AFAC Medical Guidelines:

The primary purpose of the AFAC interim medical guidelines is to highlight medical conditions that if not otherwise detected could impact adversely on a fire fighter's ability to perform the tasks of fire fighting. They are designed to assist medical and health professionals assess the fitness of fire fighters to safely perform their essential functions, based upon current medical evidence.

The medical conditions so identified are described and their potential impact explained. They apply to both urban and rural fire fighters, full-time, retained and volunteers. However some agencies may need to seek clarification of the guides from an experienced medical practitioner where special duties or functions are identified.

Scope of the guidelines

These guidelines are to guide and support the recommendations regarding medical fitness to perform essential fire fighting functions. They also serve to highlight acute and chronic medical conditions that may lead to treatment, or the provision of modified or alternative duties.

It is not intended, or indeed possible, to list every medical condition, or combination of conditions which an individual can experience, and which could compromise fire fighter and emergency service worker safety. Professional judgement is therefore required in assessing medical fitness for fire fighting and emergency service duties.

MEDICAL CONDITIONS AND FIREFIGHTING

The guidelines provide an overview of the most critical medical conditions affecting fire fighting are not provided as a prescriptive or exhaustive list, but rather as guidance to the most appropriate decision-making process to be followed.

Each major category is listed and in summary includes:

1. Cardiovascular conditions
2. Alcohol
3. Drugs other than alcohol
4. Psychiatric disorders
5. Neurological conditions
6. Neuromuscular disorders including multiple sclerosis, parkinsonism
7. Dementia and other cognitive impairments
8. Serious acquired brain injury
9. Syncope
10. Sleep disorders
11. Vision and eye disorders
12. Hearing
13. Vestibular dysfunction
14. Locomotor disabilities
15. Endocrine disorders
16. Gastrointestinal disorders
17. Respiratory conditions
18. Renal conditions
19. Cancer
20. HIV infection
21. Pregnancy

Each medical category includes an explanation of:

- Rationale
- Epidemiology
- Effects on fire fighting and,
- Medical Guideline.

Guidelines are presented as either **Category A or B.**

Category A conditions: indicate circumstances that might preclude the safe performance of active fire fighting duties and require medical clearance by the specialist treating doctor or a medical panel.

Category B conditions: indicate that a thorough work-related risk assessment is required, and that before an individual is determined capable of fully performing fire fighting duties **some restrictions or constraints may apply**.

In each Category further assessment of the individual would be expected, with either reference to the individual's **treating doctor, specialist, or a duly constituted medical panel** which would include (but not limited to) the treating doctor or specialist, an independent medical specialist.

The guidelines are not intended to be prescriptive, but importantly they are an indication of the types of conditions which, if suffered by an individual, may preclude that person from the safe performance of active fire fighting duties.

As a result of the guidelines the appropriate medical classification is recommended and handed to the fire fighter.

Further information

Details of the interim medical guidelines are available from www.naturebase.net or by contacting the Department's Risk Management Section on 9334 0396.

1. CARDIOVASCULAR CONDITIONS

1.1 Rationale

1.1.1 Epidemiology

(a) Ischaemic heart disease

Fire and emergency service personnel are mostly male and although aged under 50, are part of an aging workforce. In that section of the Australian population, ischaemic heart disease is the most common serious illness that could give rise to future medical risk. A significant percentage of older firefighters who are medically reviewed after illness for fitness for duty are in the ischaemic heart disease category.

(b) Evidence regarding risk

Heart attacks causing collapse or sudden death at work have been the subject of a number of reports. The evidence suggests that people who develop severe and even fatal coronary attacks while working may have sufficient warning to stop what they are doing before losing consciousness. However, sometimes no warning occurs or a warning symptom is misinterpreted or ignored, and this may result in severe injury or death to other workers or members of the public.

Collapse from ischaemic heart disease (non- fatal and fatal) appears to account for one sixth to one seventh of sudden illness accidents, which in turn account for about one accident per 1,000 reportable accidents. Thus ischaemic heart disease poses a relatively small but increased risk.

Although the medical and surgical treatment of ischaemic heart disease may lead to alleviation of symptoms and improve life expectancy, coronary arteriosclerosis tends to be a progressive process and the risk of heart attack, collapse and sudden loss of consciousness is greater than in healthy populations.

(c) Effects of fire fighting on the heart

A further problem in those who have established ischaemic heart disease is that fire fighting causes significant emotional and sensori-motor arousal leading to a faster heart rate (up to maximum heart rate) and fluctuation in blood pressure. It has been demonstrated that firefighters may reach maximal heart rate in response to turnout alarms and heavy exertion. Most firefighters will also occasionally need to carry out heavy work, e.g. when in rescue situations, or carrying out unforeseen and unexpected exertion. Theoretically any of these factors could trigger angina, or even myocardial infarction (heart attack).

Fire fighters as a professional group are known to have a significant incidence of death from ischaemic heart disease. However whether fire fighters have an increased incidence compared with the general population is not known, although it has been subject to considerable conjecture and some research in recent years. More research is required.

1.1.2 Effects on fire fighting

(a) Medical incidents creating the risk

The risk when performing fire fighting duties is that either collapse or chest pain arising from the presence of heart disease could result in sudden loss of consciousness, and resultant inability to perform essential functions such as control of an emergency vehicle.

For example:

- Syncope (fainting, collapse, sudden loss of consciousness) can result from cardiac arrhythmia, infarction, severe angina, or failure of a pacemaker; and
- Severe incapacitating chest pain from angina or infarction can come suddenly.

The issue is whether some people can be said to be at higher risk of such events; and whether they should be allowed to work in circumstances where occupational and public safety may be jeopardised.

(b) Fire fighters with ischaemic heart disease

Fire fighters at increased risk may come to the notice of the employer or other persons because they have recovered sufficiently from clinical heart disease to return to normal duties; or they are discovered to have symptoms and/or signs of disease through routine screening.

It is usually not possible (or desirable) to do more than place the person with established heart disease in a broad risk category, such as some increased risk over the general population, or no increased risk.

Screening with well-designed techniques will find some people with established ischaemic heart disease. These people clearly have increased risk over the general population, and are classified under the Guideline listed below as having angina or established ischaemic heart disease.

(c) Risk factors

Several well known pre-disease risk factors occur in the general population: age, sex, blood pressure (especially if uncontrolled); high blood fats (cholesterol, triglycerides); family history; smoking and sedentary lifestyle. There is no statistically sound evidence on which to base a judgement about risk for fire fighting in those who are asymptomatic, but have very high risk factors, but routine risk factor screening does enable an objective later assessment to be performed and modification of risk levels.

An ECG should be performed only if clinically indicated. Medical examiners who are not skilled in the interpretation of ECGs should have them interpreted by a cardiologist or specialist physician.

Fire fighters in whom multiple risk factors are known to exist should be reviewed annually.

(d) Reduction of risk in regard to occupational and public safety

The issue of whether to exclude those at higher risk of heart attack from duties is not a medical decision, but medical findings are relevant. Opinions on the degree of restriction are divided. Some clinical medical authorities take a patient-oriented view that broadly claims that there is acceptable risk where a patient has no symptoms and has normal heart performance on testing. Those who focus on public safety and liability issues, including fire fighting authorities, tend towards more restrictive viewpoints.

The epidemiological (statistical) evidence supports the view that people with coronary artery disease, including those who have had bypass surgery, have an increased risk of future episodes compared with those who do not have the disease.

Identification of those with increased risk places legal and ethical obligations on medical examiners and employers.

1.2 Guideline

1.2.1 Ischaemic heart disease or coronary artery disease

(a) Angina pectoris.

Category A: Proven angina pectoris

Category B:
Fitness to perform fire fighting duties may be considered in the following circumstances.

1. If a Bruce stress test (or equivalent protocol) and thallium or sebastamibil scan show no evidence of myocardial ischaemia.
2. If myocardial ischaemia is demonstrated, a coronary angiogram may be an appropriate clinical intervention. This is a clinical decision made outside the recommendations of these guidelines since coronary angiography is an invasive procedure, which has a small but not insignificant risk of complications. If results of such a procedure are known, and if there is lumen diameter reduction of less than 70% in a major coronary branch, and less than 50% in the left main coronary artery, the person may perform duties, subject to annual review.
3. If the result of the angiogram shows a lumen diameter reduction of equal to or greater than 70% in a major coronary branch and less than 50% in the left main coronary artery (or if an angiogram is not conducted), and
   - the clinical history is one of minimal symptoms; and
   - there is an exercise tolerance of at least six minutes on the Bruce treadmill test (or equivalent protocol); and
   - there is no evidence of severe ischaemia, i.e. less than 2mm ST segment depression on an exercise ECG and absence of a large defect on a stress perfusion scan; and. there is an ejection fraction of 50% or over:

The presence of other risk factors should also be considered.

Where surgery or angioplasty is undertaken to relieve the angina, the guideline listed below applies.

(b) Suspected angina pectoris

When the cause of the chest pain is in doubt, an approved specialist should carry out an exercise test. If the tests are positive or the person remains symptomatic and requires anti-angina medication for the control of symptoms, the guideline as listed for proven angina pectoris (above) apply.

(c) Confirmed myocardial infarction, coronary artery bypass grafting (CABG) or coronary angioplasty.

Category A: if the person has had a confirmed myocardial infarction, CABG, or coronary angioplasty.

Category B: Return to alternative, modified or normal duties (with or without restrictions) may be issued after 3 months if:

- the clinical history is one of minimal symptoms; and
- there is an exercise tolerance of at least 6 minutes on the Bruce treadmill test (or equivalent protocol); and
- there is no evidence of severe ischaemia, i.e. less than 2mm ST segment depression on an exercise ECG and absence of a large defect on a stress perfusion scan; and
- there is an ejection fraction of 50% or over:

The presence of other risk factors should also be considered.

In the event of non-return to normal duties efforts should be directed to retraining and redeployment of fire fighters commensurate with their cardiac status.

1.2.2 Other vascular disorders

Category A: if the person has aortic aneurysm, thoracic or abdominal, either before or after surgery.

1.2.3 Hypertension

Category A: if the person's sitting blood pressure is consistently 200/110 or greater (treated or untreated); or if there is end organ damage (cardiac, cerebral, retinal or renal) which will impair safe performance of duties or if treatment results in marked postural hypotension or impaired alertness.

The presence of other risk factors should also be considered.

Category B: Fitness to perform fire duties may be considered, subject to annual review if:

- the person is treated with anti-hypertensive drug therapy and

- effective control of hypertension is achieved (ideal blood pressure less than 140/90 but no greater than 150/95) without appreciable side effects over a four week follow-up period; and
- if there is no evidence of target organ damage, associated ischaemic or other forms of heart disease; and
- if other causative risk factors have been treated.

1.2.4 Arrhythmia

Category A: if the person has a history of recurrent or persistent arrhythmia, which may result in syncope or incapacitating symptoms.

Category B: Duties *with restrictions* may be recommended where

- the condition has been cured surgically (e.g. Wolf- Parkinson White syndrome) or successfully treated medically for **at least three months** .
- the person is taking anti-coagulants refer to anti-coagulants therapy below.
- the person has a pacemaker or electrical device implanted.
  Restricted duties may be recommended by a cardiologist with expertise in electro- physiology after consideration of the relative risks of pacemaker dysfunction.
- if the person has a cardioverter-defribillator implanted for ventricular arrhythmias.

Anti-coagulant therapy is discussed below (1.2.9).

1.2.5 Electrocardiograph (ECG) abnormality

An ECG is only required if clinically indicated.

Category A: if the person has an electrocardiograph abnormality.

Category B: restricted duties may be considered, subject to *annual review*:

- if the ECG shows left or right bundle branch-block, pre-excitation or changes suggestive of myocardial ischaemia or previous myocardial infarction; *and*
- if an exercise test performed by a cardiologist or specialist physician or referral made to an approved specialist is negative; *and*
- if there are no other disqualifying conditions.

Equivocal cases should be referred to an approved specialist.

1.2.6 Valvular heart disease

Category A:

- if the person has any history or evidence of valve disease, with or without surgical repair or replacement, associated with symptoms or a history of: embolism, arrhythmia, cardiac enlargement (on chest X-ray greater than 16cm), abnormal ECG, high blood pressure; or
- if the person is taking anti-coagulants. Restricted duties may be considered subject to the Guideline specified below in relation to anti-coagulant therapy.
- if mitral stenosis is present, even if not associated with any of the above conditions.

Category B: Restricted duties may be considered, subject to annual review:

- if the person's cardiological assessment shows mild valvular disease of no haemodynamic significance, and it is not associated with any of the above conditions.

Equivocal cases should be referred to an approved specialist.

1.2.7 Cardiomyopathy

Category A:

- if the person has established cardiomyopathy; or
- if the person has had a heart or heart/lung transplant.

1.2.8 Congenital heart disorders

Category A:

- if the person has complicated congenital heart disorders.

Category B: restricted duties may be considered:

- if there are minor congenital heart disorders such as pulmonary stenosis, atrial septal defect, small ventricular septal defect, bicuspid aortic valve, patent ductus arteriosis or mild coarctation of the aorta; and
- if there are no other disqualifying conditions.

1.2.9 Anti-coagulant therapy

Anti-coagulant therapy for cardiac conditions needs to be optimal to prevent emboli while not increasing the risk of haemorrhage.

Category A:

- if the person is on anti-coagulation therapy.

Category B: restricted duties, subject to annual review, may be considered if the person's cardiologist or haematologist certifies that the therapy is satisfactory.

1.2.10 Deep Venous Thrombosis

Category A:

- if the person suffers deep venous thrombosis which is liable to recurrence or embolus.

Category B:

Restricted duties may be considered if recommended by a specialist depending upon the cause of the thrombosis and the response to treatment.

2. ALCOHOL

2.1 Rationale

The adverse effects of alcohol on work, and particularly safe driving are well documented. All Australian jurisdictions (and most throughout the world) enforce legislation to control the incidence of drink driving. Most would claim at least partial success. This regulatory trend has led to lower acceptable blood alcohol concentrations (BACs) for drivers generally and in Australia zero levels for heavy vehicle drivers.

Epidemiological studies have compared BACs of drivers involved in crashes with people driving under similar controlled circumstances. These studies leave little doubt that the consumption of alcohol is a major contributor to motor vehicle crashes and the serious injuries that result.
In the USA, the Department of Transportation has estimated that:

- 11% of drivers involved in all crashes have BACs greater than 0.05g/100ml;
- 24% of those involved in crashes with serious injuries have elevated BACs;
- 45% of drivers involved in fatal crashes have BACs of 0.10g/100ml or higher; and
- almost 70% of drivers in fatal crashes involving just one vehicle, for which the driver is considered to be responsible, have BACs greater than 0.10g/100ml.

In a New South Wales study, 13% of fatal accidents involved truck drivers with BACs over 0.05g/100ml, and 22% of all fatal and serious injury accidents involved drivers with BACs over 0.05g/100ml. The studies conclude that as the severity of the crash increases, so does the probability that alcohol is involved.

The risk of involvement in a motor vehicle crash increases as the concentration of alcohol in the blood increases. It has been reported that with a BAC of 0.06g/100ml, a driver is twice as likely to be involved in a fatal crash as is a driver without alcohol in the blood; at 0.10g/100ml the driver is 7 times as likely to be involved; and at 0.15g/100ml the relative risk is more than 25 times greater.

Many physiological, psychological and other factors affect blood alcohol concentrations. It is therefore difficult to accurately estimate a BAC from a known alcohol intake.

A further distinction should be drawn between a clinically obvious intoxication, and the impairment of significance for motor vehicle or other work safety. The obvious clinical signs of slurred speech, inability to walk in a straight line or difficulty in standing, classically associated with intoxication, are often not observed until much later than the significant decrement in a person's ability to perform given tasks compared to their normal performance. Some people do not appear intoxicated until levels of 0.20g/100ml to 0.30g/100ml are reached, whereas impairment has been demonstrated at 0.03g/100ml and lower.

When the data from crashes involving drivers with elevated BACs is further examined, two further subgroups stand out with even higher risk. These are:

- problem or addicted drinkers; and
- young drivers, particularly young males.

A 1983 study demonstrated that alcoholics and problem drinkers are involved in at least one third to one half of all alcohol-related crashes with serious injuries, yet the overall prevalence of this group in the community is generally accepted to be 10% of the adult population.

The chronic effects of excess alcohol intake on organ damage are well known to all medical practitioners, and it is obvious that the many manifestations of organic brain damage seen from alcohol are incompatible with safe working and driving.

However, in many ways it is the effects that lead to impairment of functions vital to the optimal performance of complex tasks that present the more difficult decisions. These can generally be grouped into:

- those functions associated with the processing and handling of sensory information and CNS arousal in general; and
- those concerned with speed and accuracy of response in the psychomotor tasks.

There are a variety of tests to measure performance in these tasks including the:

- Critical Flicker Fusion Threshold Test,
- Choice Reaction Time Test,
- Compensatory Tracking Test,
- Short-term Memory, Continuous Attention Task, and
- Subjective Sedation Test.

2.2 Guideline:

2.2.1 Chronic alcohol abuse

Category A:

- if the person has clear historical and clinical evidence of chronic alcohol abuse (including binge drinking, frequent alcohol intoxication) and unequivocal signs of end organ damage, especially if any organic brain damage.
- if the person has a strong history of alcohol abuse and clinical evidence of abuse is limited to biochemical findings without clinical signs.

Category B: with restrictions may be considered, subject to frequent review:

- if the person has stopped drinking, demonstrates good evidence of insight into the problem, is not suffering from any withdrawal symptoms, and shows no evidence of any progressive damage. *It is preferable that experienced medical practitioners specialising in alcohol treatment make this assessment.*

2.2.2 Frequent alcoholic intoxication

People who are frequently intoxicated do not readily admit to a problem and the diagnosis of most cases will require careful clinical judgement.

People in this category should be told of the very significant risk they pose to occupational and public safety as well as to their own health. They should be monitored at yearly intervals to ensure that their risks as drivers have not increased.

Category A:

- if the person has a clear history of frequent alcohol intake leading to intoxication coinciding with periods of driving.

Category B: may be considered with restrictions:

- if the person's episodes of intoxication do not coincide with work or driving. However, there would need to be a clear demonstration that blood alcohol concentrations will have returned to legal limits when driving activities are undertaken, and that psychomotor performance and information processing will not be adversely affected.

3. DRUGS OTHER THAN ALCOHOL

3.1 Rationale

3.1.1 Epidemiology

Apart from alcohol, there are many other substances that may affect safe working performance. These range from illegal substances such as heroin and other opiates through to commonly prescribed medications and over-the-counter preparations. Substance abuse, defined as taking a centrally acting substance (drug) for non-therapeutic reasons in higher than therapeutic dosage in order to obtain a desired psychological effect, is clearly incompatible with occupational safety under emergency conditions.

The co-ordination of sensory and motor systems is particularly important for fire fighters. Psychoactive drugs have the potential to disrupt cognitive and psychomotor functions crucial for safety

Table 1 gives examples of drugs that may affect psychomotor skills.

It is known that the majority of people who are prescribed psychoactive drugs are in fact in the active workforce. It is clearly important to protect them and the general public from accidents caused by drug- induced sedation.

The literature relating drugs to work accidents is much less developed than is the case for alcohol. However, it has been demonstrated that sedative drugs may particularly affect simple and repetitive tasks common in complex tasks such as driving.

There is evidence to suggest that psychoactive drugs are contributory factors to accidents in general. A 1983 study reported that the risk of accidents is increased with benzodiazepine usage, while in 1990 it was reported that benzodiazepine users are significantly more likely to sustain accident-related injuries than non-users.

In 1972 the World Health Organisation indicated its concerns over the relationship between psychoactive drugs and motor skills such as driving which have since been further supported by a number of studies. A 1990 study in the UK demonstrated that patients receiving benzodiazepine and other minor tranquillisers are five times more likely to experience a serious motor vehicle accident than non-drug users

The interaction of alcohol with psychoactive drugs can be directly fatal, or result in impairment of performance to such an extent that a fatal accident may ensue. A summary of studies in 1992 stated that the interaction between personality, mental state, performance situation and psychoactive drugs is complex. It is suggested that the use of psychoactive/sedative compounds will not necessarily cause an accident, but the more behaviourally toxic compounds may increase the relative risk of an industrial or road traffic accident.

Data on illicit drugs is much less readily available, partly because of their illegal status. However, since many of their physiological effects are similar to alcohol and prescription drugs, their usage is also likely to cause a significant safety hazard.

Stimulant drugs such as amphetamines and cocaine that produce a heightened sense of well-being, disinhibited behaviour and over activity obviously have a potential for causing accidents.

Cannabis can impair psychomotor functions thought to be related to fine motor and judgement skills. However, there is still debate about the duration of impairment outside of laboratory experiments.

3.1.2 Effects on firefighting.

Such a varied group of substances has varied effects on the variety of work skills. Driving related skills remain those most immediately at risk and some prescription; over-the-counter and illegal substances can alter vision, perception, judgement, attention span, motor function and other characteristics important to safety. While it is the 'on the road' actions that are significant, these effects are more clearly demonstrated by laboratory tests devised to quantify decrements associated with these substances. The issue of multiple drugs used by the one individual raises further need for careful consideration of drug-related impairment and safety.

3.2 Guideline

More than for perhaps any other category of medical condition, careful individual assessments need to be made of fire fighters using psychoactive drugs. Additional advice from those involved in specialised treatment centres will frequently be necessary and ongoing assessment is likely to be critical.

3.2.1 Illicit drugs

The habitual use of illicit drugs is incompatible with safe commercial vehicle driving. However, occasional use of these drugs also requires very careful assessment. Virtually all illicit drugs are psychoactive, and likely to

have detrimental effects on driving skills. The medical practitioner should be satisfied that their usage is not going to affect the fire fighter in the performance of his or her duties.

Category A:

- if the person is using illicit drugs in a manner which may affect his or her driving; or
- if the person is using stimulants such as amphetamines. These drugs have been used to combat fatigue, and while they may initially increase alertness and efficiency, their effect is notoriously unpredictable and may be accompanied by marked changes in mood and behaviour: Amphetamine use is also commonly followed by periods of depression and fatigue.

3.2.2 Prescribed psychoactive drugs (see Table 1)

Although short or long term usage of many of this group of drugs is also incompatible with safety at work, the circumstances will vary markedly between individuals and each case should be considered on its merits. At the very least, strong warnings should be made to individuals using any of this group of substances, particularly if there is potential for combination with alcohol. Methadone programme participants must be given very careful and detailed consideration. In most cases, the condition for which medication is prescribed will be of greater significance than the medication itself in regard to fitness as a fire fighter hence the sections on these conditions should be consulted.

In all cases when doctors are prescribing medications, they should consider any possible effects on the essential skills required of a fire fighter and inform the patient. At periodic examinations, fire fighters should be reminded of the effects prescription and over-the-counter medications and alcohol have on work skills. Failure to do so may have medico-legal consequences for the practitioner in the event of an accident involving the patient.

Where alternative therapy with non- psychoactive drugs is possible, this should be undertaken.

Category A:

- if the person is taking psychoactive drugs which will impair safety-critical performance on a long term basis.

Uncertain cases should be referred to an approved specialist.

TABLE 1: Classes of drugs with potential for affecting safety critical skills	
Sedative, Hypnotic or Anti-Anxiety Agents • barbiturates • benzodiazepines	Skeletal Muscle Relaxants: • dantrolene • methocarbamol
Analgesics • codeine • narcotics • propoxyphene	Ophthalmic Agents (topical preparations) • most agents for treating glaucoma
Anti-Allergy Agents • antihistamines	Antibiotics • minocycline
Antipsychotic or Antidepressant Agents • cyclic antidepressants • haloperidol • phenothiazines • marijuana	Drugs and Chemicals of Abuse • alcohol • amphetamines (chronic use) • cocaine (chronic use) • marijuana
Antihypertensives • clonidine • methyldopa • reserpine	Anti-Motion Sickness Agents • antihistamines (centrally acting)

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4. PSYCHIATRIC DISORDERS:

4.1 Rationale

Assessment of firefighters with psychiatric disorders regarding their fitness for firefighting presents a challenging problem for the examining doctor. A wide variety of conditions can occur which may fluctuate in their degree of disability and transience. The precise effect of alterations in mental state on working ability may also be unclear.

Fire fighting demands complicated psychomotor performance, which depends on fine co-ordination between the sensory and motor system. It is influenced by factors such as arousal, perception, learning, memory, attention, concentration, emotion, reflex speed, time estimation, auditory and visual functions, decision taking and personality. Complex feedback systems interact to produce the appropriate co-ordinated behavioural response. Therefore anything that interferes with any of these factors can impair working ability and in particular safety. Examining doctors should assess fire fighters with these factors in mind.

4.1.1 Epidemiology

Patients hospitalised for mental illness appear to have higher accident rates than those of the general population. The MVA rate among mentally ill people was twice that of an age-adjusted sample without mental illness. The sample consisted mostly of schizophrenic and manic-depressive individuals.

Certain diagnostic groups appear largely responsible for the higher accident rates found among psychiatric inpatients. Patients with neuroses and personality disorders had increased rates. Rates for people with schizophrenia differ little from the general population. The highest rate of accidents has been found in people with personality disorders and alcoholism. People who were paranoid or depressed have been found to be more likely to be involved in fatal accidents than those in a control group.

It has also been reported that more than 50% of fatally injured drivers had experienced interpersonal or vocational stresses during the 12 months preceding their accident, compared with 18% of a control group. Accident rates double six months before and after divorce, which provides evidence that there is increased risk of accidents during periods of stress.

Other studies have shown that drivers involved in accidents had an increase in stressful events within four weeks of these occurrences.

4.2 Guideline

Australian and overseas experience shows the inappropriateness of rigid rules relating to psychiatric conditions and work ability. Psychotropic medication can affect alertness and coordination. The potential for interactions, especially alcohol, should be noted. Antidepressant medication may cause drowsiness and postural hypotension. Decisions on individual cases should be made after all the facts are considered and, if in any doubt, psychiatric consultation should be sought. However, epidemiological evidence supports of the following approach.

Category A:

- if the person has an acute psychosis, whether schizophrenia, manic-depression or other depressive psychosis. People who have affective disorders suffer from disturbances in attention, judgement, and motor activity that can seriously, even if temporarily, affect their fitness to perform essential duties; *or*
- if the person is taking psychoactive drugs which will impair motor performance (such as driving or use of plant and equipment) on a long term basis; *or*
- if the examining doctor believes that a person's judgement or psychomotor activity is currently affected by present or past mental disorder; *or*
- if the examining doctor believes that there is a significant risk of a previous psychotic condition relapsing.

Category B: (with restrictions) may be considered

- if relevant specialist psychiatric opinion is supportive; *or*
- if the person has a psychotic condition which is so well controlled as to reduce the risk of an exacerbation to that of any member of the general population.

*A medical decision is **not** appropriate*:

- if the person has a personality disorder: Such people often show disregard for social values and the law; they may have a history of aggressive, irresponsible or erratic behaviour which may be evidenced by repeated traffic violations and civil charges. Such people should be managed through administrative channels. Their fitness to perform fire fighting, for example, on personality traits alone is not considered to be a medical decision.

5. NEUROLOGICAL CONDITIONS

5.1 Epilepsy

5.1.1 Epidemiology

Epilepsy occurs in two peaks, between 2 to 5 years and again at puberty. Therefore, the presence of idiopathic epilepsy will most likely be apparent by the time a fire fighter applies to join a fire service. In a heterogeneous group of 'first fitters', 62% had recurring fits 12 months after the first seizure, and nearly 50% after 6 months. Estimates of the risk of epilepsy related work accidents vary between 0.03% and 0.3%.

Drivers with epilepsy are involved in accidents at about 1.8 times the normal frequency. In any particular case, the likelihood of further seizures after the first episode is dependent upon the actual epilepsy syndrome involved.

5.1.2 Effects on fire fighting

Sudden loss of consciousness clearly impairs the ability to perform essential duties. Whilst control of epilepsy may appear to be adequate, several inherent features of the fire fighter's work such as sleep deprivation, and the possible use of concomitant drugs may increase the risk of fitting.

5.2 Guideline

Category A:

- if epilepsy is confirmed.

Category B: (with restrictions) may be considered if the person is assessed by a specialist neurologist and:

- the person has a past history of febrile convulsions; *or*
- a past history of epilepsy with seizure free period of 5 years *and*
- is not taking any anticonvulsant medication; or
- had a past single seizure, or cluster of seizures, due to exceptional and non-repeatable circumstances; or
- has epilepsy, which is so well controlled as to reduce the risk of a convulsion to that of any member of the general population, noting the inherent features of the individual's job, *and*
- The EEG shows no epileptiform activity.

5.2 Strokes

5.2.1 Effects on fire fighting

People who have suffered a stroke are at increased risk of a second episode, which may render them unconscious, or otherwise incapable of performing duties safely.

The sequelae of strokes may limit a fire fighter's ability to adequately control a vehicle, plant and equipment, or result in sensory or perceptual deficits, which may cause the fire fighter to fail to recognise dangerous situations.

5.2.2 Guideline

Category A:

- if the person has a history of cerebrovascular accident.

Category B: (with restriction) may be considered if in the opinion of a specialist neurologist:

- the stroke was caused by a condition that has now been satisfactorily treated, and
- a satisfactory recovery from the stroke, including perceptual deficits, has been demonstrated.

Cases of berry aneurysm should be referred to an approved specialist.

5.3 Transient Ischaemic Attacks

5.3.1 Effects on fire fighting

Transient ischaemic attacks may render a fire fighter temporarily unconscious

5.3.2 Guideline

Category A:

- if the person has had two or more transient ischaemic attacks.

Category B: (with restrictions) may be considered:

- if the aetiology of the attacks has been identified, the underlying cause removed, and the person has had a six-month period free of attacks.

If the underlying cardiac pathology for such episodes is identified any restriction would be based upon the prognosis of that condition, and the likelihood of continued recurrence.
Persons who have had only one transient ischaemic episode should be referred to an approved specialist.

6. NEUROMUSCULAR DISORDERS INCLUDING MULTIPLE SCLEROSIS, PARKINSONISM

6.1 Rationale

Severe neuromuscular disorders limit the ability of a fire fighter to safely perform complex motor tasks.

6.2 Guideline

Category A:

- if the person has Parkinsonism, multiple sclerosis or any other severe neuromuscular disorder.

Category B: (with restrictions) may be considered:

- if the disability is limited to minor muscular weakness (subject to frequent reassessment because of the progressive nature of such disorders);

or

- if the Parkinsonism is drug induced; and
- if the person is likely to recover on cessation of the treatment; and
- if the underlying cause for which the drugs were administered is not a cause for exclusion in its own right.

7. DEMENTIA AND OTHER COGNITIVE IMPAIRMENTS

7.1 Rationale

The effects of dementia or cognitive impairment may be variable, but in most cases would inhibit the fire fighter's ability to respond quickly to emergency situations.
(See also HIV Infection)

7.2 Guideline

Category A:

- if the person's dementia or cognitive impairment is confirmed.

8. SERIOUS ACQUIRED BRAIN INJURY

8.1 Rationale

Effects of an acquired brain injury vary widely depending on the severity of the initial injury and the particular structures affected. Individuals who have suffered a brain injury may suffer 'soft' neurological sequelae such as perceptual difficulties and behavioural changes (mood swings, disinhibition, and aggression). They may also display a lack of insight, and inappropriate responses to advice. Such cases need to be very carefully assessed and often require skilled neuro-psychological testing.

8.2 Guideline

A person who recovers from a loss of consciousness of less than 24 hours with no complications does not present any special risk. Similarly, immediate seizures which occur within 24 hours of a head injury are not considered to be epilepsy, but part of the acute process.

Category A:

- if the person has an acquired brain injury causing functional disturbance until the after effects have been assessed. This may include a medical assessment, neuropsychological testing, and/or task-based assessments

9. SYNCOPE

9.1 Rationale

Unpredictable, spontaneous loss of consciousness is obviously incompatible with safely performing firefighting

9.2 Guideline

Category A:

- if the person suffers from current syncope.

Category B: may be considered by an approved specialist:

- if the cause of the person's syncope has been identified, appropriate treatment instituted, and compliance confirmed.

10. SLEEP DISORDERS

10.1 Obstructive Sleep Apnoea

10.1.1 Epidemiology

Obstructive Sleep Apnoea is a disorder characterised by snoring, closure of the upper airway, oxygen desaturation and episodes of multiple arousal during sleep. Daytime sleepiness is a major symptom. The estimated prevalence is 1-2% in the total population and at least 8% in middle-aged males. There is an even higher prevalence in some occupational groups. A study of truck drivers in the USA suggested 46% had some form of sleep apnoea.

10.1.2 Effects on fire fighting

Accident records from USA and Europe have suggested an accident rate from 2.5 to 12 times greater in those suffering sleep apnoea than age-matched controls. Another USA study using a computer based test of vigilance showed that those suffering from sleep apnoea make significantly more errors than non-sufferers of the same age.

Significant sleep apnoea (i.e. more than 20 episodes of apnoea per hour of sleep) is associated with increased mortality rate and an increased risk of strokes and cardiovascular incidents.

As a group, people with sleep apnoea are excessively sleepy during the day compared with non-sufferers but the severity of the apnoea is not highly correlated to the degree of sleepiness experienced, as people with mild sleep apnoea can be very sleepy.

10.1.3 Clinical issues

People with sleep apnoea tend to underestimate their level of daytime sleepiness and self-reported data on daytime sleepiness, or the potential to fall asleep while driving, cannot be relied on. Thus, if a person is considered to be suffering from sleep apnoea, this should be investigated by overnight study in a recognised sleep disorders centre. Under some circumstances, daytime wakefulness testing may also be appropriate.

Common indicators of the possibility of sleep apnoea include habitual snoring during sleep, witnessed apnoeic events, falling asleep during non-stimulating activities and feeling tired despite apparently adequate amounts of sleep. Although uncommon, some sufferers experience sleep attacks without prior warning. Other symptoms include morning headaches, periods of poor concentration and difficulties with short-term memory. Less frequently, arousals produced by apnoea cause a presentation dominated by the complaint of insomnia.

A high level of suspicion of sleep apnoea should occur where a person presents with the following features:

- a history of snoring
- witnessed apnoeas (by a partner)
- excessive daytime sleepiness
- physical features such as a thick neck, obesity (BMI >30 kg/m^2 and reddened, oedematous and narrowed oropharynx.

However, significant degrees of sleep apnoea occur without many of the above features. Thin people may also suffer from sleep apnoea and often the sufferer may under report the symptom of sleepiness. The consumption of alcohol or sedatives, shift work and sleep deprivation may exacerbate sleep apnoea. Conditions such as hypertension and hypothyroidism are often associated with sleep apnoea.

Treatment for sleep apnoea may include weight loss and alcohol reduction programmes, surgery or continuous positive airways pressure (CPAP).

10.1.4 Guideline

Category A:

- if the person has established sleep apnoea until treatment is effective. Consideration should be given to compliance with treatment such as CPAP.

Category B: (with periodic review) may be recommended:

- if the person has a combination of daytime sleepiness and a BMI in excess of 30 and a reddened, oedema to us narrow oropharynx; or
- if the person has a history of snoring and witnessed apnoeas,

Note: unless sleep apnoea can be reasonably excluded, the certifying practitioner should arrange for appropriate investigation.

10.2 Narcolepsy

10.2.1 Epidemiology

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Narcolepsy, a neurological condition in which sufferers experience the unheralded occurrence of sleep, is related to dysfunction of the brain-stem sleep-wake mechanisms. It affects 0.06% of the population and is much less a problem than sleep apnoea. It is typically unrecognised for many years because of a lack of knowledge by medical practitioners and a characteristic behavioural response of many sufferers, who because of embarrassment about sleepiness and cataplexy (when present) conceal the symptoms. The peak age of onset is adolescence.

Narcolepsy can be diagnosed by ascertaining the patient's history, in conjunction with the multiple sleep latency test (MSLT). Overnight sleep study is necessary on the night prior to the MSLT to be certain that there are no other sleep disorders and to aid MSLT interpretation. The majority of sufferers are HLA-DR2 positive. Importantly there is a subgroup of excessively sleepy individuals who do not have the diagnostic features of narcolepsy, but nonetheless are pathologically sleepy.

10.2.2 Effects on fire fighting

The excessive sleepiness clearly puts the fire fighter at risk in a variety of essential fire fighting duties. Many sufferers, by strong motivation and various measures (open windows, cold air) find that they can force themselves to stay awake. However, they can be subject to sleep attacks without warning, and/or cataplexy, which place them at extreme risk.

Sufferers of narcolepsy may experience:

- excessive daytime sleepiness;
- cataplexy;
- sleep paralysis;
- and vivid hypnogogic hallucinations.

Tricyclic antidepressants and MAO Inhibitors are used to treat cataplexy while a combination of chemical stimulant and behavioural therapy is required to treat sleepiness.
Narcolepsy sufferers should avoid dangerous situations and mundane tasks. Although the
efficacy of amphetamines can be tested using wakefulness testing; ongoing compliance with treatment is essential to the future level of wakefulness.

10.2.3 Guideline

Category A: if narcolepsy is confirmed.

11. VISION AND EYE DISORDERS

11.1 Visual Acuity

11.1.1 Epidemiology

Between 2% and 6% of the population drivers can be expected to have visual acuity of 6/12 or less (visual acuity id defined as the best obtainable vision, with or without glasses or contact lens) However, available studies of the relationship between reduced visual acuity and accidents suggest that the percentage of accidents due to defective visual acuity or to other ocular abnormalities is very small.

11.1.2 Effects on fire fighting

Since over 90% of information input to fire fighters is visual, adequate visual acuity is required in order to safely perform the duties.

11.1.3 Guideline

Category A:

- if the person's best **corrected** visual acuity is less than 6/12 in the better eye (this - includes monocular vision) or less than 6/18 in the other; *or*
- if the person makes more than two errors in the 6/12 line with the better eye, or 6/18 line with the other eye.
- Corrective lenses to achieve the visual requirements may be used provided they cannot be dislodged during the type of strenuous activity performed by fire fighters. Contact lens may not be satisfactory since if self-contained breathing apparatus (SCBA) is worn they cannot be replaced, and an adequate face seal must be maintained with SCBA – 'combat glasses' or similar in which the side arm is replaced by a flat rubber strip may satisfy this criteria.

Category B:

- if the person's vision is less than 6/18 in the worse eye. This includes those with monocular vision. The opinion of a specialist ophthalmologist or optometrist should be obtained.

11.2 Visual Fields

11.2.1 Epidemiology

Studies in the USA indicate that less than 1% of the population have total visual fields less than 120 degrees. There is no evidence that these drivers are more prone to accidents than those with normal visual fields. It might be expected that drivers with restricted visual fields would be more likely to be involved in side collisions. There is no evidence that drivers with monocular vision are over-represented in accidents. It is generally assumed that drivers who have recently lost one eye may be at particular risk.

11.2.2 Effects on fire fighting

It is reasonable to assume that fire fighters with substantial visual field loss are less equipped to perceive potential and actual hazards and are more susceptible to temporary blindness by dust, smoke, fumes and foreign bodies.

11.2.3 Guideline

Visual fields should initially be assessed by confrontation. Specialist assessment (including perimetry) is required for any abnormality detected.

Category A:

- if the person has monocular vision, any abnormality of visual fields to confrontation, or bitemporal or homonymous hemianopia.

Category B: may be considered:

- if a person with a partial field loss has 140^0 or more of horizontal visual field remaining. This is to be determined with an IV4e target on a Goldman perimeter or equivalent, and
- after consideration of the likelihood of progression of the underlying condition, and
- after consideration of the nature of the essential fire fighting duties.

11.3 Colour Perception

11.3.1 Epidemiology

Defective colour vision is mainly inherited. It occurs in 8.0% of men and about 0.2% of women. Of men, 2.0% have a red perception difficulty (protan defect), and 6.0% have a green perception difficulty (deutan defect). Less than 0.5% have a severe red perception difficulty (protanopia).
Some studies have indicated that drivers with protan defect have a reduced visual distance for other vehicles' taillights and for red traffic signal lights. Drivers with a protan defect have an increased nose to tail collision rate.

A recent review of studies of motor vehicle accidents and drivers with colour blindness has found that drivers with severe colour blindnes s are at increased risk.

11.3.2 Effects on fire fighting

Fire fighting is a varied, demanding and often unpredictable occupation. Accurate colour discrimination not only impacts on the effectiveness of doing the work, but also safety. Visual conditions are often sub-optimal. Smoke, darkness and distance makes colour discrimination difficult. Electrical circuitry and emergency gauges/alarm boards all rely on accurate colour discrimination for safety.

Emergency driving

Because of the decreased sensitivity to red, protanopes and protanomals have a reduced awareness of brake lights and other red light signals. This form of colour vision deficiency is not compatible with safe driving for heavy vehicles (such as a fire appliances) or vehicles travelling under emergency conditions.

Discrimination of other colours in fire fighting tasks

A recent Australian study has shown that persons with dichromatic colour defects (protanopes and deutranopes) have difficulty in discriminating between colours involved in essential fire fighting tasks. Some deutranomals have colour perception that is adequate for most tasks, and may be considered safe for fire fighting- Protanomals are considered unsafe for fire fighting because of the associated driving requirements.

11.3.3 Guideline

Colour vision is to be initially assessed with the - *Ishihara Test* administered under good lighting. Where three or more errors are made (out of 24 plates), further assessment is required. A *Medmont C100 (or OSCAR)* vision tester should be used to identify protans. A listing of ocular practitioners with appropriate testing equipment is available from the driver licensing authorities in each State or Territory, the Australian Optometrical Association (Tel: (03) 9663 6833), or the Royal Australian College of Ophthalmologists (Tel: (02) 92677006).

Category A:

- Persons protanopia and protanomalous trichomatism
- Persons with deutranopia

Category B:

- Persons with deutranomalous trichromatism may meet the criteria for fire fighting, subject to passing the fire fighters colour vision test (FCV - test).

Persons with tritanism should be referred for specialist assessment

If the person is assessed to be a protan and wishes to seek a review of that assessment, he or she may seek a final and conclusive test on a *Nagel Anomaloscope.* Contact the Victorian College of Optometry (Tel: 03 9349 7400 or Fax: 03 9349 7498) for further information.

11.4 Diplopia

11.4.1 Epidemiology

Diplopia, although rare, does occur as a result of neurological disease, trauma or as a developmental anomaly. No authoritative epidemiology could be found relating diplopia to drivers or accident rates. However, it can be assumed to be a visually disabling condition likely to cause confusion and uncertainty.

11.4.2 Effects on fire fighting

Diplopia, of whatever cause, represents an unacceptable risk. Episodes of diplopia, whether due to transient ischaemic attacks, migraine or other cause, should be considered in terms of their suddenness of onset and the person's ability to stop what they are doing safely and obtain relief.

11.4.3 Guideline

Category A:

- if the person has diplopia from whatever cause, whether persistent or recurrent.

Category B:

- if the person has diplopia only on extreme lateral gaze. While this does not warrant failure, it should be recorded on the examination form.

11.5 Dark Adaptation and Night Vision

11.5.1 Epidemiology

It has been estimated that 2% of the population may have significantly reduced night vision, and significant individual variability has been documented. Certain retinal disorders can result in reduced night vision. These are either familial or lead to reduced visual acuity. Retinitis pigmentosa is the most common. Retinitis pigmentosa causes severe visual field loss, which has a greater effect on road safety than any concurrent reduction of night vision. No authoritative epidemiology has been found relating reduced night vision to drivers or accident rates.

11.5.2 Effects on fire fighting

Diseases such as retinitis pigmentosa, glaucoma and choroido-retinitis produce a marked deficiency of night vision, and present many obstacles to safe driving amongst other firefighting tasks.

11.5.3 Guideline

Cases of severe retinal disease, or a history of familial retinal disease (such as retinitis pigmentosa) should be referred to an approved specialist.

Category B:

- for daylight duties only.

11.6 Cataract and Aphakia

11.6.1 Epidemiology

Cataracts are very common and their incidence increases with age -some 40,000 cataract operations are performed in Australia each year. It is difficult to estimate the prevalence of cataracts because the condition may range from small opacity of the lens that does not affect visual acuity through to an extensive opacity resulting in significant vision loss.

11.6.2 Effects on fire fighting

People with cataracts encounter increased glare from oncoming vehicle lights, which may reduce their ability to see clearly, presenting a hazard for night driving. Advanced cataracts may lead to decreased visual acuity. Moderate cataracts may have little effect on visual acuity, but may still be associated with increased vulnerability to glare. The extent and location of the cataract, together with any glare disability, should be considered when deciding on visual fitness.

Absence of the lens of the eye (aphakia) following cataract surgery is usually corrected satisfactorily with an intra -ocular lens. If correction is by means of spectacles or contact lenses only, consideration should be given to whether the person is fit to perform fire fighting duties.

11.6.3 Guideline

The Guideline for visual acuity must be met for drivers with a cataract. (**11.1.3**)

Following cataract surgery, individual specialist assessment should occur:

11.7 Glaucoma

11.7.1 Epidemiology

Over the age of 40 years, 1-2% of the population are diagnosed as having glaucoma. The incidence rises with increasing age. People with glaucoma may have significant loss of visual fields.

11.7.2 Effects on fire fighting

Glaucoma can lead to progressive loss of visual fields if untreated. However, if satisfactorily controlled, in the absence of other visual disability, it represents no increased public risk. For driving fire fighters should be made aware that use of miotic drops can lead to reduced night vision.

11.7.3 Guideline

The categories for visual fields apply and should be met. (**11.1.3**)

Category B:

- subject to an annual review of visual fields.

12. HEARING

12.1 Rationale

Mild to moderate hearing loss does not appear to affect the ability to work safely, and driving studies have shown that some drivers with hearing loss have a better than average driving record.

12.2 Effects on fire fighting

Fire fighters should have a reasonable level of hearing to be aware of changes in engine or road noises which may signal developing problems, and to be aware of fire station loudspeaker announcements, radio transmissions, horns, rail crossings, emergency signals and sirens without compromise of safety.

Hearing aids amplify extraneous noise and are subject to malfunction. They are adversely affected by water, and their batteries are prone to failure without warning. They should not be relied upon without specialist advice.

12.3 Guideline

Hearing should be initially evaluated by a simple clinical test. If there is a clinical suggestion of hearing loss, then a formal audiogram should be conducted without the use of hearing aids.

Category A:

- if the person has an average hearing threshold level of equal to or greater than 40dB in the better ear: (Average hearing threshold is the simple average of pure tone air conduction thresholds at 500, 1000, 2000 and 3000 Hz.).

Category B:

Modified or alternative duties recommended by a hearing specialist may be considered where:

- fire fighters who use hearing aids and have sufficient corrected hearing to meet the safety requirements outlined in 12.2, and where hearing is not safety critical.

13 VESTIBULAR DYSFUNCTION

13.1 Rationale

Vestibular malfunction can occur suddenly and with sufficient severity to make safe driving of any type of vehicle impossible; it is often accompanied by nystagmus, which compounds the disability in regard to driving. In confirmed Menières disease, these symptoms can occur despite treatment and the natural history is one of progression, associated with increasing deafness until, in the extreme, total loss of vestibular and cochlear function occurs.

Following an acute labyrinthitis attack of vertigo, sudden onset of vertigo may occur for up to twelve months resulting in a sudden, unpredictable inability to drive.

Benign paroxysmal vertigo, which may follow a head injury, causes vertigo and nystagmus when specific head positions are assumed. This condition is likely to recur at any time for many years despite treatment.

13.2 Guideline

Vestibular function should be assessed by using a simple Romberg test, which is also required for
neurological function. (A pass requires the ability to maintain balance while standing with shoes off, feet together side-by-side, eyes closed and arms by sides, for thirty seconds.)

Category A:

- if the person has any condition of recurrent vertigo. This includes people suffering from confirmed Menières disease and benign paroxysmal vertigo, despite treatment; or
- if the person has any other type of vertigo. Such persons should be re-assessed after 12 months free of attacks without treatment.

Persons who fail the Romberg test should be referred to an appropriate medical specialist.

14. LOCOMOTOR DISABILITIES

14.1 Rationale

14.1.1 Epidemiology

Locomotor disorders are common. The main conditions occurring in the adult years include:

- Ankylosing spondylitis -affects 1% of the population and is 4 times more common in males;
- Rheumatoid arthritis -affects 3% of the population and is 2-3 times more common in females;
- generalised osteoarthritis and degenerative joint disease are nearly universal by the time of retirement, although pain and stiffness do not necessarily accompany radiological changes;
- Paget's disease -affects between 0.5%-2% of adults and is twice as common in men. Aching and pain may be a feature affecting the spine, hips, knees and skull.

There is no specific data on the relative accident risk for workers suffering from the above conditions, back injuries, amputations, deformities, arthritis or peripheral neuropathies. However, the scientific literature does show an association between whole body vibration, driving heavy vehicles, and a higher incidence of back pain and/or peripheral neuropathy compared to workers in more sedentary jobs.

Whilst these conditions are not linked with accidents, they can be a cause of major disability and a factor in premature retirement.

14.1.2 Effects on fire fighting

There is no published data on the risk of accidents and/or loss of control of a vehicle due to locomotor disorders. Musculo-skeletal impairment frequently precludes driving heavy vehicles, working at height or in confined spaces, lifting and use of emergency equipment. Rotation of the head (mobility of cervical spine) is a particular requirement. Adaptive equipment cannot usually be installed in emergency vehicles due to the multi-user nature of the vehicles.

14.1.3 Aim of the medical assessment

The medical assessment is aimed at detecting those fire fighters who would have difficulty in controlling fire fighting equipment including vehicles, because of loss of the use of critical limbs or digits or loss of sensation in the extremities. In some cases a functional assessment should be undertaken by an occupational therapist who is suitably qualified, trained and familiar with firefighting and driving.

If the fire fighter lives in an isolated area, an occupational therapist could conduct the test with advice from a therapist specialising in such areas as driver rehabilitation. It is recommended that the treating doctor consult the peak occupational therapists' association in his/her State or Territory.

14.2 Guideline

In relation to disability due to locomotor disorders or peripheral neuropathies the decision can only be made after careful assessment by those competent to evaluate the essential physical skills of people with disabilities (e.g. an occupational therapist who has completed the Occupational Therapy Driver Evaluation Course).

Note: Vehicles with clutches and manual transmissions require drivers to have four functioning extremities. The lower extremities are required to operate clutch, brake and accelerator pedals, and the upper extremities are needed to steer, shift gears, and operate other controls including radios.

Category A:

- if the person has peripheral neuropathy resulting in loss of sensation or proprioception in the extremities; or
- if there is amputation or congenital absence of a limb required to operate a hand or foot control where no modification is practicable; or
- if there is amputation or congenital loss of both upper and both lower limbs, or one upper and one lower limb.
- if the thumbs are missing from both hands (subject to a practical assessment); or
- if acute inflammation and pain in any joint interferes with concentration or impairs the range of motion such that the vehicle cannot be operated safely. Such cases should be re-examined if the inflammation is brought under control; or
- if rotation of the cervical spine is less than 45° to the left or right.

Category B: subject to practical assessment:

- if there is pain and stiffness in any joint, or a joint replacement, having regard for the range of movement and muscle power required to operate fire fighting equipment and accessing typical fire ground obstacles.

A practical task-based assessment (TBA) is essential for most final decisions.

Where Category B may be appropriate or where there is any doubt about the person's ability to perform duties safely, the examining doctor should suggest a more comprehensive assessment, including a practical test.

15. ENDOCRINE DISORDERS

15.1 Diabetes Mellitus

15.1.1 Epidemiology

Diabetes affects 2% of the population rising to 8% in those over 60 years of age.

15.1.2 Effects on fire fighting

Diabetes may affect a fire fighter's ability to drive, operate plant and equipment, work at height or in confined spaces, due to acute loss of consciousness in a hypoglycaemic episode or from end organ effects on vision, vasculature or limbs and extremities, particularly the feet. Tight control of insulin-dependent diabetes is associated with increased risk of hypoglycaemic episodes.

To avoid hypoglycaemia, an insulin dependent diabetic must maintain a balance between insulin dose, dietary intake and physical activity. A fire fighter may be turned out at any time without warning, and may then be required to undertake strenuous physical activity. As a result mealtimes may be disrupted, or meals missed altogether. If an insulin dose is injected shortly before turnout, and the meal missed or even delayed, then hypoglycaemia may ensue. The last line of defence for a diabetic who experiences the warning symptoms of hypoglycaemia (and not all do) is to have some sugar, for example a sugary drink or some sweets. However a fire fighter who is wearing SCBA in a hazardous or toxic environment cannot remove the mask to eat or drink.

15.2 Guideline

Category A:

- if the person has diabetes unless it is satisfactorily controlled by diet alone.

Category B: restricted duties may be considered if recommended by a specialist in diabetes or endocrinology:

- subject to at least 6 monthly review *and*
- if there is absence of hypoglycaemic episodes, the individual recognises hypoglycaemia and that they are taking agents that provide the minimum risk of hypoglycaemia *and*
- there is absence of end-organ damage which may effect essential fire fighting functions *and*
- there is consideration of the impact of shift work or irregular working hours on the management of diabetes.

The presence of insulin-dependent diabetes effectively precludes a person from fire fighting, but persons receiving insulin therapy may be referred to an approved specialist if there is an absence of hypoglycaemic episodes and no end organ damage and the treating specialist certifies that control is exemplary.

15.2 Other Endocrine Disorders

Endocrine disorders (such as thyroid gland disorders) with symptoms, which could affect the ability to safely perform essential fire fighting duties, should be individually assessed.

16. GASTROINTESTINAL DISORDERS

16.1 Epidemiology

Gastro-intestinal disease is now well understood and effective treatments are available for most conditions. There are few, if any, of these conditions that are likely to cause sudden loss of consciousness or inability to perform fire fighting, provided they are well managed and under regular review.

16.2 Effects on fire fighting

Untreated peptic ulceration and oesophagitis may manifest as anaemia, pain or frank bleeding. While the symptoms may render a person unfit to perform all duties in the short-term, the conditions respond well to treatment and the risk of a sudden disabling illness is insignificant.

Inflammatory bowel conditions such as colitis and Crohn's disease may all cause considerable pain and disability if not well controlled. This may take the form of lethargy, diarrhoea, and urgency of defecation and, in extreme cases, faecal incontinence. A person with such an active condition would be unfit for fire fighting due to lack of concentration, and where access to toilet facilities may be limited.

The onset of untreated malignancy of the gastro-intestinal tract is typically slow and not prone to cause acute disablement.

16.3 Guideline

There are no specific conditions that absolutely preclude fire fighting duties. There are no specific mandatory tests or examinations for the gastrointestinal system.

17. RESPIRATORY CONDITIONS

17.1 Epidemiology

The respiratory system is one of the most commonly affected by disease, with specific conditions such as asthma causing about 5 deaths per 100,000 population in Australia.

17.2 Effects on fire fighting.

Severe respiratory disorders may interfere with a fire fighter's aerobic function, and safe handling of equipment and vehicles, through inadequate oxygen and/or increased, carbon dioxide to the brain and heart, leading to poor judgement, agitation, drowsiness, reduced concentration, weakness, and cardiac effects.

Less severe respiratory disorders, whilst not impairing tasks such as driving to the same degree, may affect the safe use of SCBA (Self Contained Breathing Apparatus).

Fire fighting requires at times physical exertion to maximum pulse rate, and exercise induced bronchospasm can become rapidly disabling.

17.3 Guideline

There should be normal lung function, and the absence of signs of respiratory disease at the medical examination:

Spirometry:

- Both FVC and FEV_1 should be within 10-15% of the predicted mean, and FER (Forced Expiratory Ratio: FEV_1 /FVC) of >75%.

A chest x-ray (if performed) should demonstrate no radiological evidence of lung pathology.

Category A:

- if the person has severe respiratory failure.
- FER <75% and FVC and/or FEV_1 <85% of predicted value
- A diagnosis of active asthma or evidence of bronchial hyper-reactivity, in view of the risk of exposure to respiratory irritants and the physical requirements of safe use of SCBA (breathing apparatus).

Category B:

Modified or alternative duties may be provided, if recommended by a respiratory physician, and

- If there is normal lung function, *and*
- A bronchial challenge test with hypertonic saline (4.5%) is normal, *and*
- There is no history of current use of bronchodilator therapy, or history of use of oral or parenteral steroids for the treatment of asthma within the previous three (3) years.

Note: lung function tests and investigations would be at the clinical discretion of the respiratory physician.

18. RENAL CONDITIONS

18.1 Epidemiology

End-stage renal failure affects 50-60 people per 1,000,000 in Australia, of which two-thirds are less than 60 years of age.

18.2 Effects on fire fighting

Many of the complications of renal failure are reversible, such as urinary tract infection and obstruction, and fluid and electrolyte disturbances. They may require short-term admissions to hospital to treat and stabilise.

The above complications may be worsened by fire fighting if the fire fighter does not consume adequate amounts of fluid, have ready access to toilet facilities or where access to medical assistance is difficult. Clearly the impact of heavy physical work in hot conditions over prolonged periods of time is important.

18.3 Guideline

Category A: if the person has end-stage renal failure.

***Category B*:** if supported by an approved renal specialist.

19. CANCER

19.1 Effects On Fire fighting

Cancer may affect the ability to perform fire fighting duties due to primary or secondary tumours in the brain, their treatment, or as a result of effects on a site elsewhere in the body.

19.2 Guideline

The effects at the initial site are mainly covered by Guidelines given elsewhere.

Category A:

- if the person has evidence of primary or secondary cancer within the brain, skeletal system or other end-organs.

Category B:

- may be considered by an approved specialist if a cancer has been successfully treated.

20. HIV INFECTION

20.1 Epidemiology

HIV infection is an important public health issue. It is also important in the evaluation of medical problems, which may affect safety to perform fire fighting since it may present adverse general health effects or specific neurological problems with little, if any, advance warning. It is not uncommon for neurological or psychological events to be the first clinical manifestation of HIV infection, and these can be initially subtle disturbances in behaviour, memory and control of movement.

The issue of HIV infection should not be confused with other blood-borne diseases such as Hepatitis B and C which in general do not exhibit the same long-term neurological sequelae.

20.2 Effects on fire fighting

The human immunodeficiency virus (HIV) is highly neurotropic. The brain appears to be a principal site for the virus soon after infection and the development of neurological complications may be an indication of the course of the infection and the severity of the immune deficiency.

Whilst fire fighters in the early phases of the disease may be symptom-free, a major safety concern is that disturbances of behaviour, memory and control of movement, may have subtle development or present suddenly with little or no prior clinical warning. Some of the earliest manifestations of the progression of the disease may be impaired cognitive processes or isolated neurological defects with later AIDS dementia complex.

The evaluation of psychiatric, neurological and neuromuscular conditions and problems with dementia and cognitive impairment, are addressed in Sections 4 -7.

20.3 Guideline

HIV testing is not required routinely and should not be performed unless there is a clinical indication, and there is full informed consent following appropriate counselling.

Category A:

- if the person has an HIV infection together with neurological or neuro-psychiatric complications.

Category B:

- Modified or alternative duties may be appropriate if recommended by a specialist in HIV medicine, *and*
- subject to at least annual review if specialist advice is received on the person's condition and there is an absence of neurological manifestations or neuro-psychiatric or other complications, which would compromise safety.

21. PREGNANCY

21.1 Rationale:

Pregnancy brings many changes for the period of the pregnancy and for a short time thereafter. The changes vary to a greater or lesser extent depending upon individual circumstances.

Normal pregnancy is of 40 weeks duration, divided into three trimesters, and in general a healthy woman with an uncomplicated pregnancy can continue to work throughout the pregnancy.

21.2 Pregnancy and firefighting:

It is to be encouraged that fire fighters seek professional advice regarding their health and the health of the pregnancy in regards to fire fighting duties. In particular heat, chemical and biological exposures are of potential concern.

Excessive fatigue is universal in the first trimester and shift work and heavy manual work are contraindicated. There is also some evidence to suggest that fetal abnormalities in the first trimester are more common if the body's temperature is elevated.

In the second trimester back pain, pelvic and abdominal pain, dizziness and fainting can occur particular in hot environments.

Medically complicated pregnancies, where there are medical conditions that were pre-existing or arise as a direct result of the pregnancy, add to the risk of an adverse pregnancy outcome.

However the person concerned should be treated as for any other person with that medical complication.

Return to work after pregnancy requires thorough medical consideration, including such issues as fatigue, breast-feeding and social factors.

Guideline:

Category A:
When pregnancy is confirmed, and until medical clearance obtained after pregnancy.