 8.7 percent +/- 1.0 percent) underwent induced hypoglycemia. At several levels of hypoglycemia participants completed a symptom questionnaire and neuropsychological test, estimated their glucose level, and reported whether they could drive safely. The proportion of patients judging that they could drive safely decreased as serum glucose levels decreased. Men and middle-aged patients were more likely to consider it safe to drive during hypoglycemia than women and those under 25 years of age. Those who were symptomatic and those who recognized hypoglycemia were less likely to report safe driving ability during hypoglycemia. Most patients who were cognitively impaired appeared to recognize this and reported that they could not drive safely at a serum glucose level of 40 mg/dL.

Ysander L. The Safety of Drivers with Chronic Disease. *British Journal of Industrial Medicine*. 1966;23:28-36.

Six hundred twelve drivers with chronic diseases; mainly diabetes, cardiovascular disease, renal disorders; were investigated in regard to the frequency of road accidents and serious driving offenses during a 10-year period. Road accidents directly caused by the disease or its treatment occurred in 0.8 percent of cases, all due to hypoglycemic attacks in insulin treated diabetics.

C.3 Hepatic (Liver)

Srivastava A, Mehta R, Rothke SP, et al. Fitness to Drive in Patients with Cirrhosis and Portal Systemic Shunting, A Pilot Study Evaluating Driving Performance. *Journal of Hepatology*. 1994;21:1023-1028.

Sixty-six percent of subjects with cirrhosis had two or more abnormal neuropsychological tests, criteria used to define the presence of sub-clinical encephalopathy. No deficiencies in simulator or real driving performance were seen when compared to patients with cirrhosis with normal neuropsychological test. In this study, stable subjects with cirrhosis and evidence of portal hypertension, portal systemic shunting, abnormal neuropsychological test and no prior history of overt encephalopathy did not exhibit a major impairment in their fitness to drive. The study highlighted the importance of testing actual driving ability rather than relying on neuropsychological tests or driving simulators to assess driving performance in patients with cirrhosis.

C.4 Cardiac (Heart)

Akiyama T, Powell JL, Mitchell LB, Ehlert FA, Baessler C. Resumption of driving after life-threatening ventricular tachyarrhythmia. *New England Journal of Medicine*. 2001;345:391-397.

The risks associated with allowing patients with life-threatening ventricular tachyarrhythmias to drive have not been quantified. The Antiarrhythmics Versus Implantable Defibrillators (AVID) trial compared antiarrhythmic-drug therapy with the implantation of defibrillators in patients resuscitated from near-fatal ventricular arrhythmias. In this study, patients from the AVID trial were sent questionnaires, to be completed anonymously, requesting information about driving habits and experiences. A total of 758 of 909 patients (83 percent) responded. Of these, 627 patients drove during the year before their index episode of ventricular tachyarrhythmia and 57 percent of those resumed driving within months of their entry into the trial. Two percent of these had a syncopal episode while driving and 11 percent had dizziness or palpitations that necessitated stopping the vehicle. A total of 22 percent had dizziness or palpitations that did not necessitate stopping the vehicle and eight percent of the 295 patients with an implantable cardioverter-defibrillator received a shock. Fifty patients reported having at least one accident, for a total of 55 accidents during 1619 patient-years of follow-up after the resumption of driving (3.4 percent per patient-year). Only 11 percent of these accidents were preceded by symptoms of possible arrhythmia (0.4 percent per patient-year). The authors concluded that most patients

with ventricular tachyarrhythmias resume driving early. Although it is common for them to have symptoms of possible arrhythmia while driving, accidents are uncommon.

Several editorials including those below suggested that drawing a conclusion from this study might be premature, especially for those in certain occupations. These include;

- Lowenfels AB. Driving after life threatening ventricular tachyarrhythmia (correspondence). *N Engl J Med* 2002;346:208-209.
- Smith TW. Driving after ventricular arrhythmias (editorial) *N Engl J Med* 2001;345:451-452

American College of Cardiology / European Society of Cardiology Clinical Experts Consensus Document on Hypertrophic Cardiomyopathy. *Journal of the American College of Cardiology*. 2003;42:1687-713.

Hypertrophic cardiomyopathy is a complex, relatively common genetic disorder with a prevalence of about 1 in 500 in the general adult population. It has been subject to intense scrutiny and investigation for over 40 years. It is a particularly common cause of sudden death in young people, including trained athletes, and may cause death and disability in patients of all ages, although it is also frequently compatible with normal longevity. Because of its heterogeneous clinical course and expression, hypertrophic cardiomyopathy frequently presents uncertainty and represents a management problem for cardiovascular specialists and other practitioners. Risk factors for sudden death include cardiac arrest, spontaneous sustained ventricular tachycardia, family history of premature sudden death, unexplained syncope, left ventricular thickness greater or equal to 30mm, abnormal exercise blood pressure, and non-sustained ventricular tachycardia by Holter monitor.

Antecol DH, Roberts WC. Sudden death behind the wheel from natural disease in drivers of four-wheeled motorized vehicles. *American Journal of Cardiology*. 1990; 66:1329-1335.

Post-mortem pathological studies of 30 persons who died suddenly from natural causes in the driver's seat of an automobile, truck or bus revealed that 20 had cardiac arrest while driving and the other ten while sitting in the driver's seat of a parked vehicle. Of the twenty drivers, sixteen died from atherosclerotic coronary artery disease (CAD) while the other four died from: aortic rupture associated with the Marfan syndrome in one; cardiac sarcoidosis in one; thoracic aortic dissection in one; and severe mitral regurgitation from infective endocarditis, which had healed in one. Accidents occurred in twelve (40 percent of those who died behind the wheel), all minor. Of the ten persons who were found dead in the driver's seat of a parked vehicle, eight had fatal CAD. The authors concluded that characteristics of drivers who die suddenly are similar in age, gender, and extent of coronary artery involvement. They also found that the resulting accidents were minor.

Bansch D, Brunn J, Castrucci M, Weber M, Gietzen F, Borggrefe M, Breithardt G, Block M, Syncope in patients with an implantable cardioverter-defibrillator: incidence, prediction and implications for driving restrictions. *Journal of the American College of Cardiology*. 1998 Mar 1;31(3):608-15.

Recognizing that syncope while driving can lead to accidents, the authors sought data on the risk of syncope in individuals who have implantable cardioverter defibrillators. This retrospective study on 421 with an implantable cardioverter-defibrillator (ICD) found that 229 (54.4 percent) had recurrent ventricular fibrillations/ventricular tachycardia (VT/VF), and 62 (14.7 percent) had syncope. The actuarial survival rate free of VT/VF was 58 percent, 45 percent and 37 percent and that for survival free of syncope was 90 percent, 85 percent and 81 percent at 12, 24 and 36 months after implantation, respectively. Once VT/VF had occurred, 76 percent, 68 percent and 62 percent of patients remained free of syncope during the following 12, 24 and 36 months, and 68 percent, 64 percent and 56 percent remained free of second syncope 12, 24 and 36 months after first syncope, respectively. A low baseline left ventricular ejection fraction (LVEF), induction of fast VT (CL <300 ms) during programmed ventricular stimulation and chronic atrial fibrillation (AF) were associated with an increased risk of syncope. Once patients had a VT recurrence, syncope during the first VT and a high VT rate were the strongest risk predictors of future syncope.

Bellet S, Roman L, Kostis J. The Effect of Automobile Driving on Catecholamine and Adrenocorticoid Excretion. *The American Journal of Cardiology*. 1969;24:365-368.

This was a study of 17 young normal subjects aged 19-25 and 19 patients with coronary heart disease ages 38-72 years. The effects of automobile driving on urinary catecholamine and 11-Hydroxycorticosteroids (11-OHCS) excretion was measured in both groups. In both groups, excretion of catecholamines and 11-OHCS was found to be significantly increased during a two-hour period of driving compared with a two-hour control period. These results support the contention that ischemic ST segment depression, premature ventricular contractions (PVC's) or both on the electrocardiogram (EKG) which occur during driving in subjects with coronary artery disease are induced by this stress.

Bellet S, Roman L, Kostis J, Slater A. Continuous Electrocardiographic Monitoring During Automobile Driving. *American Journal of Cardiology*. 1968;22:856-862.

The authors reported 65 young normal males subjects aged 25-39 with no clinical evidence of heart disease and 66 subjects with documented coronary heart disease. In this study, 16.7 percent of subjects with the coronary heart disease had electrocardiographic changes during a 2½-hour driving period during daylight hours. The patients were driving their own cars and had been instructed to drive in their usual manner with regard to speed and traffic conditions. Among the subjects with coronary heart disease, significant electrocardiographic changes occurred. These changes occurred under relatively favorable driving conditions.

Bonow RO, Chair. 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. *Journal of the American College of Cardiology*. 1998;32:1486-1588.

This report discusses the diagnosis, treatment, course, and natural history of the major valvular diseases such as aortic stenosis, aortic insufficiency, mitral stenosis. This document was used by the FMCSA 2002 cardiovascular guidelines.

Booze CF. Sudden Incapacitation in General Aviation. Office of Aviation Medicine Federal Aviation Administration DOT/FAA/AM/87/7. August 1987.

Data indicates that approximately three accidents per 1,000 (15 per 1,000 fatal accidents) are known to result from incapacitation of the pilot from all causes. Coronary heart disease is the most important cause of sudden incapacitation or death among diseases likely to be diagnosed in general aviation accidents. U.S. population mortality data reports that cerebrovascular disease accounts for approximately 20 percent of all deaths due to cardiovascular disease. Autopsy studies conducted by the FAA have found an average of five cases per year involving cardiovascular incapacitation with an autopsy rate of 38 percent, or 13 cases per year if extrapolated to the entire fatal general aviation population. FAA studies also indicate a prevalence of severe coronary artery disease in about 5 percent of autopsied general aviation pilots in command for the years 1975 through 1977. Accident rates for cardiovascular incapacitation are low compared to other factors known to contribute to general aviation accidents. Older age groups experience higher incapacitation rates and contribute more to the total incapacitation in general aviation.

Chaitman BR, Davis KB, Dodge HT, et.al. Should Airline Pilots be Eligible to Resume Active Flight Status after Coronary Bypass Surgery?: A CASS Registry Study. Journal of the American College of Cardiology, 1986, 1318-24.

Medical certification to return-to-work after coronary bypass surgery in occupations that carry a risk to public safety is controversial, particularly in airline pilots. To address this issue, 2,326 men out of 10,312 patients in the Coronary Artery Surgery Study (CASS) registry who had coronary artery bypass surgery were selected based on clinical and post-operative characteristics similar to those of the average airline pilot who might apply to renew his license after surgery. The data from this CASS registry study are pertinent to the question of first class medical certification after bypass surgery. The data is also relevant to the issue of medical certification after coronary bypass surgery of individuals in other occupations in the transportation industry where public safety is an issue. Data from this study of highly selected patients reveal a relatively low probability of developing an acute cardiac event in the 5-7 years after successful coronary bypass surgery. The risk of an acute cardiac event or death is low in patients with normal or relatively well preserved left ventricular function in the initial seven years and for this highly selected group of CASS patients the risks appears to compare favorably with U.S. male population of similar age.

Christian MS. Incidence and implications of natural deaths of road users. British Medical Journal. 1988;297:274-285.

This was a prospective study for the period 1978 – 87 to determine the incidence of a sudden death in road users. In East Berkshire emergency departments 30,000 people were brought in for injuries from motor vehicle crashes. Of the 267 who were dead on arrival (DOA) or died within 2 hours of admission, 64 (24 percent) died from natural disease or were killed in an accident because of pre-existing medical disease. Seven of the cases were from ruptured abdominal aortic

aneurysm. None of the seven knew of the aneurysm. A second finding was that sudden natural death in road users is not an appreciable hazard to other road users.

Cocco G, Iselin HU. Cardiac Risks of Speed Traps. *Clinical Cardiology*. 1992;15:441-444.

Twenty-two patients with stable cardiac disease drove into a radar trap while wearing an ambulatory electrocardiogram. All patients reported cardiac symptoms, with heart rate increase and repetitive ventricular arrhythmias. Myocardial ischemia was observed in some patients. This data confirmed the effects of stress and adrenergic tone on ventricular arrhythmias. No changes lasted longer than four minutes, but increased heart rate and ventricular couplets and ventricular triplets reached statistical significance.

Cupples LA, Gagnon DR, Kannell WB. Long and Short-term Risks of Sudden Coronary Death. *Circulation*. 1992;85(Supplement 1):1121-28.

The short and long-term relationship between risk factors and sudden cardiac death was examined in the Framingham Heart Study of 2011 men and 2,534 women aged 35-70 at the 4th biannual examination. In men, pre-existing coronary heart disease conferred a 3.3-fold increased long-term risk of sudden cardiac death and a 5.3-fold increase short-term risk. In women the long-term risk is 1.9 and short-term risk is 2.8. Cardiac failure in men conferred a 4.8-fold increased long-term risk and a 2.6-fold increased short-term risk. In women, the increased long-term risk was 1.8-fold and the increased short-term risk 6.2-fold. Over the 28 years of follow-up, 171 men and 80 women experienced sudden cardiac death. Women had a lower incidence than men at all ages. Another essential feature is a short time span from the onset of symptoms to death. Time criteria however, have ranged from instantaneous to death within 1, 2, 6, and even 24 hours. The essential elements of the definition are the unexpected occurrence of a natural process that develops rapidly. This data suggests that short-term vulnerability to sudden death is determined more by intrinsic cardiac factors such as the degree of silent myocardial ischemia, left ventricular hypertrophy (LVH) and coronary circulatory reserve than by predisposing risk factors. Hence the effect of electrocardiogram (ECG) abnormalities, heart rate and pre-existing congestive heart failure (CHF) is stronger in the short-term than in the long-term. In the long-term, risk factors play a more important role.

Dhala A, Bremner S, Blanck Z, Sra J, Deshpande S, Jazayeri MR, Akhtar M. Impairment of driving abilities in patients with supraventricular tachycardia. *American Journal of Cardiology*. 1995;75:516-518.

This study involved a survey of 589 patients with supraventricular tachycardia and symptoms, syncope and driving. A total of 15 percent of those surveyed experienced syncope or near syncope. Of those, two had accidents preceded by syncope and 22 stopped driving due to the onset of presyncope. While syncope can occur and result in impairment in driving ability, voluntary restriction of driving is uncommon. The only good predictor of identifying those at risk was the history of previous syncope.

Epstein AE Chair, Miles WM Chair. Medical/Scientific Statement From the American Heart Association and the NAPSE. Personal and Public Safety Issues Related To Arrhythmias That May Effect Consciousness: Implication for Regulation Physician Recommendations. *Circulation*. 1996;94:1147-1166.

This is a comprehensive review article of arrhythmias and recommendations for drivers of both commercial and private vehicles. The authors acknowledge that a zero risk is unattainable but that the acceptable risk differs depending on the setting and activity. They discussed the regulations relating to driving and flying, and the ethics of regulating driving. Guidelines, but not practice standards, were provided on specific arrhythmias such as bradycardia, ventricular tachycardia and conduction disturbances. Implantable defibrillator and pacemakers were part of this review.

Halinen MO, Jaussi. Fatal road accidents caused by sudden death of the driver in Finland and Vaud, Switzerland. *European Heart Journal*. 1994;15:888-894.

This retrospective analysis looked at incidence of fatal traffic accidents caused by sudden incapacity of the driver due to cardiac and other illnesses. Data was obtained from Finnish traffic accident data files from 1984-1989, and police records of traffic accidents, from Canton de Vaud, Switzerland from 1986-1989. Sudden driver incapacity caused 1.5 percent of all traffic deaths in Finland (including other than drivers), and 3.4 percent in Vaud. Probable cardiac arrest caused 2.1 percent of all drivers' deaths in Finland (driver only deaths) and 1.7 percent in Vaud, respectively. Deaths caused by professional drivers' sudden incapacity were responsible for 0.11 percent of all traffic deaths in Finland, and for 0 percent in Vaud. Old age and short mileage were associated with illness-caused accidents.

Haskell WL, Brachfeld N, Bruce RA, et al. Determination of Occupational Working Capacity in Patients with Ischemic Heart Disease. *Journal of American College of Cardiology*. Task Force 2. 1989;14:1016-42.

The energy requirements and myocardial oxygen demands of various work tasks are significantly influenced by hot and cold temperatures, conditions of heat, or humidity or both. High levels of air pollution reduced the exercise tolerance of healthy people as well as those limited by ischemia. Occupational work classification by energy requirements: very heavy and heavy - carrying heavy objects, climbing many stairs rapidly is greater than 6 METS; medium - carrying moderate weight objects (i.e. 50 pounds) is 4 to 6 METS; light - carrying light objects (i.e. 20 pounds) – 2 to 4 METS; and sedentary –sitting, slow walking, lifting light objects of 10 pounds is less than 2 METS.

Cardiac demands of driving various types of commercial vehicles reflect physical, psychological, and environmental factors. Physical factors include the work of driving and the fatigue of extended work hours. Psychological factors include driving in bad weather, heavy traffic, or demanding situations such as meeting schedules and environmental factors of air pollution, heat and altitude. Physical factors include the work of driving, especially isometric exercise.

Kou WH, Calkins H, Lewis RR, et.al. Incidence of Loss of Consciousness During Automatic Implantable Cardio-defibrillator Shocks. *Annals of Internal Medicine*. 1991; 115:942-945.

This was a study of 180 patients who had an implantable cardioverter-defibrillator (ICD) for treatment of ventricular tachycardia or ventricular fibrillation. Patients with sustained ventricular tachycardia or ventricular fibrillation, who received an ICD that delivered only high-energy shock therapy, are at moderate risk for experience of loss of consciousness during shocks. No clinical variables were found to be predictors of syncope. Therefore, driving and other activities that require patients to be extra vigilant should not be assumed to be safe after implantation of an ICD that delivers only high energy shock therapy. Of 180 patients, 59 percent experienced shocks during the follow-up period of 16 ± 12 months. Sixteen (9 percent) experienced loss of consciousness, 13 of these 16 patients had syncope and three died suddenly in association with the shocks.

Kjeksus J. Arrhythmias and Mortality in Coronary Heart Failure. *American Journal of Cardiology*. 1990;65:421-48.

Sudden death occurs in 8-10 percent of New York Heart Association functional Class 1 patients and in 20 percent of Class 2, 3, and 4 patients. Yearly mortality rates increase from 12 to 15 percent in Class 1 and 2 to 60 percent in Class 4. Sudden death in Class 1 and 2 is 50 to 60 percent of all deaths, whereas in Class 4, it is only 20 to 30 percent. The most important cause of death in Class 4 is progressive congestive heart failure.

Larsen GC, Stupey MR, Walance CG, et.al. Recurrent Cardiac Events in Survivors of Ventricular Fibrillation or Tachycardia. *JAMA*. 1994;271:1335-39.

The study included 501 consecutive survivors of sustained ventricular tachycardia (VT) or ventricular fibrillation (VF) cared for by a university arrhythmia service between August 1978 and October 1989. One-year event rate for all 501 patients was 17 percent. Three distinct periods of risk were identified. The monthly hazard rate was highest in the first month at 4.22 percent, intermediate at months 2-7, 1.81 percent, and lowest in months 8-12 at 0.63 percent. Among the 191 patients for whom no successful conventional anti-arrhythmic drug could be found during electrophysiological testing, there was a high monthly event risk of 1.6 percent during months 8-12.

Ostrom M, Eriksson A. Natural Death While Driving. *Journal of Forensic Sciences*. 1987;32:988-998.

From 1980 through 1985, all 126 cases of sudden natural death of persons while driving cars (69), bikes (35), snowmobiles (11), mopeds (6), kick-sleds (4), and motorcycles (1) that occurred in the northern half of Sweden were autopsied. The mean age of the 69 car drivers was 59 years. Ischemic heart disease accounted for 112 of the 126 deaths and other cardiovascular disease for an additional nine deaths. Only 20 percent of the victims experienced previous symptoms of disease. Although natural death at the wheel is fairly common, the risk for other persons is not significant.

Petch MC. Heart disease, guidelines, regulations and the law. *Heart*. 2002;87:472-479.

This article discusses guidelines and regulations that cardiologists should consider when advising their patients with heart disease whether or not to drive. Aviation medical advisors chose a 1 percent annual risk of incapacity as the acceptable risk for an individual in a pilot. This is the annual risk of a heart attack of a healthy male age 45-64. Pilots should be at no increased risk compared to their peers. Epilepsy guidelines in the U.K. use a 2 percent annual risk, about that of death from coronary artery disease in an individual in their 70's.

Wielgosz AT, Azad N. Effects of cardiovascular disease on driving tasks. *Clinics of Geriatric Medicine*. 1993;9:341-348.

This article reviews the impact of heart disease on driving in the elderly. Elderly drivers aged 60 and over have more motor vehicle crashes per miles driven and more traffic violations than drivers aged 30-59. While cardiovascular disease may be associated with this increased risk, cognitive impairment may be a more important factor. Only about 0.9 to 2.1 per 1000 motor vehicle crashes are caused by sudden incapacity, but of those, about half are due to cardiovascular disease. Most of these are able to avert a major accident. Sudden death or loss of consciousness accounted for about 2 percent of driving related injury or death to other. The risk is related to the probability of the incapacitating event occurring and the time spent driving. The authors recommended that drivers with unstable angina wait one month before resuming driving. It was also recommended that elderly should not drive for more than 6 hours per day or longer than 90 minutes without a rest. The authors advise providers that the risk of incapacity must be considered before a patient is advised to drive. The physician must also consider the impact of concomitant illnesses or medications.

C.5 Vision

Dille JR, Booze CF. The 1980 and 1981 Accident Experience of Civil Airman with Selected Visual Pathology. June 1983. Office of Aviation Medicine Federal Aviation Administration FAA-AM-83-18.

Monocular, aphakic, lens implant and amblyopic accident airmen had higher accident rates than did the total airmen population. It is possible for persons with 20/200 vision to have useful peripheral vision in the affected eye.

Ivers R, Mitchell P, Cumming RG. Sensory impairment and driving: the Blue Mountains eye study. *American Journal of Public Health*. 1999;89:85-87.

This study examined the associations between vision, hearing loss, and car accidents. The study group was a cross-sectional survey of 3654 people aged 49 years and older. Self-reported car accident rates in the past year among 2379 current drivers were 5.6 percent for those aged 49 to 79 years and 9.1 percent for those 80 years and older. A 2-line difference in visual acuity was associated with increased risk of accidents. Also associated with increased risk of accidents was visual acuity worse than 6/18 in the right eye, overall moderate hearing loss, and hearing loss in the right ear.

Nakagawara VB, Montgomery RW, and Wood KJ. The Aviation Accident Experience of Civilian Airmen with Refractive Surgery. June 2002. Office of Aviation Medicine Federal Aviation Administration. DOT/FAA/AM-02/10.

This study examined the relationship between aviation accidents and airman who had undergone refractive surgery. Records of airman who had undergone refractive surgery (n=130) or general eye surgery (n=5179) during the years 1994-1996 were reviewed. This was cross-referenced with the Accident/Incident Data System database to determine those airmen involved in aircraft accidents. Frequency totals and mean accident rates (accidents/100,000 flight hours) were calculated for each class of FAA medical certification. Analysis of Variance was performed to compare the mean accident rates of non-refractive and refractive surgery airmen. The total accident rate was higher for airmen with refractive surgery (3.86/100,000 flight hours) when compared with those without refractive procedures (2.62/100,000 flight hours). Accident rates for airmen with refractive surgery were also higher in all three classes of medical certification, but the difference was not statistically significant. In no accident was the refractive surgery identified as a causal factor. The authors concluded that while no direct association between refractive surgery and aviation accidents was identified, these airmen did have a higher accident rate. Ongoing monitoring would be needed to ensure that airman with the newer refractive surgery techniques are able to fly safely.

Nakagawara VB, Montgomery RW, and Wood KJ. Aviation accidents and incidents associated with the use of ophthalmic devices by civilian pilots. July 2001. Office of Aviation Medicine Federal Aviation Administration. DOT/FAA/AM-01/14.

Approximately 54 percent of civilian pilots rely on ophthalmic lenses to correct defective vision. This report reviews aviation accidents and incidents, in which ophthalmic lenses used by civilian pilots were contributing factors in the mishaps between 1 January, 1980 and 31 December, 1998. The National Transportation Safety Board's (NTSB's) Aviation Accident/Incident Database and the Federal Aviation Administration's (FAA's) Incident Data System were queried for terms related to ophthalmic lenses for the period 1980-98. The Aviation Safety Reporting System (ASRS) was also reviewed. The NTSB and FAA databases included 16 mishaps in which factors, such as lost/broken eyeglasses (11), problems with sunglasses (7), incompatibility with personal protective breathing equipment (6), new or inappropriate corrective (12), and contact lenses becoming damaged or dislodged (2), were found to be contributing factors in aviation accidents or incidents. Aviation personnel voluntarily submitted 26 ASRS reports describing operational problems involving traditional ophthalmic devices that adversely affected aviation safety. The authors concluded that ophthalmic devices used by pilots have contributed to aviation accidents and incidents. Recommendations included the following: eyeglasses should fit snugly and a strap should be used; refractive prescription should be optimal for all applicable distances; contact lenses should be well maintained and frequently replaced and a back up pair of corrective lenses should be available in the event the contact lens is displaced, dislodged or damaged; appropriate sunglasses should be available to prevent glare but should not be worn in low light conditions; and corrective lenses should not interfere with the use of personal protective equipment or communication devices.

Nakagawara VB, Wood KJ. Aviation Accident Risks for Airmen with a Aphakia and Artificial Lens Implants. July 1993. Office of Aviation Medicine Federal Aviation Administration DOT/FAA/AM-93/11.

The entire population of aphakia and interocular lens implants had significantly higher accident rates than the corresponding non-aphakic airman population ($p < .5$). Conditions in which the crystalline lens has been extracted is usually a result of cataract removal. The relationship of age to aphakia is well established. Spectacles, contact lenses and artificial intraocular lens implants can be used. Aphakia spectacles have many optical deficiencies and are now not recommended for flight operation. Contact lenses used to correct aphakia have deficiencies. Lens implantation has become the primary therapeutic modality. For aphakia pilots: third class pilots can be certified, first and second class pilots are considered on a case by case basis.

Szlyk JP, Seiple W, Viana M. Relative effects of age and compromised vision on driving performance. *Human Factors*. 1995;37(2):430-6.

The study examined the effects of age and compromised vision on driving-related skills and on-road accidents. A total of 107 subjects were tested from the following four groups: 1) a younger, normally sighted group, 2) an older, normally sighted group, 3) a younger, visually compromised group, 4) an older, visually compromised group. Driving performance was assessed by self-reported and state-recorded accident frequency and by an evaluation of performance on an interactive driving simulator. The older groups had poorer driving-related skills, than had the younger groups, but not significantly higher on-road accident rates. The older subjects and those with compromised vision had reduced risk-taking scores. All older drivers had increased eye movements and had slower simulator driving speeds. Regression analyses showed that compromised vision and visual field loss predicted real-world accidents in the study population.

C.6 Neurology

Berg AT, Vickrey BG, Sperling MR, Langfit JT, Bazil CW, Shinnar S, Walczak TS, Pacia S, Spencer SS. Driving in adults with refractory localization-related epilepsy. *Neurology*. 2000;54:625-630.

This study examined the frequency of driving an automobile and characteristics associated with driving in individuals with refractory localization-related epilepsy. In an ongoing, prospective, study of resective epilepsy surgery, individuals were interviewed when they presented for surgical evaluation. Of 367 eligible participants, 115 (31.3 percent) had driven in the last year, most on at least a weekly basis. Factors found to be associated with an increased likelihood of driving were having a current license or ever having had a license and being younger. Lower levels of driving were found in women, those self-described as disabled, and those who were employed full-time or part-time. A total of 144 individuals experienced one or more seizures while driving, and 98 experienced at least one accident because of a seizure. Of those who had accidents, 94 percent reported property damage, 32 percent had an injury and 20 percent caused injury to others.

Cockerell OC, Johnson AL, Sander J, Shorvon SD. Prognosis of Epilepsy: A Review and Further Analysis of the First Nine Years in the British National General Practice Study of Epilepsy, a Prospective Population-Based Study. *Epilepsia*. 1997;38:31-46.

The national general practice study of epilepsy is the first large population based study that has prospectively assessed patients with newly diagnosed epilepsy over a prolonged period. There are two important aspects of prognosis in epilepsy – the chance of achieving remission of seizures and the chance of premature death. A total of 1,091 patients newly diagnosed in the United Kingdom between 1984 and 1987 were studied. Only 33 patients were completely lost to follow-up. After nine years, 86 percent of patients with definite epilepsy had achieved a remission of three years and 68 percent had achieved a remission of five years. The proportion of patients with definite epilepsy still in remission at nine years was 68 percent for three year remission and 54 percent for five years. When stratified by etiology, the proportion achieving the five-year remission by nine years was 69 percent for idiopathic seizures and 61 percent for remote symptomatic epilepsy, partial seizures having lower remission rates than generalized seizures. The number of patients still in five-year remission at nine years is explained by the percentage of patients who have since relapsed.

The chance of a patient with epilepsy dying prematurely is more than twice than expected in the general population. The study has shown that patients with epilepsy generally have a good uniform chance of long-term seizure freedom, although patients with epilepsy secondary to underlying structural causes are at significant risk for premature death.

Drazkowski JF, Fisher RS, Sirven JI, Demaerschalk BM, Uber-Zak L, Hentz JG, Labiner D. Seizure-related motor vehicle crashes in Arizona before and after reducing the driving restriction from 12 to 3 months. *Mayo Clinic Proc*. 2003 Jul;78(7):819-25.

This was a time trend study with analysis of motor vehicle crash reports in the state of Arizona 3 years before and 3 years after the seizure-free interval was decreased from 12 to 3 months. Seizure-related crashes increased from 125 for the 3 years before to 136 for the 3 years after the law changed; however, the rate of seizure-related crashes did not increase. During the same time period, crashes related to other medical conditions increased from 288 to 310. The incidence rate of crashes associated with seizures decreased approximately 2 percent during the same period that crashes attributed to other causes increased approximately 8 percent. The incidence rate of crashes was calculated by dividing the number of crashes by the number of miles driven during the given period. In the period after the law changed, miles traveled were approximately 17 percent greater than miles traveled before the law changed. The number of registered vehicles and drivers over the study period increased. For the 6 years studied, approximately 614,000 crashes were recorded in the state of Arizona, 859 of which were related to all medical conditions.

The authors concluded that the rate of seizure-related crashes did not significantly increase in the state of Arizona after the seizure-free interval was reduced from 12 to 3 months.

Dubinsky RM, Stein AC, Lyons K. Practice Parameter: The Risk of Driving and Alzheimer's Disease. Report of The Quality Standards Subcommittee of the American Academy of Neurology. *Neurology*. 2000;54:2205-2211.

The impairment of drivers with probable Alzheimer's Disease or a clinical dementia rating of 0.5 was no greater than that tolerated in other segments of the driving population or those driving under the influence of alcohol at a blood alcohol concentration of less than 0.8 percent. This study was based on 0.5 memory deficit: consistent/slight forgetfulness, partial recollection of events, orientation, fully oriented except for slight difficulty with time relationships, slight impairment in solving problems, similarities and differences, slight impairment in community activities, life at home, hobbies and intellectual interests slightly impaired but fully capable of self-care. Drivers with Alzheimer's dementia with a severity of one posed a significant traffic safety problem both in crashes and from driving performance.

Heikkila VM, Purkk AJ, Korpelainen J. Decreased Driving Ability in People with Parkinson's Disease. *Journal of Neurology, Neurosurgery and Psychiatry*. 1998;64:325-330.

The purpose of this study was to assess the relationship between Parkinson's disease and driving ability. The driving ability of 20 patients with idiopathic Parkinson's disease and 20 age and sex matched healthy control subjects was evaluated by a neurologist, psychologist, vocational rehabilitation counselor, and driving instructor using a standard 10 point scale. The patients and controls also evaluated their own driving ability. Cognitive and psychomotor laboratory tests and a structured on road driving test were used for evaluating the subjects' driving ability. The patients with Parkinson's disease performed worse than the controls both in the laboratory tests and in the driving test. The neurologist overestimated the ability of patients with Parkinson's disease to drive compared with the driving ability evaluated by the structured on-road driving test and with the driving related laboratory tests. The authors concluded that patients were not capable of evaluating their own driving ability accurately and that driving ability is decreased even in those patients with mild disease.

Hobson DE, Lang AE, Martin WRW, Razmy A, Rivest J, Fleming J. Excessive daytime sleepiness and sudden-onset sleep in Parkinson Disease, a survey by the Canadian Movement Disorders Group. *JAMA* 2002;287:455-463.

This survey was designed to study the frequency of and predictors for sudden-onset sleep and, particularly, episodes of falling asleep while driving among patients with Parkinson's disease (PD) through a prospective study. A total of 638 consecutive highly functional PD patients without dementia were enrolled, of whom 420 were currently drivers. Excessive daytime somnolence was found in 327 (51 percent) of the 638 patients and in 213 (51 percent) of the 420 drivers. Sixteen patients (3.8 percent) had experienced at least one episode of sudden onset of sleep while driving, occurring without warning in three. The two risk factors associated with falling asleep at the wheel were the Epworth Sleepiness Scale score greater than 7 and the Inappropriate Sleep Composite Score of 1. The authors concluded that excessive daytime sleepiness is common even in patients with PD who are independent and do not have dementia.

Krauss GL, Ampaw WL, Krumholz A. Individual State Driving Restrictions for People with Epilepsy in the United States. *Neurology*. 2001;57:1780-1785.

Fifty-five percent of patients who had seizures while driving had motor vehicle crashes. One recent U.S. study showed that patients with intractable seizures often continue driving. Among these drivers, 39 percent had a seizure at the wheel and 27 percent crashed because of a seizure.

Krauss GL, Krumholz A, Carter RC, Li G, Kaplan P. Risk factors for seizure related motor vehicle crashes in patients with epilepsy. *Neurology*. 1999;52:1324-1329.

This was a retrospective case-control study to determine the influence of clinical risk factors associated with seizure-related motor vehicle crashes. Fifty patients with epilepsy who crashed during seizures and 50 matched control patients were compared. Factors that significantly decreased the odds of patients with epilepsy having motor vehicle crashes due to seizures were: long seizure-free intervals, reliable auras, few prior non-seizure related accidents, and not having had their antiepileptic drugs (AEDs) reduced or switched. It was also found that 25 percent of patients had more than one seizure-related crash and 20 percent had missed an AED dose just prior to their crash. The majority (54 percent) of patients who crashed were driving illegally, with seizure-free intervals shorter than legally permitted.

Lings S. Increased driving accident frequency in Danish patients with epilepsy. *Neurology*. 2001;57:435-439.

A 10-year historical cohort register study of 159 subjects with epilepsy and 559 controls individually matched for age, gender, place of residence, and exposure period to determine driving accident frequency. Those with diagnoses of other neurologic diseases, diabetes, psychoses, seizures, abuse, or poisoning of any kind were not included. Ten patients with epilepsy and five controls had been treated at the casualty department, the rate per 1,000 person-years with epilepsy being seven times higher.

McKiernan D, Jonathan D. Driving and Vertigo. *Clinical Otolaryngology*. 2001;26:1-2.

Vertigo is a common condition and would rarely be severe enough to make driving unsafe. Whether a patient should be advised to stop driving will depend on the doctor's judgment on the severity and frequency of the attacks. It is difficult to lay down rigid criteria. The English Licensing Board distinguished between group 1 drivers - motor cars and motor bikes, and group 2 drivers - lorries and buses, and impose higher medical standards for the latter. Group 1 drivers liable to sudden attacks such as Meniere's disease, labyrinthine or other brain stem disorders should cease driving on diagnosis. Driving will be permitted when satisfactory control of symptoms is achieved. For Group 2, the driver must be symptom free and completely controlled for at least one year before re-application.

Norton R, Vander Hoorn S, Roberts I, Jackson R, MacMahon S. Migraine: a risk factor for motor vehicle driver injury. *Accident Analysis and Prevention*. 1997;29:699-701.

Data was collected from 10,529 individuals with a personal history of migraine and motor vehicle injury. The adjusted odds ratio for motor vehicle driver injury associated with migraine

was 2.3, 1.5 after excluding those with a history of head injury. The authors concluded that migraine may be associated with a 50 percent increase in the risk of motor vehicle driver injury.

Schultheis MT, Garay E, DeLuca J. The influence of cognitive impairment on driving performance in multiple sclerosis. *Neurology*. 2001;56:1089-1094.

This study evaluated incidence of motor vehicle crashes and violations among drivers with multiple sclerosis (MS) when cognitive impairment is present. Researchers reviewed records of Department of Motor Vehicles (DMV) records of 27 patients with MS, 14 without cognitive impairment and 17 healthy controls. MS individuals with cognitive impairment had a higher incidence of motor vehicle crashes and violations than MS patients without cognitive impairment.

Taylor J, Chadwick D, Johnson T. Risk of accidents in drivers with epilepsy. *Journal of Neurology, Neurosurgery and Psychiatry*. 1996;60:621-7.

This study compared the risk of traffic accidents in drivers with history of single seizures or epilepsy (16,958) with drivers followed by Transport Research Laboratory (8,888) in a retrospective study and questionnaire. After adjustment for differences in age, sex, driving experience and mileage between the two populations there was no evidence of any overall increase in risk of accidents in the population of drivers with a history of epilepsy. There was evidence of an increased risk of more severe accidents in the population with epilepsy.

C.7 Non-cardiac Syncope

Bhatia A, Dhala A, Blanck Z, Deshpande S, Akhtar M, Sra AJ. Driving safety among patients with neurocardiogenic (vasovagal) syncope. *Pacing and Clinical Electrophysiology*. 1999;22(11):1576-80.

Risk of injury due to syncope while driving and driving behavior was evaluated in 155 consecutive patients (92 women and 63 men; mean age 49 +/- 19 years) with history of syncope in whom hypotension and syncope or presyncope could be provoked during head-up tilt testing. Patients with syncope and positive head-up tilt table test were treated with pharmacological therapy. All participants were asked to fill out a detailed questionnaire regarding any driving related injuries and their driving behavior before tilt table testing and during follow-up. Prior to head-up tilt testing two patients had syncope while driving, and one of these patients had a syncope related injury during driving. Of the 155 patients, 52 (34 percent) had no warning prior to syncope, while 103 (6 percent) had warning symptoms such as dizziness prior to their clinical syncope. Following a diagnosis of neurocardiogenic syncope established by head-up tilt testing, six patients stopped driving on their own. During a median follow-up of 22 months recurrent syncope occurred in five (3.2 percent) patients. No patient had syncope or injury during driving.

Li H, Weitzel M, Easley A, Barrington W, Windle J. Potential risk of vasovagal syncope for motor vehicle driving. *American Journal of Cardiology*. 2000 Jan 15;85(2):184-6.

This study analyzed the clinical characteristics of patients who had syncope during driving and subsequently underwent the head-up tilt test (HUTT). Of the 245 consecutive patients undergoing HUTT, 23 (9 percent) had at least one episode of syncope during driving. HUTT was positive in 19 (group A) and negative in 4 (group B) patients. The authors concluded that vasovagal syncope during driving is not uncommon in patients referred for syncope evaluation.

C.8 Attention Deficit Disorders

Barkley R, Guevremont DC, Anastopoulos AD, DuPaul GJ, Shelton T. Driving-related risks and outcomes of attention deficit hyperactivity disorder in adolescents and young adults: a three to five year follow-up survey. *Pediatrics*. 1993;92:212-218.

Two groups of teenagers and young adults (ADHD and normal) were followed for 3 to 5 years after original diagnosis. There were thirty-five subjects with ADHD and 36 control subjects between 16 and 22 years of age, all of whom were licensed drivers. Parent ratings of current symptoms of ADHD, oppositional defiant disorder, and conduct disorder, a survey of various negative driving outcomes, and a rating scale of driving behavior were measured. Subjects with ADHD were more likely than control subjects to have had auto crashes, to have had more such crashes, to have more bodily injuries associated with such crashes, and to be at fault for more crashes than control subjects. These individuals were also more likely to have received traffic citations and received more such citations than control subjects, particularly for speeding. The authors concluded that ADHD and ADHD with oppositional defiant disorder/ conduct disorder, is associated with a substantially increased risk for driving among teenagers and young adults.

Barkley RA, Murphy KR, Kwasnik D. Motor vehicle driving competencies and risks in teens and young adults with attention deficit hyperactivity disorder. *Pediatrics*. 1996;98:1089-1095.

A total of 25 young adults with ADHD and 23 young adults without ADHD were evaluated using interview, behavior ratings by self and others, video test of driving knowledge, computer simulated driving test, and official motor vehicle records. The ADHD young adults were cited more often for speeding, were more likely to have had their licenses suspended, were involved in more crashes, were more likely to have had crashes causing bodily injury, and were rated by themselves and others as using poorer driving habits.

Cox DJ, Merkel RL, Kovatchev B, Seward R. Effect of stimulant medication on driving performance of young adults with attention-deficit hyperactivity disorder: a preliminary double-blind placebo controlled trial. *Journal of Nervous and Mental Disease*. 2000;188(4):230-4.

This study compared driving ability using a driving simulator in seven ADHD patients and six non-ADHD controls. At 0800 and 1530, subjects consumed either a placebo or Ritalin pill and at 0930 and 1700, subjects drove the simulator. After both drives, subjects rated their driving performance. Compared with non-ADHD subjects, ADHD subjects had more career driving accidents ($p < .04$) and motor vehicle violations ($p = .059$), drove worse on the simulator under placebo condition ($p < .05$), demonstrated significant improvement under the Ritalin condition (p

< .05). ADHD patients rated themselves as driving poorer during the placebo condition ($p = .05$), and tended to perceive their driving to be better during the Ritalin condition ($p = .07$). The authors concluded that patients with ADHD judge that they drive better with medication and this was supported by the results of the driving simulator.

Jolly BT, Todd KH, Driving histories of ADHD subjects. *Annals of Emergency Medicine*. 1997;29:546-547.

This study, performed for the National Highway Traffic Safety Administration (NHSTA), reviewed a longitudinal database of 492 children with ADHD and comparable age-matched non-ADHD subjects. Those with ADHD in childhood had a higher risk of motor vehicle accidents in early adulthood.

C.9 Sleep Disorders

Barbe F, Pericas J, Munoz A, et al. Automobile Accidents in Patients with Sleep Apnea Syndrome. *American Journal of Respiratory and Critical Care Medicine*. 1998;158:18-22.

Researchers prospectively recruited 60 consecutive patients with sleep apnea syndrome ($AHI\ 58 \pm 3$) and 60 healthy control subjects. The authors quantified the degree of daytime sleepiness (Epworth Scale), anxiety and depression (Beck Tests), and level of vigilance and driving performance. Patients had more accidents than the control group and were more likely to have had more than one accident. These differences persisted after stratification for amount of driving, age, and alcohol consumptions. Patients were more somnolent, anxious and depressed than control subjects and had a lower level of vigilance and poorer driving performance. There was no correlation between the clinical or physiologic markers used to define severity and patients at higher risk of having an automobile accident.

Findley L, Smith C, Hooper J, et al. Treatment with Nasal CPAP Decreases Automobile Accidents in Patients with Sleep Apnea. *American Journal of Respiratory and Critical Care Medicine*. 2000;161:857-859.

A study of 50 consecutive patients tested the hypothesis that successful treatment of obstructive sleep apnea with nasal continuous positive airway pressure decreases automobile accidents. Thirty-six patients reported using nasal continuous positive airway pressure (CPAP) regularly during two years. Fourteen patients reported they had not used CPAP during the two years. Patients with sleep apnea in this study had a higher automobile crash rate than all drivers in the state of Colorado, 0.07 vs. 0.01 crashes per driver per year. Patients that were treated with nasal CPAP had a lower crash rate while being treated than before treatment, 0.07 vs. 0. Untreated patients with sleep apnea continued to have a high crash rate, 0.07 crashes. This is the first study to confirm with traffic records that patients with sleep apnea have fewer automobile crashes while being treated with nasal CPAP.

George CFP. Vigilance Impairment: Assessment by Driving Simulators. *Sleep*. 2000;23(Supplement 4):115-118.

Sleep related accidents comprise 16 percent of all vehicle crashes on major roads in southwest England and over 20 percent of accidents on midland motorways. Crash rates of drivers using company cars and/or those who fall asleep at the wheel are closely associated with daytime sleepiness. A French study suggests approximately half of drivers involved with sleep related accidents have sleep disorders. Because sleepiness can worsen inattention, it is quite logical to assume that it will lead to more accidents. This study showed that driving simulators are useful tools for repeated evaluation of performance in a number of patient groups including sleep apnea and narcolepsy.

Horne JA, Reyner LA. Sleep related vehicle accidents. *British Medical Journal*. 1995;310:565-567.

Surveys of either police databases or interviews of drivers involved in 679 sleep related accidents were reviewed. The data revealed three peaks when drivers were involved in sleep related accidents, at around 0200, 0600, and 1600. About half these drivers were men under 30 years; few such accidents involved women.

Horstmann S, Hess CW, Bassetti C, Gugger M, Mathis J. Sleepiness-related accidents in sleep apnea patients. *Sleep*. 2000 May 1;23(3):383-9.

The frequency of motor vehicle and working accidents was analyzed by anonymous questionnaire in 156 patients with sleep apnea syndrome in 160 age-gender matched controls. In the sleep apnea syndrome (SAS) group 12.4 percent of all drivers had motor vehicle accidents as compared to 2.9 percent in the control group. The motor vehicle accident rate was 13.0 per million km in patients with more severe sleep apnea syndrome compared to 1.1 in patients with milder sleep apnea syndrome and 0.78 in control group. During treatment with nasal continuous airway pressure (nCPAP) in 85 SAS patients, the motor vehicle accident rate dropped from 10.6 to 2.7 per million km. The authors concluded that patients with moderate to severe SAS have an up to 15-fold risk increase of motor vehicle accidents.

Lindberg E, Carter N, Gislason T, Janson C. Role of snoring and daytime sleepiness in occupational accidents. *American Journal of Respiratory and Critical Care Medicine*. 2001;164:3031-5.

This was a prospective study of the relationship between excessive daytime sleepiness (EDS), snoring and occupational accident. A total of 2,874 men aged 30-64 were asked questions on snoring and EDS. Ten years later 2,009 (73.8 percent of the survivors) responded to a follow-up questionnaire including work-related questions and potential confounders. A total of 345 occupational accidents were reported by 247 of the men (12.3 percent). Multivariate analysis revealed that men who reported both snoring and EDS at baseline were at an increased risk of occupational accidents during the following 10 years, with an adjusted odds ratio of 2.2 (95 percent CI 1.3-3.8) after adjusting for age, body mass index, smoking, alcohol dependence, years at work, blue-collar job, shift work, and exposure to noise, organic solvents, exhaust fumes, and

whole-body vibrations. However, no significant increased risk was found for snorers without EDS or non-snorers with EDS. The researchers concluded that sleepy, male snorers have an increased risk of occupational accidents.

Lloberes P, Levy G, Descals C, et al. Self-reported Sleepiness While Driving as a Risk Factor for Traffic Accidents in Patients with Obstructive Sleep Apnea Syndrome and in Non-Apneic Snorers. *Respiratory Medicine*. 2000;94:971-76.

A series of 189 consecutive patients with a driving license referred for a sleep study because of the suspicion of obstructive sleep apnea were matched for age and sex with a control group of 40 hospital staff workers who denied snoring. Patients underwent an over-night polysomnograph and both patients and controls completed a self-answered questionnaire. One hundred and twenty-two patients were diagnosed as obstructive sleep apnea and 67 patients as non-apneic snorers. The self-reported number of accidents was significantly higher in obstructive sleep apnea patients compared to the control group. The authors conclude that self-reported sleepiness while driving is associated with an increased risk of traffic accidents in obstructive sleep apnea patients and in non-apneic snorers. Although the association between obstructive sleep apnea and traffic accidents seems to be proved in the light of recent literature, the evidence of a relationship between the severity of obstructive sleep apnea and an increased risk for accidents is based on limited data.

Lyznicki JM, Doege TC, Davis RM, Williams MA. Sleepiness, driving, and motor vehicle crashes. *JAMA* 1998;279:1908-1913.

This is a review of the literature on the contribution of driver sleepiness to highway crashes. Driver sleepiness is a causative factor in 1 percent to 3 percent of all U.S. motor vehicle crashes. About 96 percent of sleep-related crashes involve passenger vehicle drivers and 3 percent involve drivers of large trucks. Risk factors include youth, shift work, alcohol and other drug use, over-the-counter and prescription medications, and sleep disorders.

Masa JF, Rubio M, Findley LJ, and Cooperative Group. Habitually Sleepy Drivers Have a High Frequency of Automobile Crashes Associated with Respiratory Disorders During Sleep. *American Journal of Respiratory and Critical Care Medicine*. 2000;162:1407-1412.

Sleepiness is considered a common cause of traffic crashes. A recent study found that 2 percent-3 percent of drivers are habitually sleepy while driving and these drivers reported a significantly higher frequency of auto crashes than control subjects. The adjusted odds ratio was 13.3. The habitually sleepy drivers had a significantly higher prevalence of respiratory sleep disorders (apneas, hypopneas, and other respiratory effort-related arousals). The total respiratory event index was significantly higher in subjects with automobile crashes. This study had several important findings: 1) Approximately 1 of every 30 drivers is habitually sleepy and is involved in several fold more automobile crashes than control subjects. 2) One-half of habitually sleepy drivers report sleepiness occurring predominantly during driving and did not report excessive sleepiness during all activities. 3) Habitually sleepy drivers report falling asleep more frequently while driving and have a 13-fold increased risk of having an automobile crash than control subjects. 4) A high proportion of habitually sleepy drivers have an unrecognized respiratory

disorder during sleep, and 5) the presence of respiratory disorders during sleep is an independent risk factor for auto crashes in the habitually sleepy drivers.

The percentage of professional drivers was higher in habitually sleepy drivers than control subjects. A higher prevalence of respiratory disorders during sleep, chronic alterations of wakefulness/sleep rhythm, poor quality of sleep and insufficient sleep have been observed in truck drivers. It is possible that even though professional drivers have many risks for crashes, these drivers are more practiced, cautious and skillful and are able to overcome their many risk factors for a crash. Only 50 percent of sleepy drivers had a value of greater than or equal to 9 on the Epworth Scale.

Excessive daytime sleepiness, as measured by the Epworth Sleepiness Scale, did not predict an increased automobile crash rate in this study. Several previous studies also found that excessive sleepiness measured by the Epworth Sleepiness Scale or the Multiple Sleep Latency Test does not predict which drivers with sleep apnea will or will not have automobile crashes. Overall excessive daytime sleepiness measured by the Epworth sleepiness scale does not predict a higher number of automobile crashes in our studies as well as other studies. Findings suggested that asking about excessive sleepiness while driving may better predict which subjects with breathing disorders during sleep have crashes than asking about overall sleepiness.

Risser MR, Ware JC, Freeman FG. Driving simulation with EEG monitoring in normal and obstructive sleep apnea patients. *Sleep*. 2000;23(3):393-8.

This prospective study measured simulated driving performance in obstructive sleep apnea patients (n=15) and healthy controls (n=15) and evaluated the relationship with electroencephalogram (EEG) defined attention lapses. A computer based driving simulator recorded lane position variability, speed variability, steering rate variability, and crash frequency. The frequency and duration of EEG-defined attention lapses were also measured. The results demonstrated that the apnea group had significantly greater variability in lane position, steering rate, and speed than the control group. The apnea group also had more crashes. In addition, the apnea group had more EEG-defined attention lapses of longer duration. These lapses increased over the 60-minute test period. The driving simulation task unmasked and quantified marked performance impairments in the sleep apnea group that increased over time. The poor performance appeared related to the EEG-defined attention lapses. This study suggests that poorer driving performance and crashes are not entirely due to overt sleep, but inattention due to sleepiness.

Shiomi T, Arita AT, Sasanabe R, Banno K, Yamakawa H, Hasegawa R, Ozeki K, Okada M, Ito A. Falling asleep while driving and automobile accidents among patients with obstructive sleep apnea-hypopnea syndrome. *Psychiatry and Clinical Neurosciences*. 2002;56(3):333-4.

Among 448 patients with obstructive sleep apnea-hypopnea syndrome (OSAHS), 40 patients (8.9 percent) had been involved in one or more automobile accidents during the preceding five years. The main cause of these accidents was falling asleep while driving. Excessive sleepiness during driving was associated with an Epworth sleepiness scale (ESS) score of over 11 and/or an apnea-hypopnea index (AHI) of > 15 . The automobile accident rate among 182 patients with severe OSAHS (AHI > 30) was significantly higher than the rate among 106 simple snorers

(AHI < 5). Although four of the simple snorers were involved in automobile accidents, their ESS scores were all very high (15 or more). Falling asleep while driving appears to be related those with higher AHI.

Stoohs RA, Guilleminault C, Itoi A, Dement WC. Traffic Accidents in Commercial Long Haul Drivers: The Influence of Sleep Disorders, Breathing and Obesity. *Sleep*. 1994;17:619-623.

This was a cross-sectional population study of 90 commercial long haul drivers, 20-64 years of age. The main outcomes included presence or absence, as well as severity of sleep disordered breathing, and the frequency of automobile accidents. Truck drivers with sleep disordered breathing had a two-fold higher accident rate per mile than drivers without sleep disordered breathing. Accident frequency was not dependent on the severity of the sleep related breathing disorder. Obese drivers with a body mass index (BMI) >30kg per m² also presented a two-fold higher accident rate than non-obese drivers.

Teran-Santos J, Jimenez-Gomez A, Cordero-Guevara J. The association between sleep apnea and the risk of traffic accidents. *New England Journal of Medicine*. 1999;340:847-851.

This was a case-control study of the relation between sleep apnea and the risk of traffic accidents. The case patients were 102 drivers who received emergency treatment at hospitals and the controls were 152 randomly selected patients from primary care centers. Patients were screened for sleep apnea at home and the diagnosis was confirmed by conventional polysomnography. Patients with an apnea-hypopnea index of ten or higher had an odds ratio of 6.3 for having a traffic accident. This relation remained significant after adjustment for potential confounders, such as alcohol consumption, visual-refraction disorders, body-mass index, years of driving, age, history with respect to traffic accidents, use of medications causing drowsiness, and sleep schedule. Among subjects with an apnea-hypopnea index of ten or more, the risk of an accident was higher among those who had consumed alcohol on the day of the accident than among those who had not. The researchers concluded that there is a strong association between sleep apnea, as measured by the apnea-hypopnea index, and the risk of traffic accidents.

Young T, Blustein J, Finn L, Palta M. Sleep-disordered breathing and motor vehicle accidents in a population-based sample of employed adults. *Sleep*. 1997;20(8):608-13.

The goal of this investigation was to determine if unrecognized sleep-disordered breathing in the general population was associated with motor vehicle accidents. The sample comprised 913 employed adults enrolled in an ongoing study of the natural history of sleep-disordered breathing. Sleep-disordered breathing status was determined by overnight in-laboratory polysomnography. Motor vehicle accident (MVA) history was obtained from a statewide data base of all traffic violations and accidents from 1988 to 1993. Men with five or more apneas and hypopneas per hour of sleep [apnea-plus-hypopnea index (AHI) > 5], compared to those without sleep-disordered breathing, were significantly more likely to have at least one accident in 5 years (adjusted odds ratio = 3.4 for habitual snorers, 4.2 for AHI 5-15, and 3.4 for AHI > 15). Men and women combined with AHI > 15 (vs. no sleep-disordered breathing) were significantly more likely to have multiple accidents in 5 years (odds ratio = 7.3). These results, free of clinic selection bias, indicate that unrecognized sleep-disordered breathing in the general population is

linked to motor vehicle accident occurrence. If the association is causal, unrecognized sleep-disordered breathing may account for a significant proportion of motor vehicle accidents.

C.10 Medications

Adelsberg BR. Sedation and performance issues in the treatment of allergic conditions. *Archives of Internal Medicine*. 1997;157:494-500.

This article evaluates and summarizes the results of studies investigating the central nervous system effects of second-generation antihistamines, with particular emphasis on psychomotor and cognitive effects. The data sources were computer-assisted MEDLINE searches using the search terms histamine H1 antagonists, psychomotor performance, sleep, and specific drug names, including astemizole, cetirizine, loratadine, and terfenadine. Only controlled studies using standardized or quantitative methods for defining drug-induced effects on sedation, psychomotor performance, or cognition were reviewed. Objective and subjective measures of sedation show that loratadine and terfenadine produce sedation at a rate comparable with placebo. Cetirizine is associated with sedation or psychomotor impairment in some studies but not all studies. The data on central nervous system effects of astemizole are limited and were not evaluated. The absence of sedation and psychomotor or cognitive impairment in patients receiving loratadine or terfenadine justifies the cost of these agents, particularly for patients who drive, pilot aircraft, or operate machinery. Whether the potential for rare but serious cardiovascular events (associated with astemizole and terfenadine) is justifiable must be decided on a case-by-case basis.

Aiken A, Chaturvedi AK. Prevalence of Selective Serotonin Reuptake Inhibitors in Pilot Fatalities of Civil Aviation Accidents, 1990 – 2001. May 2003. Office of Aerospace Medicine, Federal Aviation Administration. DOT/FAA/AM-03/7.

With few exceptions, these psychotropic medications are not approved by aeromedical regulatory authorities for use by aviators, since selective serotonin reuptake inhibitors (SSRI's) have the potential for impairing performance and causing drug/drug interactions. Out of 4,184 fatal civil aviation accidents from which CAMI received samples, there were 61 accidents in which pilot fatalities had SSRI. As determined by the NTSB, the use of an SSRI had been a contributory factor in at least 9 of the 61 accidents. The interactive affects of other drugs, ethanol and/or even altitude hypoxemia producing adverse affects on pilots cannot be ruled out.

The reluctance of aeromedical regulatory authorities to allow SSRI use stems primarily from the basic pharmacological nature of SSRI's as psychotropic drugs. These drugs have a potential to affect the central nervous system and might impair performance or ultimately compromise aviation safety. SSRI's themselves may not exhibit considerable adverse affects on human performance at the recommended therapeutic doses, but depression itself has a significant potential for performance impairment. Because of the pharmacologic potencies and drug metabolism inhibitory properties of SSRI's and their metabolites, SSRI's may adversely affect CNS function and cause drug/drug interactions. SSRI's inhibit their own metabolism at high doses. The potential for the inhibition of the metabolism of other drugs is further increased when SSRI's are taken in higher doses.

Barbone F, McMahon, Davey PG, Morris AD, Reid IC, McDevitt DG, MacDonald TM. Association of road-traffic accidents with benzodiazepine use. *Lancet*. 1998;352:133-1336.

This study evaluated risk of a first traffic accident in drivers aged 18 and older who had used a psychoactive drug (tricyclic antidepressant, benzodiazepine, selective serotonin-reuptake inhibitor, or other psychoactive drug). Use was determined by measures of dispensed medications. A total of 19,386 drivers were involved in a first road-traffic accident during the study period and 1731 were users of at least one of the study drugs. On the day of the accident, 189 individuals were taking tricyclic antidepressants, 84 selective serotonin re-up-take inhibitors, 235 benzodiazepines, and 47 other psychoactive drugs. The authors concluded that users of anxiolytic benzodiazepines and zopiclone were at increased risk of experiencing a road-traffic accident and should be advised not to drive. There was also an increased risk of accidents in patients on tricyclic antidepressants, selective serotonin re-uptake inhibitors, benzodiazepines and other psychoactive drugs.

Canfield DV, Flemig J, Hordinsky J, Veronneau S. Unreported Medication Used and Incapacitating Medical Conditions Found in Fatal Civil Aviation Accidents. Office of Aviation Medicine Federal Aviation Administration Report Number DOT/FAA/AM-94/14. August 1994.

Review of toxicology results from 2192 fatal aviation accidents detected 48 cases in which the pilot had taken a drug that used to treat a potentially incapacitating medical condition. Drug use in the treatment of cardiovascular disease was found in 13 cases. Neurological medications were found in seven and medications used in the treatment of psychiatric conditions were found in 28 of the cases. There were only three cases out of the 48 cases studied in which the pilots reported the drugs detected during laboratory analysis on the medical application. These cases were all for the treatment of cardiovascular conditions. Although these 48 cases represent only approximately 2 percent of the pilot fatality caseload examined at CAMI, the specific drugs should help channel the index of suspicion of aviation medical examiners.

Canfield DV, Hordinsky J, Miller DP, et al. Prevalence of drugs and alcohol in fatal civil aviation accidents between 1994 and 1998. U. S. Department of Transportation Federal Aviation Administration DOT/FAA/AM-00/21 June 2000.

Between 1994 and 1998, specimens were taken from 1,683 pilots for postmortem toxicologic analysis. Controlled dangerous substances schedules 1 and 2 were found in 89 of the pilots. Schedules 3-5 were found in 49 of the pilots tested. Prescription drugs were found in 240 of the pilots and over-the-counter pills were found in 301. Alcohol at or above the legal limit of 0.04 was found in 124 pilots. Over-the-counter medications are the most frequently found drugs in fatal aviation accidents and many of these drugs, or the medical conditions for which they are used, could impair a pilot's ability to safely fly an aircraft. The low incidence of drugs in the 3-5 category may be a result of difficulty in finding and identifying the new Benzodiazepines commonly prescribed.

Fishbain DA, Cutler RB, Rosomoff HL, Steele R, Romanoff RS. Are Opioid-Dependent/Tolerant Patients Impaired in Driving-Related Skills? A Structured Evidence-Based Review. *Journal of Pain and Symptom Management*. 2003;25(6):559-577.

This study began with the statement that previous studies have concluded that opioids cause dose related impairment in driving skills among opioid naïve individuals. This group performed a literature review of all available studies involving individuals who were opioid dependent/tolerant. This review concluded that there was no consistent evidence of impairment in cognitive function, greater incidence of motor vehicle accidents or impairment in driving simulators for opioid dependent/tolerant individuals.

Frucht S, Rogers JD, Greene PE, Gordon MF, Fahn S. Falling asleep at the wheel: motor vehicle mishaps in persons taking pramipexole and ropinirole. *Neurology*. 1999;52:1908-1910.

This study reported on eight patients with Parkinson's disease who were taking either Pramipexole or Ropinirole and who fell asleep while driving with resultant accidents. Five of the individuals had no warning. These attacks ceased when the medication was discontinued.

Galski T, Williams B, Ehle HT. Effects of Opioids on driving ability. *Journal of Pain and Symptom Management*. 2000;19:200-208.

This study looked at the driving abilities of patients using opioid medications on a regular basis (Chronic Opioid Analgesic Therapy - COAT) for chronic pain. Sixteen patients with chronic nonmalignant pain on COAT, who underwent an off-road driving evaluation using a pre-driver evaluation (PDE), a simulator evaluation (SDE), and behavioral observation during simulator performance. Patients in the COAT group were compared to a historical control group of 327 cerebrally compromised patients (CComp) who had undergone the same evaluation. Results revealed that COAT patients generally outperformed the CComp patients as a group. The COAT patients had a relatively poorer performance than CComp patients on specific neuropsychometric tests in the PDE; however, the differences were not statistically significant. Behaviorally, COAT patients were generally superior to CComp patients; however, COAT patients had greater difficulty in following instructions as well as a tendency toward impulsivity, similar to the CComp patients who failed the behind the wheel test. While there was general support for the notion that COAT did not significantly impair the perception, cognition, coordination, and behavior measured in off-road tests, the authors note that there may be problems generalizing the results of this study.

Grabe HJ, Wolf T, Gratz S, Laux G. The influence of clozapine and typical neuroleptics on information processing of the central nervous system under clinical conditions in schizophrenic disorders: implications for fitness to drive. *Neuropsychobiology*. 1999;40(4):196-201.

The present study investigated the psychomotor performance of schizophrenic inpatients receiving neuroleptic medication in regard to their fitness to drive. Researchers compared patients taking clozapine with those taking classical neuroleptics and measured reaction time, vigilance, visual perception and stress tolerance. The patients' driving ability was equally impaired in both treatment groups; 11 percent of patients passed all tests without major

impairment; 32 percent of the patients showed some impairment that required individual evaluation of their driving ability; 57 percent were considered to be severely impaired and driving could not be recommended.

Grabe HJ, Wolf T, Gratz S, Laux G. The influence of polypharmacological antidepressive treatment on central nervous information processing of depressed patients: implications for fitness to drive. *Neuropsychobiology*. 1998;37(4):200-4.

This study evaluated the influence of antidepressants and common co-medications such as lithium, carbamazepine, benzodiazepines or neuroleptics on central nervous information processing on the ability to drive. Forty-four inpatients with major depression were evaluated on a Act & React Testsystem ART-90. A total of 88.6 percent of the patients failed to pass all the tests. With respect to different groups of antidepressants, no differences in psychomotor reaction performance were observed in poly-drug treatment.

Hemmelgarn B, Suissa S, Huang A, Boivin JF, Pinard G. Benzodiazepine use and the risk of motor vehicle crash in the elderly. *JAMA*. 1997;278:27-31.

This study reviewed the effect of benzodiazepines of either long- or short half-life on the risk of motor vehicle crash in the elderly. This was a nested case-control design within a cohort of 224,734 drivers from the Canadian province of Quebec, aged 67 to 84 years, followed from 1990 to 1993. The study included 5579 drivers involved in an injurious crash (cases) and a random sample of 10 controls per case selected. The adjusted rate ratio of crash involvement within the first week of long-half-life benzodiazepine use was 1.45 with the rate ratio for continuous use of longer duration up to 1 year was slightly lower but remained significant. There was no increased risk after beginning treatment with short-half-life benzodiazepines.

Kay GG, PhD. The effects of antihistamines on cognition and performance. *Journal of Allergy and Clinical Immunology*. 105(6, part 2) (Supplement):S622-S627, June 2000.

This article reviews the effects of allergic disorders and antihistamines on disability. The first generation antihistamines are highly lipophilic and readily cross the blood-brain barrier, causing considerable sedation. The second-generation agents are more lipophobic and less likely to cross the blood-brain barrier, causing little if any sedation. In a recent comparative study, subjects treated with the first-generation agent diphenhydramine were found to have significant performance deficits on tests of divided attention, working memory, vigilance, and speed. Those treated with the second-generation antihistamine, Loratadine, performed as well as subjects who were treated with a placebo. It was recommended that patients whose occupations require vigilance, divided attention, or concentration receive only second-generation antihistamines.

Logan BK, Case GA, Gordon AM. Carisprodol, meprobamate, and driving impairment. *Journal of Forensic Sciences*. 2000;45(3):619-623.

This article reviews the pharmacology and driving impairment of the centrally acting muscle relaxant carisprodol, and its metabolite meprobamate. A series of 104 incidents in which these

drugs were detected in the blood of drivers involved in accidents or arrested for impaired driving was considered. Reported driving behaviors included erratic lane travel, weaving, driving slowly, swerving, stopping in traffic, and hitting parked cars and other stationary objects. Many of these cases had alcohol or other centrally acting drugs present also, making difficult the attribution of the documented impairment specifically to carisoprodol and meprobamate. In twenty-one cases, however, no other drugs were detected. Impairment appeared to be possible at any concentration of these two drugs; however, the most severe driving impairment and most overt symptoms of intoxication were noted when the combined concentration exceeded 10 mg/L.

Menzin J, Lang K, Levy P, Levy E. A general model of the effects of sleep medications on the risk and cost of motor vehicle accidents and its application to France. *Pharmacoeconomics* 2001;19:69-78.

This paper reported on a model to evaluate the potential effects of sleep medications on motor vehicle accidents and costs. The researchers evaluated impairment in driving performance, in a randomized controlled open-road study using the standard deviation of a vehicle's lateral position (SDLP), a measure of weaving. The degree of driving impairment was expressed in terms of equivalent blood alcohol (ethanol) concentration (BAC) which was then used to predict excess risk of motor vehicle accidents. A non-impairing medication would not increase risk; a medication that produces mild impairment in driving performance equivalent to 0.05 percent BAC would increase motor vehicle accident risk by 25 percent. One that leads to moderate impairment (an SDLP change of 4.5 cm, equivalent to 0.08 percent BAC) would roughly double this risk, and a severely impairing medication (an SDLP change of 7 cm, equivalent to 0.12 percent BAC) would result in up to a 5-fold increase in motor vehicle accident risk. A hypothetical population of 100,000 adult drivers with insomnia was assumed to be treated for 14 days with either a medication that has been shown not to significantly impair driving performance or one that has been shown to cause moderate impairment. The moderately impairing medication would be expected to result in 503 excess accidents per 100,000 drivers.

O'Hanlon JF, Ramaekers. Antihistamine effects on actual driving performance in a standard test: a summary of Dutch experience, 1989-94. *Allergy*. 1995;50:234-242.

This review summarizes the results of eight double-blind, placebo-controlled, volunteer studies looking at the effects on actual driving performance of "sedating" and "non-sedating" antihistamines. Standard deviation of lateral position was used to measure driving impairment. The newer drugs were generally less impairing.

O'Neill WM, Hanks GW, Simpson P, Fallon MT, Jenkins E, Wesnes K. The cognitive and psychomotor effects of morphine in healthy subjects: a randomized controlled trial of repeated (four) oral doses of dextropropoxyphene, morphine, lorazepam and placebo. *Pain*. 2000;85:209-215.

This was a randomized double-blind four-way crossover study of ten healthy subjects to examine the cognitive and psychomotor effects of repeated oral doses of dextropropoxyphene and morphine. Four treatments were compared: dextropropoxyphene napsylate 100 mg, morphine sulphate 10 mg, lorazepam 0.5 mg and placebo. The study found that oral morphine may

enhance performance in some measures of cognitive function, whereas dextropropoxyphene seems more likely to cause impairment. Neither opioid has substantial effects on cognition and psychomotor function compared with lorazepam.

Ray AR, Thapa PB, Shorr RI. Medications and the older driver. *Clinics in Geriatric Medicine*. 1993;9:413-438.

This is a review article on the effects medications on driving in the elderly. Some studies used 65 years as the age cut off while others included those over 55 as "older." The various methods to evaluate potential impairment on driving including psychomotor tests, driving simulators, on-road driving tests, tests of attention were reviewed. Some evaluators favored the on-road test for prediction of driving ability while others preferred a battery of tests.

Medications that should be of concern include the benzodiazepines, antidepressants, opioid analgesics, antihistamines and hypoglycemics. Conclusions included that benzodiazepines impair performance in a dose related manner and may be responsible for up to a six-fold increase in crash risk. Other anxiolytics and hypnotics may also impair but different drugs in this category will have less or no effect. The sedating antidepressants were found to decrease psychomotor function. Frequent use of the cyclic antidepressants was found in one study to have a more than doubled risk of injurious crashes. Opioids were found to also impair performance, but this effect was blunted in opioid tolerant individuals. The non-sedating antihistamine did not affect performance, but the sedating antihistamines decreased ability on a number of test protocols.

Weiler JM, Bloomfield JR, Woodworth GG, Grant AR, Layton TA, Brown TL, et al. Effects of fexofenadine, diphenhydramine, and alcohol on driving performance. A randomized, placebo-controlled trial in the Iowa Driving Simulator. *Annals of Internal Medicine*. 2000;132:354-63.

This was a randomized, double-blind, double-dummy, four-treatment, four-period crossover trial study comparing the effects of fexofenadine (60 mg), diphenhydramine (50 mg), and alcohol on driving performance in the Iowa Driving Simulator. Participants had significantly better ability to match the speed of the vehicle they were following after taking alcohol or fexofenadine than after taking diphenhydramine. Ability to stay in lane was impaired after alcohol and diphenhydramine use compared with fexofenadine use. Mean response time to a blocking vehicle was slowest after alcohol use. Self-reported drowsiness did not correlate with lack of coherence and was weakly associated with minimum following distance, steering instability, and left lane excursion.

Wylie KJ, Thompson DJ, Wildgust HJ. Effects of Depot Neuroleptics on Driving Performance in Chronic Schizophrenic Patients. *Journal of Neurology, Neurosurgery and Psychiatry*. 1993;56:910-13.

Twenty-two patients receiving depot neuroleptics for chronic schizophrenia were compared with sixteen control subjects in performance on simulated driving tests. There was a significant decrement in driving performance in the index group compared with the normal control group. Parkinsonism is likely to be the main mechanism by which neuroleptic drugs may impair

driving. Neuroleptics are potentially sedative and may lead to drowsiness. Two surveys of patients admitted to the hospital for schizophrenia were not found to have increased road traffic accident rates. The index sample has the potential source of bias in that only those patients who felt confident in their general capabilities, which may include driving, were volunteering for the study. It also remains unclear to what extent performance on a driving simulator reflects real driving ability. Nevertheless, the panel concluded that tests using driving simulators may be a better measure of driving skills than tests of competence and motor function. It is not clear how much of the impairment is due to chronic schizophrenia and how much is due to the medication or side-effects of medication. In this study, the index group was stabilized on their medication. They were also on anti-cholinergic medication. Regular review of psychopathology and movement disorders by the physician is necessary, especially for those seeking advice on their suitability to drive a vehicle.

C.11 Provider Knowledge

Cable G, Reines M, Salwa G, Thirumavalavan V. Knowledge, attitudes and practice of geriatricians regarding patients with dementia who are potentially dangerous automobile drivers: a national survey. *Journal of the American Geriatric Society*. 2000;48:14-17.

This paper reports the findings of a survey among 467 geriatricians of their knowledge regarding how to prevent a patient with dementia who is a potentially dangerous driver from driving. The survey also assessed the geriatricians' willingness to recommend license revocation against the wishes of both the patient and the patient's family. More than 28 percent of all geriatricians did not know how to report patients with dementia who are potentially dangerous drivers. More than 75 percent agreed that physicians are responsible for reporting patients. This study demonstrated that although the majority of geriatricians knew that they were responsible for reporting unsafe drivers, a majority did not know how to do so.

King D, Benbow SJ, Barrett JA. The law and medical fitness to drive - A study of doctor's knowledge. *Postgraduate Medical Journal*. 1992;68:624-628.

Doctors' knowledge on laws and recommendations regarding fitness to drive was assessed through questionnaire. A total of 400 general practitioners and 246 hospital doctors were asked to respond to the survey anonymously. Only 26 percent of general practitioners and 32 percent of hospital based physicians responded. Results showed that physicians either did not ask about medical conditions which might impact driving or did not report when required to do so. Only 59 percent of general practitioners and 30 percent of hospital physicians responded correctly based on Driver Vehicle Licensing Agency requirements for those who had a myocardial infarction. Several indicated they would tell their patient to drive if they felt able. Less than 50 percent were aware of the guidelines on transient ischemic attacks (TIAs).

C.12 Multiple Medical Conditions / Other

Koepsell TD, Wolf ME, McCloskey L, Buchner, Louis D, Wagner EH, Thompson RS. Medical Conditions and motor vehicle collision injuries in older adults. *Journal of the American Geriatric Society*. 1994;42:695-700.

This was a case control study to determine whether medical conditions that can impair sensory, cognitive, or motor function increase the risk of injury due to motor vehicle collision in older drivers. Drivers who were 65 years or older and injured were matched with controls by age, gender and county of residence. Injury risk was 2.6-fold higher in older diabetic drivers, especially those treated with insulin or oral hypoglycemic agents, those with diabetes for over 5 years, and those with both diabetes and coronary heart disease. There was also an increased risk for those older drivers with coronary artery disease, depression, alcohol abuse, or falls but these were not statistically significant.

Li G, Baker SB, Grabowski JG, et al. Age, Flight Experience and Risk of Crash Involvement of Cohort or Professional Pilots. *American Journal of Epidemiology*. 2003;157:874-80.

This was a ten-year study (1987-1997) on a cohort of 3,306 commuter air carrier and air taxi pilots who were age 45-54 in 1987. Flight Experience as measured by total flight time at baseline showed a significant protective affect against the risk of crash involvement. The protective effect of flight experience levels off after total flight time reaches 10,000 hours. The lack of an association between pilot age and crash risk may reflect a strong “healthy worker effect” stemming from the rigorous medical standards and periodic physical examination required for professional pilots.

Marshall SC, Spasoff R, Nair R, Van Walraven C. Restricted driver licensing for medical impairments: does it work? *Canadian Medical Association Journal*. 2002 Oct 1;167(7):747-51.

This research evaluated the rates of crashes and traffic violations among drivers with a restricted license, compared with the rates in the general driving population. It compared the crash and traffic violation rates before and after driving restrictions were imposed using a retrospective analysis of all licensed Saskatchewan drivers registered from Jan. 1, 1992 to Apr. 19, 1999.

Of the 703,758 drivers in the study, 23,185 (3.3 percent) had a restricted license and a higher crash rate than drivers without restrictions. This rate was lower than that among male drivers and urban drivers. Drivers with restricted licenses had a lower traffic violation rate than those without restrictions. During the study period, license restrictions may have averted up to 816 crashes and 751 traffic violations.

Parsons M. Fits and Other Causes of loss of Consciousness While Driving. *Quarterly Journal of Medicine*. 1986;58:195-303.

The accounts of incidences in which a driver lost consciousness or had a fit at the wheel were obtained from 92 patients who attended a neurology clinic and 131 press reports. Of these episodes, 78 percent were attributed to fits, coronary thrombosis or sleep. Fits and coronary thrombosis, of which drivers frequently had some premonition, caused few serious accidents,

although the latter was usually lethal. Coronary thrombosis is more common among those over 55 years, with known or suspected coronary thrombosis accounting for 50 percent of the cases and 82 percent of driver's deaths. Although the driver's chance of survival is poor, the risk of a serious accident is small, which confirms the other studies. Drivers who fell asleep often did so without warning on arterial roads and in commercial vehicles. This group represented 27 percent of the entire series but accounted for 83 percent of deaths attributable to trauma. Twenty-five percent of the people drove professionally.

Sjogren H, Eriksson A and Ostrom. Role of disease in initiating the crashes of fatally injured drivers. *Accident Analysis and Prevention*. 1996;28:307-314.

This study examined the results of autopsies of 480 car drivers who were fatally injured and died within 3 days of the crash over a 13-year period. Almost one quarter of the drivers were found to have medical conditions such as heart disease, seizures, or diabetes. These medical factors were more common in males than in females. In 6 percent of the drivers, intrinsic medical factors were probably the underlying cause of the crash; in 1.3 percent the probability was strong. In 19 percent of the cases 60 or over age group, intrinsic medical factors were the underlying cause of the crash.

Vernon DD, Diller EM, Cook LJ, Reading JC, Suruda AJ, Dean JM. Evaluating the crash and citation rates of Utah drivers licensed with medical conditions, 1992-1996. *Accident Analysis and Prevention*. 2002;34:237-246.

The objective of this retrospective case-controlled study was to compare the rates of adverse driving events (crash, at-fault crash and citations) experienced by drivers licensed with medical conditions to those of age-, sex- and location-matched controls. The study also compared drivers reporting medical conditions licensed with full driving privileges, and those with restricted driving privileges. All drivers licensed in the state of Utah who reported a medical condition on their driver license application over the five year period 1992-1996 were included. Controls were from the entire driving population during the same time. Medical conditions drivers had modestly elevated rates of adverse driving events compared with control drivers. Rates in the cardiovascular condition category were not higher than controls. There did not appear to be an increased rate in drivers with more than one medical condition compared to the entire group with medical conditions. Underreporting of medical conditions and inaccurate assessment of exposure rates may have been weaknesses in this study.

Ysander L. The Safety of Drivers with Chronic Disease. *British Journal of Industrial Medicine*. 1966;23:28-36.

A total of 612 drivers with chronic diseases, mainly diabetes, cardiovascular disease, or renal disorder, were investigated in regard to the frequency of road accidents and serious driving offenses during a 10-year period. Road accidents directly caused by the disease or its treatment occurred in 0.8 percent of cases, all due to hypoglycemic attacks in insulin treated diabetics. The percentage of drivers experiencing road accidents were 4.1 in the investigation series and 7.7 in the control series. The corresponding figures for road accidents and serious driving offenses taken together were 9.8 and 15.3. The conclusion is drawn that any increased risk to road safety constituted by drivers with specific chronic diseases may be satisfactorily offset by restrictions

applied in Sweden in the granting of licenses to these drivers. In 1958, Tannenbaum found that 8.2 percent of all accident cases were wholly or partly caused by the affects of acute or chronic illness.

C.13 Glossary

amblyopia –dimness of vision, especially when occurring in one eye without apparent physical defect or disease; also called lazy eye

aneurysm – widening of a vessel involving the stretching of the tissue of the media, the muscular layer of the vessel wall; major concern is rupture with sudden incapacitation

angina – chest pain caused by inadequate oxygen to heart muscle in relation to demand. Usually caused by coronary artery atherosclerosis

antiarrhythmic - a drug used to treat an abnormal heart rhythm

anxiolytic – a tranquilizer used to relieve anxiety and reduce tension and irritability

aphakia – absence of the natural lens of the eye (usually resulting from the removal of cataracts)

arrhythmia – abnormal heart rhythm

atherosclerosis – thickened and hardened lipid rich lesions within the innermost layer of medium and large arteries

cardiomyopathy – diffuse group of diseases of heart muscle that are generally classified based on structure and functional abnormalities; currently divided into dilated, hypertrophic, and restrictive

cerebrovascular – relating to the brain and the blood vessels that supply it; commonly used in relation to acute loss of blood flow to the brain with associated symptoms and signs

coronary thrombosis – obstruction of blood flow in a coronary artery by a blood clot; commonly called a heart attack

encephalopathy – any disorder or disease of the brain; associated with alterations in consciousness and ability to think and can be acute or chronic

euglycemia – a normal blood glucose level based on time since last meal

hemoglobin – a hemoprotein whose function is transport of oxygen from lung to body tissues

hemoglobin A1C (glycosylated hemoglobin) – formed when blood glucose reacts with the hemoglobin A molecule. Percent of HbA1C is based on the level of glucose over preceding 6 to 12 weeks, the life of the red blood cell. Hemoglobin A1C is tested to monitor the long-term control of diabetes

hypoglycemia - abnormally low blood sugar (glucose) usually resulting from excessive insulin. Depending on glucose level and the rate of change in its level in blood, can be associated with anxiety, sweating and rapid heart beat, as well as altered alertness, seizures and loss of consciousness

hypopnea – reduction of airflow or effort lasting at least 10 seconds. Requires at least a 30 percent decrease in thorax and abdominal breathing or airflow, and at least a 4 percent decrease in oxygen in the blood

hypotension – abnormally low blood pressure

hypertrophy – increase in mass of left ventricle of heart in response to abnormal pressure or volume

hypertrophic cardiomyopathy – genetic factors lead to hypertrophied walls of ventricle that are so thickened that they obstruct blood flow from the ventricle to the aorta

idiopathic – unexplained cause

ischemia – lack of adequate oxygen delivery by red cells to tissue due to diminished blood flow

neuroleptic – medications that work on the nervous system; primarily used to treat psychotic conditions. Have calming effect on almost all agitated persons

neuropsychological – a science concerned with the integration of psychological observations on behavior and the mind with neurological observations on the brain and nervous system

palpitations – sensation of rapid or irregular heart beat

selective serotonin reuptake inhibitors – a class of antidepressant drugs

sleep apnea – a sleep disorder involving cessation of breathing and disrupted sleep; major sleep disorder causing excessive daytime sleepiness

syncope - a brief spontaneous loss of consciousness caused by insufficient blood to the brain

tachycardia – abnormally rapid heartbeat; generally defined as over 100 beats a minute while at rest

transient ischemic attack – a brief period during which the brain gets insufficient blood supply; all symptoms and findings resolve within 24 hours

vasovagal syncope – most common cause of fainting, often associated with emotional upset. Caused by transient slowing of heart rate and a drop in arterial pressure

Appendix D – Summary of Relevant ADA Cases

This appendix summarizes selected U.S. Supreme Court cases that have implications for any transportation medical standards program. These three cases illustrate the limitations on the applicability of the ADA. Following this summary are abstracts of 42 ADA cases involving railroads. In nearly all of the railroad cases, the ADA was found not applicable.

D.1 Transportation-Related Cases

1. *Albertson's v. Kirkingburg*, 527 U.S. 555, (1999).

The following case, decided by the U.S. Supreme Court in 1999, is summarized because it is instructive in its brief discussion of the interface between the Americans with Disabilities Act (ADA) and federal medical regulations in the transportation industry.

The case, *Albertson's v. Kirkingburg*, 527 U.S. 555, is cited above in the summary of legal considerations provided in subsection 6.4.

A truck driver who had driven successfully for several years was fired after he failed to meet a vision standard in a return-to-work medical exam required by the Dept. of Transportation. In effect, the trucker had monocular vision.

At the time, the Department of Transportation had established a trial waiver program for those who failed the vision exam but could demonstrate through testing that the impairment did not create a safety hazard. Through the trial program, the DOT hoped to amass data to assist it in determining whether its vision standards were more restrictive than safety required. In this instance, the Employer elected not to provide the trucker with the option of demonstrating that he qualified for a waiver.

The trucker filed a claim under the ADA asserting in part that the employer's failure to provide him the opportunity to demonstrate he was entitled to a waiver contravened the requirement under the ADA to make reasonable accommodation for an employee with a physical impairment. It appears the Court had some difficulty rendering a final judgment. However, it concluded the employer did not violate the ADA when it ended the trucker's employment. It based its holding in significant part on the fact that the waiver program was experimental and so was not on par with the regulation itself.

Had the waiver program been part of the formal regulations and not a trial program, it is unclear whether the court would have held differently.

The *Albertson's* case is relevant to the FRA's medical standards project for two things it says about the interface between federal medical regulations and the ADA. First, it indicates that as a matter of law federal safety rules limit the application of the ADA to covered employees. At the same time, the case notes that when the ADA was enacted, Congress asked the Department of Transportation to review its medical standards for truckers to ensure they were not more demanding than safety required. The Court states in pertinent part:

When Congress enacted the ADA, it recognized that federal safety rules would limit application of the ADA as a matter of law. . . .Accordingly, two of these Committees asked 'the Secretary of Transportation [to] . . . 'review these

requirements to determine whether they are valid under this Act [the ADA].’ at pp. 573,574.

2. U.S. Airways, Inc. v. Robert Barnett, 535 U.S. 391, (2002).

The Americans with Disabilities Act of 1990 (ADA or Act), 104 Stat. 328, prohibits an employer from discriminating against an “individual with a disability” who, with “reasonable accommodation,” can perform the essential functions of the job. This case asks how the Act resolves a potential conflict between: 1) the interests of a disabled worker who seeks assignment to a particular position as a “reasonable accommodation,” and 2) the interests of other workers with superior rights to bid for the job under an employer’s seniority system. In such a case, does the accommodation demand override the seniority system?

In this case Mr. Barnett sustained an on-the-job back injury. He invoked his seniority rights and transferred to a less physically demanding mailroom position. However, two employees with more seniority also bid for the job. Mr. Barnett asked U.S. Airways to accommodate his disability-imposed limitations by making an exception that would allow him to remain in the mailroom. After initially allowing Mr. Barnett to work in the mailroom, U.S. Airways eventually decided not to make an exception to the seniority rules and terminated Mr. Barnett.

The Supreme Court found that if a requested accommodation conflicts with the rules of a seniority system then the accommodation is not “reasonable.”

3. Sutton et al.v. United Airlines, Inc., 527 U.S. 471, (1999).

Twin sisters with uncorrected visual acuity of 20/200 or worse, applied to a major commercial airline carrier for employment as commercial airline pilots but were rejected because they did not meet the airlines minimum requirement of uncorrected visual acuity of 20/100 or better. They filed an ADA claim. The District Court dismissed their complaint finding that the sisters were not actually disabled under the ADA because they could fully correct their visual impairments. The Tenth Circuit and the United States Supreme Court affirmed.

The Court relied heavily upon the point that the EEOC and the Justice Department have issued interpretive guidelines indicating that the determination whether an individual is substantially limited in a major life activity (working) must be made on a case-by-case basis “without regard to mitigating measures such as assistive or prosthetic devices.” Because the sisters in this case alleged that their vision was correctable to 20/20 the Court concluded that they are not disabled under the ADA. A key point in this case is that correctable conditions may not be protected under the ADA.

4. Toyota Motor Manufacturing, Ky., Inc. v. Williams, 534 U.S. 184, (2002).

A female employee of Toyota claimed she was disabled by carpal tunnel syndrome and related impairments and sued Toyota for failing to provide her with a reasonable accommodation under the ADA. The Supreme Court found that because she was not limited in “activities of daily living,” she was not disabled in terms of the ADA.

5. Murphy v. United Parcel Service, Inc., 527 U.S. 516, (1999).

United Parcel Service (UPS) hired Mr. Murphy as a mechanic, a position that required him to drive commercial vehicles. Despite his high blood pressure, he was erroneously granted a

commercial driver's license. After the error was discovered, UPS fired him. The Supreme Court found that because hypertension is treatable, the individual can function normally in everyday activities and thus is not disabled in terms of the ADA. UPS's termination of the employee was justified because of the employee's failure to meet the FMCSA regulations for commercial motor vehicle operators.

D.2 ADA Cases Involving Railroads

NOTE: These cases have not been "shepardized," but are illustrative of the kinds of medically-related claims that have been brought by railroad employees.

1. Poindexter v. Atchison, Topeka and Santa Fe Railroad Company, 914 F.Supp. 454 (D. Kansas 1996): Plaintiff, a clerk for defendant railroad, had been transferred to a different office to which she had to commute. Plaintiff began having anxiety attacks, was diagnosed with major depression, panic disorder agoraphobia and separation anxiety, and went on medical leave of absence. Plaintiff requested a transfer to the railroad's local office, which was refused by defendant. Although the railroad's medical board had initially approved the request, it later denied the request after consulting with the legal department. The issue before the District Court was whether the plaintiff was required to arbitrate her dispute with the railroad under the Railway Labor Act. The Court held that the ADA claim was independent of her rights under the collective bargaining agreement, permitting the employee to bring suit.
2. Poindexter v. Atchison, Topeka and Santa Fe Railroad Company, 168 F.3d 1228 (10th Cir. 1999): This case deals with the same facts and parties, after the plaintiff had won a jury verdict. The Court reversed and remanded the matter for a new trial, holding that the judge had erred by submitting to the jury the legal question of whether the claimed affliction is an impairment and whether the identified endeavor is a major life activity. The Court also held that the plaintiff must, but failed to, specifically plead or prove at trial the claimed impairments and major life activities.
3. Crown v. Union Pacific Railroad Company, 44 Fed.Appx 44; 2002 U.S.App. LEXIS 16581 (8th Cir. 2002): Plaintiff was a corridor manager supervising train dispatchers. He suffered a psychological breakdown, specifically, alcohol dependence and major depression. Although Union Pacific cleared him to work, he declined to return to work, claiming he needed some sort of accommodation. Plaintiff received short and then long-term disability payments, and when those expired in 1996 Union Pacific informed him he was not eligible for its health plan but could elect private coverage, which he did. In 1999 plaintiff was told by his doctor that he could return to work without restriction, but Union Pacific declined to give him a position. The Court held that it is irrelevant whether the plaintiff had been discharged in 1996 or in 1999, because the Court saw nothing illegal about the action of the railroad. Plaintiff did not contend he was a qualified person with a disability under the ADA, but claimed instead that the refusal to re-hire him was retaliatory for two earlier claims of discrimination. The Court found no evidence to support this claim.
4. Stoll v. C.P. Rail System, 2000 U.S.App. LEXIS 27953 (8th Cir. 2000): The plaintiff brought, among other claims, state and federal claims of disability discrimination against Soo Line Railroad. Although he is not disabled, the plaintiff alleged he was "regarded as" disabled, apparently due to his physical condition and history of injuries. Plaintiff's claim

failed because there was no evidence that the manager responsible for ending the plaintiff's employment had any knowledge of the plaintiff's physical condition or history of injuries.

5. Phillips v. Union Pacific Railroad Company, 216 F.3d 703 (8th Cir. 2000): The plaintiff brought various claims against her railroad employer, including a claim for handicap discrimination under the ADA. Plaintiff had been a personnel department stenographer when the railroad suspended her from active service pending medical clearance due to its concerns about her behavior, including threats to kill two co-workers, her history of psychological and substance abuse problems, and her occasional carrying of a gun. A psychiatrist who examined her at Union Pacific's request found that the plaintiff should not resume work until she received psychiatric treatment. The plaintiff eventually began treatment, but missed appointments and eventually stopped treatment altogether, without having achieved any of the stated goals. The plaintiff brought suit, alleging, among other things, that she had been discriminated against due to her psychological impairment. This claim was dismissed at the close of her case, pursuant to the District Court's allowance of defendant's motion for judgment as a matter of law. The Eighth Circuit affirmed, finding that the plaintiff had failed to show that she is a qualified individual.
6. Roelen v. Union Pacific Railroad, 1996 U.S.App. LEXIS 15677 (9th Cir. 1996): Plaintiff was terminated from his position as a hostler. He was barred from pursuing his claim due to his failure to timely file a charge of discrimination with the EEOC as a prerequisite to his ADA action. The court found there was no continuing violation after his termination, so that his termination was the most recent act.
7. Henzel v. Delaware Ostego Corporation, 285 F.Supp.2d 271 (N.D.N.Y. 2003): Plaintiff brought claims under the ADA and the New York Human Rights Law. Plaintiff was a diesel mechanic when he developed ulcerative colitis. He was out of work for a while, returned on a part-time basis for one month, then left again and did not return. He had two surgical procedures in 1999. The railroad disputed the plaintiff's contention that he was on unpaid leave. Following this, the railroad notified the plaintiff that his employment had been terminated due to a reduction in force, and his position had been completely eliminated. In 2000 the plaintiff had a surgical procedure that would have made him medically capable of working. The plaintiff conceded that he never requested any accommodation; he was not medically fit to return to work until the surgery in 2000; and he never told the railroad he was able to return to work. The Court found he had failed to show he was otherwise qualified, since he admitted he could not do his job at all, even with accommodation, until after the 2000 surgery, and the plaintiff does not dispute that at the time he was terminated in 1999 his position as a steam locomotive mechanic was eliminated. Moreover, plaintiff admitted he never requested an accommodation, and there was no accommodation that would have permitted him to do his job. Even if unpaid leave were to be considered an accommodation, there was no job to return to. Finally, plaintiff offered no evidence in support of his retaliation claim.
8. Valtierra v. Burlington Northern & Santa Fe Railroad Company, 2002 U.S.Dist. LEXIS 24472 (E.D. Ill. December 19, 2002): Plaintiff brought claims against his railroad employer for race and disability discrimination (ADA). Plaintiff was working as a switchman and brakeman, became a conductor in 1984, was working as a conductor in 1994 when he slipped and hurt his shoulder. He was on medical leave until 1997 when he was cleared for work as an engineer and entered the training program. He became concerned that he would not have

steady work because his seniority dated from 1997. After discussions with other employees he concluded that but for his injury he would have been trained in 1994 and promoted in 1995. Despite his requests, and his reliance on a letter of understanding, the railroad did not adjust his seniority position. Plaintiff brought suit in 1998. This suit was ultimately settled. In 2002 he filed an EEOC charge, and brought suit. The suit was dismissed based on the late filing of the EEOC charge, and based on res judicata, because the same claims were being brought as those settled in the prior suit, resulting in the dismissal of the earlier, identical claims, with prejudice.

9. Newberry v. Burlington Northern Santa Fe Railroad, 2002 U.S. Dist. LEXIS 6235 (D. Minn., March 29, 2002): Plaintiff was a machinist who suffered a lower back injury at work, returned to work, suffered a second back injury following which he returned to work again. He sought compensation by bringing a FELA claim. At about the same time, he was restricted to light-duty work, was given an assistant, and was permitted to work only 4-6 hours per day. The plaintiff decided that even light duty was too much for him, and stopped working. The FELA claims were tried to a jury, and the plaintiff's doctors testified that even with the accommodations provided by the defendant, the plaintiff could not perform the duties of a machinist. The plaintiff also testified that he could not work. He won the FELA action. Subsequently, the plaintiff sought reinstatement with the defendant. He also sought disability benefits, which were awarded to him. Before the defendant officially responded to the request for reinstatement, the plaintiff filed a charge of disability discrimination with the EEOC. This was subsequently dismissed. The plaintiff then filed an action alleging violations of the ADA and the Minnesota Human Rights Act. The Court held that the plaintiff was judicially estopped from bringing these claims. The Court found that at the earlier trial the plaintiff alleged he was completely unable to work, and he prevailed. The Court examined the Supreme Court case of Cleveland v. Policy Management Systems Corp., in which an employee was not judicially estopped from pursuing an ADA claim because she had applied for social security disability, where SSKE does not take reasonable accommodations into account. The Supreme Court held that the employee must be able to offer an explanation as to why her SSDI application is not inconsistent with her ADA allegations in order to avoid judicial estoppel. Here, the plaintiff failed to offer such an explanation.
10. Wilhelm v. CSX Transportation, Inc., 169 F.Supp.2d 755 (N.D. Ohio, 2001); *reversed and remanded*, 65 Fed.Appx. 973, 2003 U.S.App. LEXIS 10864 (6th Cir. 2003): The plaintiff, a locomotive engineer, was an asthmatic who brought suit under the FELA and the Ohio handicap discrimination act for the defendant's failure to enforce its no-smoking policy. The plaintiff alleged that despite the policy, and despite the plaintiff's complaints and a medical letter documenting his sensitivity to cigarette smoke, employees and supervisors smoked in the workplace. He claimed that he was ostracized as a result of his complaints. The defendant admitted that its practice was to tell the smoker to "put it out" on request. The District Court granted the defendant's motion for summary judgment. It found that, as to the FELA claim, the plaintiff had not provided the Court with sufficient evidence of the harmful effects of second hand smoke on others, and therefore had failed to show that second hand smoke created an unsafe work environment. As to the handicap discrimination claims, the Court found that the plaintiff had failed to show that the non-enforcement of the smoking ban was caused by the plaintiff's handicap. Further, the Court found that the ostracism he suffered was not an adverse employment action, having failed to show that they rose to the

level of a material change in the terms and conditions of his employment. On appeal, the Court reversed and remanded with respect to the FELA claim, finding that the plaintiff had offered evidence that he was exposed to second hand smoke almost daily; that this exposure triggered asthma attacks; that the defendant knew about this; and that the defendant had enacted the no-smoking policy out of concern for the health of non-smokers.

11. Felix v. New York City Transit Authority, 154 F.Supp.2d 640 (S.D.N.Y. 2001): The plaintiff (who died while the action was pending and was represented by her Estate) was a railroad clerk working in a subway station. She developed post traumatic stress disorder and a serious sleep disturbance following the firebombing of a token booth where she had been scheduled to work. The plaintiff was evaluated, and found to be unable to do subway work. The plaintiff was put on a “restricted work, temporary” status, later changed to “no work, temporary.” The plaintiff was terminated under a provision in the Civil Service law authorizing the defendant to terminate a civil service employee who, for medical reasons, is unable to work after a year’s absence. The plaintiff was twice informed by letter that the defendant was intending to terminate her, but neither letter informed her about the right to challenge a medical “no work” determination. The plaintiff did ask her union to file a grievance contesting the denial of work and requesting reasonable accommodation. This was denied, a step II hearing was held, and appeal of the denial was dismissed. The plaintiff brought a claim under the ADA alleging that the defendant should have transferred her to a different position. The Court held that the plaintiff’s application for (and award of) SSDI benefits did not preclude her from pursuing her ADA claim, as there were explanations for her apparently contradictory positions. Thus, a jury should be permitted to decide whether the claim of total disability to the Social Security Administration should preclude the ADA claims. The Court also found that the plaintiff’s PTSD was an impairment that interfered with sleep, a major life activity. After some discussion of whether the requested transfers were reasonable accommodations, the Court found that the plaintiff had failed to show a causal connection between her PTSD, which limited her ability to sleep, and the reasonable accommodation sought. The Court found that the plaintiff’s sleep problems did not impair her ability to work, nor was any accommodation of her sleep problem sought.
12. Swierkowski v. Consolidated Rail Corporation, 168 F.Supp.2d 389 (E.D.Pa., 2001): Plaintiff suffered from scoliosis. In 1993 he transferred from the clerical craft to the trainman craft, which encompasses a variety of positions, some requiring heavy duty, some light duty. Plaintiff began training as a brakeman/conductor, but found that the duties caused him back pain. He was examined by several doctors, all of whom concluded that the plaintiff could not return to work as a brakeman/conductor. The plaintiff was medically disqualified from all but sedentary trainman jobs. After turning down a number of positions that were too far from his home, he eventually returned to work as a switch tender. Plaintiff brought an action pursuant to ADA and the Rehabilitation Act, claiming that he had not been notified of other suitable positions that became available at an earlier point in time. The ADA claims were dismissed for failure to exhaust administrative remedies. The Court held that the plaintiff was not barred by the statute of limitations. The Court held that the plaintiff had presented sufficient evidence to support his claim that he is unable to perform a broad range of jobs and that he had presented sufficient demographic evidence. Thus, he had met his burden of presenting evidence of a disability substantially limiting the major life activity of working. The Court also found there as a genuine issue of material fact as to whether plaintiff was a qualified individual.

13. Lapinsky v. Amtrak Commuter Services Corp., 2001 U.S.Dist.LEXIS 2174, 11 Am. Disabilities Cas. (BNA) 1092 (E.D.Pa. February 28, 2001): The plaintiff had nerve damage stemming from a car accident. She alleged that Amtrak discriminated against her based on the perception that she was disabled, and that her union discriminated against her and also breached its fiduciary duty by failing to waive a typing test. The Court held that the plaintiff had raised a genuine issue of material fact with respect to whether Amtrak regarded her as being disabled. While she did not raise a genuine issue of material fact with regard to whether the Union regarded her as disabled, she did raise a genuine issue of material fact as to whether she is substantially limited in the major life activity of performing manual tasks, and whether she is a qualified individual with a disability. She also presented evidence in support of her claim that Amtrak knew of her disability and her desire for reasonable accommodation, and that Amtrak failed to make a good faith effort to reasonably accommodate her. Finally, the fair representation claim was barred by the statute of limitations.
14. Kellogg v. Union Pacific Railroad Company, 2000 U.S.Dist. LEXIS 734 (D.Nebraska, January 28, 2000): The plaintiff was a senior Manager of Intermodal Service Delivery, a high-stress job with long hours. He suffered a panic attack at work, and was diagnosed with major depression and anxiety. After treatment he was released to return to work, but was restricted to a 40-hour week during daylight hours. This accommodation was made for one month, following which the plaintiff took some time off for the adjustment of his medications. When he sought to return to work he was refused. The plaintiff filed a charge with the Nebraska Equal Opportunity Commission for violation of the ADA. The NEOC issued a right-to-sue letter. The Court found that the 40-hour-daylight limitation was not sufficient to find a “disability” under the ADA. The Court also found that there was no evidence the defendant considered the plaintiff to be “disabled”.
15. Cain v. Union Pacific Railroad Company, 1999 U.S.Dist. LEXIS 20174 (N.D.Ill., December 29, 1999): Plaintiff worked in a position where he could be called to work as either a conductor or an engineer. He was diagnosed with sleep apnea. When he reported this to the defendant he was pulled from all duty. He sued under the ADA alleging that he should have been permitted to work as a conductor only. The defendant argued that this would have infringed on the collective bargaining agreement (CBA). The parties each interpreted the CBA differently with respect to whether it permitted an employee to take only conductor jobs if he or she is unable to work as an engineer due to disability. The Court held that the interpretation of the CBA is a “minor dispute” for which arbitration is required under the Railway Labor Act, and therefore the Court lacked jurisdiction.
16. Donahue v. Consolidated Rail Corporation, 52 F.Supp.2d 476 (E.D.Pa., 1999): (See also 224 F.3d 1083, copied separately). The plaintiff, a conductor, alleged that the defendant had discriminated against him by failing to transfer him to a different position when his heart condition made him unable to perform his job as a conductor. Although the plaintiff had initially been cleared for work as a conductor, it became clear that this would be dangerous for him and for others as he was likely to pass out. Indeed, he passed out while walking down the track. He attempted to obtain a job as a road foreman or a dispatcher, but there were no jobs available. Plaintiff applied for disability benefits. That application did not estop him from asserting the ADA claim because the statements in his application were consistent with his position that he could have performed some other job. The Court also

found that plaintiff submitted enough evidence to support his claim of disability, and that he was substantially limited in the major life activity of working. The Court found there was at least a jury question as to whether the defendant made a good faith effort to accommodate him. However, the plaintiff did not show that he could have been accommodated but for the defendant's lack of good faith because he failed to show there was any vacant job available for him. Therefore, his claim was dismissed (defendant's motion for summary judgment allowed).

17. Ricciardi v. Consolidated Rail Corporation, 1999 U.S.Dist.LEXIS 1232 (E.D.Pa. February 5, 1999): The plaintiff was employed in defendant's safety department. In 1996 he suffered an injury at work, and brought a suit pursuant to the FELA, for which he recovered a favorable verdict. He then brought suit for, among other things, a claim under the ADA. The defendant moved to dismiss. The Court dismissed the wrongful discharge claims on the grounds that Pennsylvania recognizes such claims only when made by at-will employees, and because it should have been arbitrated under the Railway Labor Act. The Court also found that, although the plaintiff's EEOC charge was untimely, equitable tolling was warranted because the EEOC had allegedly lost the timely-filed charge.
18. Williams v. Northeast Illinois Regional Commuter Railroad Corporation, 1998 U.S.Dist.LEXIS 20013 (N.D.Ill., December 16, 1998): The plaintiff was a ticket sales clerk who was disabled by alcoholism. Nevertheless, he was able to perform his job duties with or without reasonable accommodation. The plaintiff alleged he was harassed and discriminated against due to race. After complaining about this, the plaintiff was suspended for 20 days without pay. At the end of the suspension it was recommended that the plaintiff meet with the Employee Assistance Program for help with his alcoholism. The plaintiff took a day off to seek treatment, and received an excuse letter from the medical center that was deemed inadequate (it referred only to "general medical treatment." Ultimately, the defendant conducted an investigative hearing that resulted in the plaintiff's termination. The Union appealed the discharge. The plaintiff also filed a charge of discrimination with the EEOC. The plaintiff was reinstated on the condition he submit to alcohol and drug screening tests. In 1997 the plaintiff arrived at work before his shift began and was asked to take the tests, but stated he had an appointment with his counsel, and agreed to be tested when he returned to work at the beginning of his shift. The plaintiff was terminated for allegedly failing to comply with the conditions of the reinstatement agreement. He brought suit pursuant to the ADA, and for racial discrimination. The defendant's motion to dismiss the racial discrimination charges was denied; the ADA claim was not discussed.
19. Mandichak v. Consolidated Rail Corporation, 1998 U.S.Dist.LEXIS 23005 (W.D.Pa., August 20, 1998): Various plaintiffs certified as a class brought claims against the defendant for violations of the ADA, the Rehabilitation Act, and the Pennsylvania Human Relations Act. There were two classes: applicants for employment who were administered medical examinations or inquiries prior to defendant making a job offer, and current and former employees and applicants who received offers of employment but were denied employment or other benefits because of their disabilities. The Court found that the plaintiffs had failed to establish a prima facie case of violation of the ADA. This case is interesting for the process Conrail had in place under its collective bargaining agreements for the evaluation of employees' medical fitness. The agreements contained a "Board of Doctors Rule" which provided a mechanism for employees who have been disqualified for physical reasons can

get a binding decision from a team comprised of his doctor, a doctor designated by Conrail, and a third doctor chosen by the first two. Conrail must honor an employee's invocation of the Board of Doctor's Rule. Conrail relies on "fee for service" doctors to do medical examinations and evaluations for a variety of purposes. The fee for service doctor receives an instruction sheet with a description of the essential functions of the job and the examination components. The fee for service doctor can evaluate the employee as: 1) qualified; 2) qualified with an accommodation; 3) deferred to Conrail medical; or 4) disqualified. Only if the fee for service doctor finds that the employee fails to meet regulatory requirements or there is an immanent risk of harm may the doctor disqualify the employee from further work. When the fee-for service doctor finds an employee should be deferred or disqualified the Conrail medical department becomes involved, and attempts, with the employee's doctor and his supervisor, to understand the nature of the medical restriction and what accommodation is necessary. If the medical department cannot reach an accommodation, then the Manager of Vocational Rehabilitation is involved. The employee then fills out an "ADA form" developed by the Manager. The Manager then tries to determine a reasonable accommodation. If he is unable to convince a supervisor to accept his recommendation, the matter is taken up by the ADA Committee, made up of representatives from the medical, labor relations, human resources, claims, legal, and the particular operating departments. According to Conrail, very few cases get that far.

20. Gustafson v. Burlington Northern Santa Fe Railroad Company, 1998 U.S.Dist.LEXIS 15977 (D.Nebraska, July 31, 1998): The plaintiff was a carman who sustained several back injuries while at work. He was removed from duty and placed on sick leave based on the employer's claim that his injuries and work created a hazard to both the plaintiff and to his coworkers, even though there had been no complaints about his ability to do the work. The plaintiff's doctor advised the defendant that he could return to work with certain restrictions, such as no bending, stooping, prolonged standing, walking, excessive flexion or rotation of the spine. The defendant did not tell the plaintiff whether he could return to work, so plaintiff filed a grievance with his union. The plaintiff filed suit pursuant to the FELA, alleging his back injuries were permanent, and received an award. Subsequently, he underwent back surgery, and was cleared for work with no restrictions. The defendant denied his request to return to work, and plaintiff brought suit pursuant to the ADA. The Court found that the plaintiff's claims were not preempted by the Railway Labor Act, nor was his claim barred by equitable estoppel. It also found that he had presented sufficient evidence that the defendant perceived him as having a disability to withstand defendant's motion for summary judgment.
21. Adler v. I&M Rail Link, L.L.C., 13 F.Supp.2d 912 (N.D.Iowa, 1998): The plaintiffs were all railroad track workers who had been employed by co-defendant Soo Line Railroad Company. When I & M bought 1100 miles of track from Soo Line, they were not re-hired by I & M, even though most of Soo Line's employees had been re-hired. The Track workers alleged that they had been asked by I & M about whether they had physical problems or disabilities, had been injured on the job or made any claims for on-the job injuries, and whether they had filed union claims or grievances. They also alleged that Soo Line had provided I&M with information about each plaintiff's history of union activity, medical conditions, work related injuries and claims for work related injuries, and disabilities. They brought various claims against the defendants, including claims under the ADA. The Court wrote a lengthy and detailed opinion discussing the defendants' motions to dismiss the plaintiffs' various claims. As to the ADA claims, the Court analyzed the provisions of the

ADA that restrict inquiry into whether a job applicant has a disability. The Court concluded that the track workers can state a claim for per se violation of these provisions only if they can also state a claim that they are disabled. The Court found that while they had not sufficiently pleaded disability, they did (barely) adequately allege perceived disability. The Court dismissed the ADA claim but permitted the plaintiffs to replead the disability and perceived disability elements of that claim.

22. EEOC v. Union Pacific Railroad, 1997 U.S. Dist. LEXIS 22182 (D. Idaho, October 24, 1997): The plaintiff filed an ADA claim challenging the defendant's decision to bar an employee from driving vehicles because he has only one eye. The employee had passed a physical examination at the beginning of his employment, including an eye examination. In 1994 he began working as a utility clerk, spending about 90% of his time driving company vehicles. Later that year he was involved in an accident while driving a company vehicle. At first he was told that the only consequence would be the issuance of a disciplinary notice, but he was subsequently suspended from work pending an examination by an ophthalmologist. Although the ophthalmologist concluded that the employee's vision was within legal driving abilities, the defendant's assistant director of occupational medical services decided that his inadequate visual field posed a direct threat of causing another accident, and barred him from driving based on his interpretation of the defendant's medical rules, the fact he had less than typical vision, the occurrence of the accident, and the ophthalmologist's report. The parties made cross motions for summary judgment. The Court concluded that the employee has a disability, or, alternatively, was regarded by the defendant as having a disability; that the employee can perform the essential functions of the job with or without reasonable accommodation; that there is no evidence of any investigation as to whether the employee's loss of eyesight contributed to the accident. (see 6 F.Supp.2d 1135 (D.Idaho 1998), copied separately)
23. Stevo v. CSX Transportation, Inc., 1997 U.S. Dist. LEXIS 16781 (N.D.Ill., October 23, 1997): The plaintiff, who was a switchman, and who had been engaged in yard work, suffered a herniated disk in 1991. He filed suit pursuant to the FELA. Although he was told on numerous occasions that he was free to return to work without restriction, the plaintiff declined to do so, fearing re-injury. In 1992 he was diagnosed as having degenerative lumbar spine disease with early stenosis, and, after treatment, was cleared to return to light duty, with instructions to increase activity over time. The defendant attempted to place the plaintiff in various positions, and to refer him to a vocational rehabilitation specialist, but he declined. In 1994 the plaintiff attempted to access the defendant's computer to check for job openings, but was denied permission because he had filed an FELA suit. In 1995 and 1996 the defendant continued to contact the plaintiff with reference to job placements, but the plaintiff was interested in sales and marketing positions. He also expressed interest in having the defendant sponsor his attendance at an MBA program. He eventually brought suit under the ADA, alleging that the defendant had discriminated against him based on his disability by restricting his access to the computer and failing to reasonably accommodate him, and claiming retaliation for having filed an ADA claim by refusing to hire him as an account executive or sponsoring him in the MBA program. The defendant moved for summary judgment. The Court held that the plaintiff had failed to show he was disabled; that the defendant had initiated the interactive process required by the ADA; that the plaintiff had failed to show he was a qualified individual; that the plaintiff failed to show that the had

suffered a materially adverse change in the terms or conditions of his employment; and that the plaintiff had failed to establish retaliation.

24. Amariglio v. National Railroad Passenger Corporation, 941 F.Supp. 173 (D.C.Cir., 1996): Plaintiff was a train attendant on coaches and sleeping cars. Following a suspension, the plaintiff was directed to report for a physical examination. The doctor concluded that the plaintiff had poorly controlled diabetes, and should not return to his former duties, but should work at a job with more regular hours. The defendant permits diabetics to work as train attendants so long as their diabetes is under control. Based on the medical reports, the defendant advised the plaintiff he was medically disqualified from work. Under the defendant's rules, a medically disqualified employee may seek to have the disqualification lifted by submitting documentation from his treating physician showing that his condition has improved. The defendant then arranges for a specialist to examine the employee, and if the examination confirms the improvement, the disqualification is lifted. The plaintiff never submitted a letter showing improvement, although the defendant attempted to obtain one by contacting the plaintiff's doctor and the plaintiff. The plaintiff filed a charge with the EEOC, alleging a violation of the ADA, alleging the defendant had discriminated against him by requiring fitness for duty examinations. The EEOC dismissed the complaint, and plaintiff filed suit. The Court allowed defendant's motion for summary judgment, finding that the defendant's conclusion that plaintiff's diabetes was not under control was reasonable. The Court also found that the defendant had met its duty to reasonably accommodate plaintiff by informing plaintiff of the procedures by which he could apply for a transfer or reassignment to a position with regular hours. Plaintiff did not apply for the transfer or reassignment.
25. Terry v. Norfolk Southern Railway Company, 948 F.Supp.1058 (N.D.Georgia, 1996): The plaintiff was a shop laborer, then a conductor who, by 1982, had been injured on the job three times, requiring multiple surgeries on his knee and the insertion of rods into his back. After the implantation of the rods the plaintiff received medical disability benefits. The plaintiff also received social security disability benefits, and represented that he usually needed help even to put on his shoes. The plaintiff was taking Percocet. A collective bargaining agreement provided that an employee who has been medically disqualified may return to work if improvement is verified in writing by a doctor and the employee is examined by a physician on behalf of the defendant. If the disqualification is affirmed the employee may notify the union and provide further written verification from his own doctor, and is also entitled to a three-doctor panel review. In 1989 the plaintiff sought to return to work, but the disqualification was affirmed, and plaintiff's request for the three-doctor panel was denied. The defendant felt that the implanted rods were a prosthetic, and as such the plaintiff failed to meet defendant's minimum medical standards for conductors. The plaintiff initiated the arbitration procedures mandated by the Railway Labor Act. The Public Law Board found that the defendant failed to meet minimum medical standards. The plaintiff then filed a complaint with the Office of Federal Contract Compliance, alleging violation of the Rehabilitation Act. The OFCCP concluded that the defendant had not violated the Rehabilitation Act. Plaintiff filed a charge of discrimination with the EEOC alleging violations of the ADA. The EEOC found for the defendant, and the defendant brought this action. The Court found the plaintiff was estopped from claiming he is a qualified individual with a disability. (But see Cleveland v. Policy Mgt. Syst. Corp., 526 U.S. 795, 119 S.Ct. 1597 (1999)).

26. Malascalza v. National Railroad Passenger Corporation, 1996 U.S. Dist. LEXIS 4198 (D. Del., March 12, 1996): This plaintiff, a car repairman, had been injured (apparently suffering some sort of back injury) and brought a claim under the FELA. As part of that claim, plaintiff's doctors testified he was disabled from working as a car repairman. The plaintiff and defendant settled that claim. The dispute arose over whether the settlement agreement provided that plaintiff be employed as a coach cleaner only, or whether the defendant might still be required to employ him in some other position, for example, by making a reasonable accommodation for him as a car repairman, his former position. The Court held that the settlement agreement did limit the defendant's obligation to employing plaintiff as a coach cleaner, using the principles of judicial estoppel.
27. Marschand v. Norfolk and Western Railway Company, 876 F.Supp. 1528 (N.D. Indiana, 1995); aff'd, 81 F.3d 714 (1996): Plaintiff was an engineer, and was the engineer of a train involved in an accident in which the train he was operating hit a pick-up truck, killing all three passengers. Although the plaintiff seemed fine, on the one-year anniversary of the accident he suffered a mental breakdown, and was diagnosed with Post Traumatic Stress Disorder. Thereafter, the plaintiff requested a return to work, and his doctor opined he could return to custodial or clerical duties. The defendant's chief clerk determined a clerical position was open, and referred the plaintiff for a fitness evaluation. The doctor affirmed that he could work as a yard clerk, and the plaintiff was given medical clearance. However, the plaintiff was unable to pass the required typing test, although he tried several times. The defendant, realizing that the plaintiff might never pass the test, referred the matter to the defendant's System Manager for Disability Support Services. The plaintiff filed a charge with the EEOC, alleging that he had been discriminated against in violation of the ADA. The defendant then contacted plaintiff's counsel, offering to pay for a typing class, and offering to find some other kind of position if the plaintiff would submit to aptitude testing. The plaintiff took the typing class, but could not pass the test. The railroad then waived the typing test, and offered a position to the plaintiff which plaintiff accepted. The Court allowed defendant's motion for partial summary judgment on plaintiff's FELA claim, finding that the plaintiff could only recover for that emotional distress caused by fear for his own safety in the accident. The court found that the plaintiff failed to make out a colorable ADA claim.
28. Jones v. Illinois Central Railroad Company, 859 F.Supp. 1144 (N.D. Ill., 1994): The plaintiff brought a claim under the ADA alleging the defendant had refused to accommodate his work-related shoulder injury. The plaintiff also brought an FELA claim in state court. The Court dismissed the ADA claim, holding that it should be heard with the FELA claim in state court.
29. Julian v. New York City Transit Authority, 857 F.Supp. 242 (E.D.N.Y. 1994): The plaintiff was a railroad clerk who was promoted to train operator. She injured her back while training for her new job, and did not return to work. The Transit Authority medical services department found her permanently disabled from performing the duties of a train operator. The plaintiff received workers' compensation benefits, and applied for accident disability retirement. Ultimately, the plaintiff's application was denied, but through a bureaucratic mix-up she was denied her appeal rights. The plaintiff hired an attorney, who secured a stipulation from the defendant to reinstate plaintiff so that she could file an application for disability retirement and accident disability retirement benefits. These were denied, and the

plaintiff filed an action in state court, claiming the defendant had failed to abide by the agreement. The state court found they had complied. The plaintiff then filed this action against myriad defendants, claiming employment discrimination based on race, gender, age, marital status and disability. The Court dismissed all of the plaintiff's claims, finding, among other things, that she had failed to file a complaint with the EEOC, as required prior to bringing a Title VII action.

30. Verdon v. Consolidated Rail Corporation, 828 F.Supp. 1129 (S.D.N.Y. 1993): The plaintiff worked as a trainman when he claimed that he took a medical leave of absence starting in 1978, in order to obtain drug treatment. While he was absent, his employer, Conrail, was relieved of its responsibility to provide commuter rail service, and the commuter line for which plaintiff allegedly worked was transferred to Metro-North. An implementation agreement was put in place providing for seniority rights and procedures for employees who were on disability or other leave when the commuter service was transferred to Metro-North. In 1986 plaintiff claimed to have been fully rehabilitated, and claimed to be ready to return to work. The dispute arose when the plaintiff attempted to obtain the position of assistant conductor (roughly equivalent to his former position of trainman) at Metro-North pursuant to the implementation agreement. Apparently, Conrail did not have full documentation of the plaintiff's position and status with Conrail. The plaintiff brought suit for violation of his rights under the implementation agreement and under §1145 of the NRSA, and for violation of his constitutional rights pursuant to 42 U.S.C. §1983 and the Fourteenth Amendment. The Court dismissed all of the plaintiff's claims, finding, among other things, that the Court lacked jurisdiction over the claims arising under the implementation agreement and NRSA, that the defendant had not deprived plaintiff of due process, and that the §1983 claims are time-barred. Further, plaintiff's attempt to add an ADA claim and a claim under the New York Human Rights Act was denied where the ADA did not come into effect until after the events complained of, and the human Rights Law claim was time barred. Interestingly, the Court imposed Rule 11 sanctions on plaintiff's attorney.
31. Sizemore v. Consolidated Rail Corporation, 56 Fed.Appx. 582, 2003 U.S.App.LEXIS 952 (3rd Cir., January 16, 2003): Plaintiff worked as a yardmaster and as acting trainmaster, a position of greater responsibility. Plaintiff suffered from a hearing impairment corrected by hearing aids. He alleged that the defendant did not hire him for a permanent position as trainmaster because it regarded him as disabled. Plaintiff's ADA claim failed because he did not produce evidence showing that defendant's employment decisions were based on a perceived disability.
32. Payne v. Consolidated Rail Corporation, 2000 U.S.Dist.LEXIS 1488 (E.D.Pa., February 10, 2000): Plaintiff was an engineer. Periodic hearing examinations showed he had suffered a high frequency hearing loss, and plaintiff was told to wear a hearing protector. Following a complaint that plaintiff could not hear, plaintiff was sent home, and was then required to report to the head of defendant's hearing program. The head of the hearing program cleared him to return to work. The trainmaster was present at this meeting, and told the superintendent that plaintiff had been cleared for work. Nevertheless, the trainman reported that the superintendent had instructed him to get rid of the plaintiff, and plaintiff was told to leave. The plaintiff brought suit pursuant to the ADA and the Rehabilitation Act. The plaintiff, who had been a member of a class action that was subsequently decertified, had never filed a charge of discrimination with the EEOC or any other administrative agency.

The Court found that the plaintiff did not have to exhaust his administrative remedies under the Rehabilitation Act, but that his ADA claim was precluded.

33. D'Amato v Long Island Railroad Co., 2001 U.S.Dist.Lexis 6768 (S.D.N.Y., May 23, 2001): In 1996 the plaintiff suffered from smoke inhalation while working on one of defendant's trains, exacerbating plaintiff's preexisting health problems. He also suffered a heart attack, and alleged that, as a result, he was limited with regard to walking, standing, and lifting. He alleged the defendant failed to accommodate his request to be transferred to a sedentary position. Plaintiff had been an assistant conductor. All assistant conductors were required to pass a series of tests. Upon passing, they were promoted to full conductor, but after repeated failures they were terminated. Plaintiff was unable to pass one of the tests. Prior to being notified of his termination, plaintiff requested the health-related transfer. The defendant informed the plaintiff that due to his less than satisfactory service record, he would not be considered for another position. Plaintiff filed a complaint with the EEOC and brought suit under the ADA. The Court held that the claim was not preempted by the Railway Labor Act, and that there was a genuine issue of material fact as to whether plaintiff had a disability and was otherwise qualified.
34. Cade v. Consolidated Rail Corporation, 2002 U.S.Dist.LEXIS 8131; 13 Am. Disabilities Cas. (BNA) 1684 (E.D.Pa., May 7, 2002): The plaintiff alleged that the defendant discriminated against her in violation of the ADA and the Rehabilitation Act. Plaintiff alleged defendant refused to return her to her former job as a block operator, or to reasonably accommodate her right knee condition and astigmatism in her left eye. As a result of two knee injuries suffered at work plaintiff stopped working because climbing the block tower stairs aggravated her knee. Plaintiff filed an FELA action during which she testified that she could not climb stairs, but could work in some other capacity. The FELA claim was settled. Plaintiff's condition improved to the point where she could climb stairs, but not frequently. Plaintiff notified the defendant that she wanted to return to work as a block operator. She was seen for a back to work physical. Although the doctor essentially cleared her for work, plaintiff did not return to work (plaintiff claimed she notified defendant of her desire to return to work, but received no response). Defendant was terminated. The Court found that plaintiff was not disabled, nor did Conrail regard her as being disabled, and granted defendant's motion for summary judgment.
35. McCuin v. The Burlington Northern And Santa Fe Railway Company, 2002 U.S.Dist.LEXIS 24021 (N.D.Tx, December 11, 2002): The plaintiff, a carman and forklift operator, fainted while at work. The defendant told him he was being withheld from service pending medical evaluation. A medical evaluation indicated that he could return to full work status, but with certain permanent restrictions. The defendant's field manager of clinical and rehabilitation services had some questions about the doctor's letter, and received a further note with a cardiology evaluation. Despite further requests for information, the doctor did not send further information to the defendant. Eventually, the plaintiff sent test results to the defendant, and he was cleared to return to work, although he had not done so. Plaintiff's claims for wrongful termination and breach of the labor agreement were preempted by the Railroad Labor Act, and there was no evidence that plaintiff's race, age, or perceived disability played a role in the defendant's delay in allowing plaintiff to return to work.
36. Johnson v. Norfolk Southern Corporation, 2003 U.S.Dist.LEXIS 4674 (N.D.Ill., March 25, 2003): The plaintiff was a locomotive engineer who began suffering from knee pain, causing

difficulty with walking, and making it difficult for him to fully straighten his leg. The plaintiff went to the Union Health Service complaining of the pain. The doctor told him to take 3 days off from work. When he tried to return to work the trainmaster told him that he needed a release from his doctor. He was examined, and although he was observed to be limping, the doctor released him for work based on his statement that his job entailed sitting “on my rump” all day. The plaintiff returned to work, but was observed having problems walking. The Occupational Health Nurse said he should have a physical examination, as his job required walking on uneven terrain and climbing into the locomotive. The Assistant Superintendent interpreted this instruction to mean that the plaintiff could not work until after he had the examination, and held him out of service. The plaintiff was examined and released to perform the essential functions of an engineer. At a meeting between the plaintiff and the Superintendent during which the plaintiff sought pay for the days he was out of service, the Superintendent noticed his limp, and took him out of service, citing safety concerns. The plaintiff was put on “medical hold” pending a determination of his fitness for duty. Ultimately, the plaintiff’s doctor signed a note that he could return to work, but the defendant was not sure the doctor knew the essential duties of the work. After further delays regarding the obtaining of records, the plaintiff was cleared for work, although he was not paid for the time he was on medical hold. The Court found that the plaintiff was unable to demonstrate an actual disability (the impairment was too minor and temporary), nor was there evidence that he was regarded as disabled, and summary judgment was entered against him.

37. Lundberg v. Burlington Northern and Santa Fe Railway, 2003 U.S.Dist.LEXIS 10393 (D.Minn., June 17, 2003): The plaintiff was a trainman/yardman who suffered three work-related injuries: a hernia, corrected by surgery, and two reinjuries. After the third injury the plaintiff no longer worked as a switchman because she could not ride on rail cars or throw track switches. Plaintiff trained to work as a hump foreman, a desk job, and as a switch tender. In 1995 plaintiff brought an FELA claim, that was settled in 1996. In 2000 the plaintiff underwent surgery to repair a ruptured bowel, and was placed on a 30-pound lifting restriction. Plaintiff sought to go on the switchperson’s extra board, which is comprised of five positions. The purpose of the extra board was to cover openings in the core jobs of switchperson and switch foreman, which comprised 80% of the positions filled by the extra board. The extra board also filled positions of hostler, switch tender and hump foreman. Defendant did not permit her onto the extra board because she could not perform these core jobs. Plaintiff filed a charge with the EEOC, which determined that the defendant’s policies violated the ADA. Plaintiff was allowed to work on the extra board until 2002. At some point she was informed that her pay would be cut so that she no longer received guaranteed pay for days when she could not perform a job due to her physical restrictions. Plaintiff brought suit under the ADA and the Minnesota Human rights Act, and also sought rescission of the FELA settlement agreement. The Court found that the lifting restriction and hernia were temporary, and were not a disability, and dismissed the disability claims. The Court also dismissed her claim of mutual mistake with reference to the settlement agreement.
38. Rodgers v. Norfolk Southern Corporation, 304 F.Supp.2d 961 (S.D.Ohio, 2003): Plaintiff was a locomotive engineer, classified as an “extra board” engineer, meaning that he was on call to cover for regular engineers. Plaintiff was diagnosed with Hepatitis C in 1999, and began a medical leave. Plaintiff’s doctor noted that plaintiff’s condition causes fatigue, and that he should be permitted to rest between eight hour runs for a period of 8-12 hours.

Plaintiff was also diagnosed with rheumatoid arthritis. Plaintiff was cleared for work, limited one trip with time off between trips. Defendant informed plaintiff that it could not accommodate her, and told her to update her information when her doctor releases her without restrictions. She was later told to obtain a work release indicating any restrictions. Extra board engineers are required to conduct runs that regularly exceed eight hours. Plaintiff filed a timely EEOC charge. The Court found that plaintiff did have a physical impairment under the ADA, but that there was no evidence that the impairment disqualified her from a broad class of similar jobs, and so she was not limited in the major life activity of working. The court also found that plaintiff was not regarded as substantially limited in her ability to perform a broad range of jobs. Her claim was dismissed.

39. Eckhaus v. Consolidated Rail Corporation, 2003 U.S.Dist.LEXIS 25045 (D.N.J., December 24, 2003): Plaintiff applied for a job as a train person. The duties of a train person include relaying oral and written instructions, communicating signals to co-workers, and recognizing audible signals or warnings. Plaintiff received an offer, and underwent a pre-employment medical examination. At the examination, plaintiff was found to have a hearing deficit, and hearing aids were recommended. Initially, plaintiff did not obtain the hearing aids because she thought she had passed the exam. Plaintiff was sent to a three-week training program, which she attended, and passed the final exam. During the training course plaintiff was told that her medical records appeared to be under review. Plaintiff provided the defendant with some audio test results, and was informed by defendant that she needed to be fitted with hearing aids and retested. Plaintiff obtained the hearing aids, and was found to hear well when they were in place. She was found qualified to work as a train person with three restrictions: she had to wear a hearing aid; she had to wear an electronic headset when near a moving train; she should avoid exposure to noises over 80 decibels when wearing her hearing aid. Plaintiff reported for work. Her new supervisor observed that she seemed to have trouble hearing and understanding him, and conducted a field test. The supervisor had her listen to the kind of portable radio equipment used by train persons, and asked plaintiff to repeat back what she heard. Based on that field test, the supervisor informed her that her employment was terminated. Plaintiff claimed that defendant ignored her requests for assignment to another position. Plaintiff filed claims with the EEOC and the N.J. Division of Civil Rights. She then brought suit against the railroad and her supervisor under the ADA, and also for age discrimination (ADEA) and for intentional infliction of emotional distress. The Court dismissed her claims, finding that, both with and without the hearing aids, she was not disabled under the ADA, that she had failed to show that either defendant regarded her as being substantially limited in one or more major life activities, and failed to show defendant had failed to accommodate her. The Court also found that the plaintiff could not bring suit against the individual supervisor under the ADA or the ADEA because he was not an “employer,” and she failed to show sufficiently extreme conduct to sustain her suit for intentional infliction of emotional distress.
40. Smith v. Union Pacific Railroad, 2004 U.S.Dist.LEXIS 2101 (N.D.Ill., February 5, 2004): The plaintiff, who had been furloughed, accepted a transfer to a position as a conductor/brakeman in a different seniority district. The plaintiff had an undisclosed history of depression. After beginning work there as a trainee, the plaintiff began to miss days of work, and then stopped reporting altogether. A manager of Manpower Planning called his home and left a message for the plaintiff to call him regarding his status, but plaintiff claimed never to have received the message. The plaintiff was marked “EA,” meaning “evading

assignment,” pending some communication from the plaintiff. The plaintiff eventually called a representative of the Union Employee Assistance Program. The plaintiff told the Representative that he was suffering from depression, was being treated, and needed information about how to take time off from work. The Representative told him he needed to contact a local manager and to contact his service unit (the plaintiff did not want the Union’s EAP to open a file on him). The plaintiff then sent a letter to the General Superintendent of his unit, informing him that he should not be marked “EA” because he was out sick, and was undergoing treatment. Several months later, the plaintiff’s therapist sent a letter to the union representative, informing him that the plaintiff was experiencing a major depressive episode, and that he could not work, although he was currently functioning well, but might need additional time off. The Representative did not understand this to be a request for accommodation. The plaintiff was eventually terminated. The plaintiff wrote a letter challenging the termination, and then brought suit under the ADA. The Court concluded that the plaintiff did suffer a mental impairment and that there was a genuine issue of material fact as to whether it substantially limited a major life activity. However, the Court found that he was not a qualified individual under the ADA, and allowed the defendant’s motion for summary judgment.

41. Roberts v. Union Pacific Railroad Company, 16 Fed.Appx. 730, 2001 U.S.App.LEXIS 17990 (9th Cir., August 6, 2001): Plaintiff was discharged for theft. After his discharge he was diagnosed with diabetes, hypoglycemia, high blood pressure, and poor impulse control. He was also diagnosed as having suffered a series of small strokes. Plaintiff sought long-term disability benefits and vacation pay, claiming he was disabled prior to his termination. While the past due vacation pay was ultimately paid, the plaintiff brought suit for breach of contract and discrimination under the ADA. The District Court granted summary judgment on the grounds that he had failed to exhaust administrative remedies, and had failed to show disability discrimination. The Court of Appeals affirmed, finding that the defendant did not act arbitrarily or capriciously when it denied plaintiff’s benefits, and finding that the plaintiff failed to timely file a complaint with the EEOC or with the local state agency (he had filed with the Idaho Human Rights Commission, but the statute of limitations had run).
42. Peterson v. Burlington Northern and Santa Fe Railway, 15 Fed.Appx. 378, 2001 U.S.App.LEXIS 15098 (8th Cir., 2001): The plaintiff was not permitted to return to work for 30 months following a medical leave of absence. Plaintiff had suffered a head injury, and had taken sick leave. His FELA claim was settled. When he subsequently sought to return to work the defendant refused, claiming the FELA settlement, in which the plaintiff had claimed a permanent disability, meant that the plaintiff was no longer employed by the defendant. At plaintiff’s request a Union official interceded on his behalf, and obtained permission for plaintiff to return to work pending a medical release by the defendant’s medical department. The defendant convened a Medical Board inquiry, and recommended that he be returned to active duty. Plaintiff resumed working, but brought suit under the ADA for damages. The Court agreed with the District Court’s assessment that even assuming plaintiff to be disabled, the defendant had articulated a legitimate reason for its treatment of the plaintiff, and there was no evidence of pretext. The grant of summary judgment to the defendant was affirmed.

Abbreviations

The abbreviations are divided into two categories: non-medical and medical.

Non-medical terminology

ADA	Americans with Disabilities Act
ADEA	Age Discrimination in Employment Act
AMCD	Aerospace Medical Certification Division
AME	aviation medical examiner
ARIOPS	Association of Railway Industry Occupational Physicians
ATCS	air traffic control specialists
ATP	air transport pilot
ATTP	Around the Track Personnel
BNSF	Burlington Northern Santa Fe Railway
BRC	Belt Railway of Chicago
CAMI	Civil Aeromedical Institute
CDL	commercial drivers license
CFR	Code of Federal Regulations
CMO	chief medical officer
CMV	commercial motor vehicle
CN	Canadian National
CN/IC	Canadian National/Illinois Central Railway
CPR	Canadian Pacific Railway
CSX	CSX Transportation
DOD	Department of Defense
DOT	Department of Transportation
DSLE	Designated Supervisor of Locomotive Engineers
EAP	Employee Assistance Program
EEOC	Equal Employment Opportunity Commission
EU	European Union
FAA	Federal Aviation Administration
FEC	Florida East Coast Railway
FELA	Federal Employers Liability Act

FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GCOR	General Code of Operating Rules
HIPAA	Health Insurance Portability and Accountability Act
HSC	Health and Safety Commission
HSE	Health Safety Executive
ICC	Interstate Commerce Commission
IME	Independent Medical Examiner
KCS	Kansas City Southern Railroad
LERB	Locomotive Engineer Review Board
MEP	Military Entrance Processing Stations
MOW	maintenance of way
MSHA	Mine Safety and Health Administration
NEOC	Nebraska Equal Opportunity Commission
NHSTA	National Highway Traffic Safety Administration
NMC	National Maritime Center
NOTAMS	Notices to Airmen
NRSA	Northeast Rail Service Act of 1981
NRTC	National Road Transport Commission
NS	Norfolk Southern Railroad
NTC	National Transport Commission
NTSB	National Transportation Safety Board
NVIC	Navigation and Vessel Inspection Circular
OCMI	Officer in Charge, Marine Inspection
OFCCP	Office of Federal Contract Compliance
OHS	Occupational Health Service Department
OSHA	Occupational Safety and Health Administration
OTC	over-the-counter
PDR	<i>Physicians Desk Reference</i>
PHS	Public Health Service

PTSD	post traumatic stress disorder
RAC	Railway Association of Canada
REC	Regional Employment Centers
RGS	Railway Group Standards
RRB	Railroad Retirement Board
RSAC	Railroad Safety Advisory Committee
RSSB	Rail Safety and Standards Board
SCPs	safety critical positions
SCT	Secretaria de Comunicaciones y Transportes
SODA	Statement of Demonstrated Ability
SPE	Skill Performance Evaluation
SSDI	Social Security Death Index
STCW	Standards of Training, Certification, and Watchkeeping for Seafarers
UIC	International Union of Railways
UIMC	Union Internationale des Services Médicaux des Chemins de fer
UP	Union Pacific Railroad
USCG	U.S. Coast Guard

Medical Terminology

ADHD	attention deficit hyperactivity disorder
AED	antiepileptic drugs
AF	atrial fibrillation
AHA	American Heart Association
AHI	apnea-hypopnea index
AVID	antiarrhythmics versus implantable defibrillators
BAC	blood alcohol concentration
BG	blood glucose
BMI	body mass index
CAD	coronary artery disease
CASS	Coronary Artery Surgery Study
CComp	cerebrally compromised
CDL	commercial drivers license
CHD	coronary heart disease
CHF	congestive heart failure
COAT	chronic opioid therapy
CPAP	continuous positive airway pressure
CVD	cardiovascular disease
DMV	Department of Motor Vehicles
DRE	drug recognition experts
ECG	electrocardiogram
EDS	excessive daytime sleepiness (somnolence)
EEG	electroencephalogram
EF	ejection fraction
EKG	electrocardiogram
ESS	Epworth sleepiness scale
HbA1C	hemoglobin A1C
HUTT	head-up tilt test
ICD	implantable cardioverter defibrillators
JNC	Joint National Committee
LVEF	left ventricular ejection fraction

LVH	left ventricular hypertrophy
METS	metabolic equivalent or metabolic equivalent of task
MNT	medical nutritional therapy
MS	multiple sclerosis
MVA	motor vehicle accident
OSA	obstructive sleep apnea
OSAHS	obstructive sleep apnea-hypopnea syndrome
PD	Parkinson's disease
PDE	pre-driver evaluation
PVC	premature ventricular contractions
SAS	sleep apnea syndrome
SDE	simulator evaluation
SDLP	standard deviation of lateral position
SSRI	selective serotonin re-uptake inhibitors
TIA	transient ischemic attack
VF	ventricular fibrillations
VT	ventricular tachycardia