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Part V

MANUAL OF CIVIL AVIATION MEDICINE
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International Civil Aviation Organization

PART V. AVIATION MEDICAL TRAINING

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

Part V

Chapter 1. AEROMEDICAL TRAINING FOR DESIGNATED MEDICAL EXAMINERS

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Chapter 1. AEROMEDICAL TRAINING FOR DESIGNATED MEDICAL EXAMINERS

INTRODUCTION

"***Medical examiner.*** A physician with training in aviation medicine and practical knowledge and experience of the aviation environment, who is designated by the Licensing Authority to conduct medical examinations of fitness of applicants for licences or ratings for which medical requirements are prescribed.

1.2.4.4 Contracting States shall designate medical examiners, qualified and licensed in the practice of medicine, to conduct medical examinations of fitness of applicants for the issue or renewal of the licences or ratings specified in Chapters 2 and 3, and of the appropriate licences specified in Chapter 4.

1.2.4.4.1 Medical examiners shall have received training in aviation medicine and shall receive refresher training at regular intervals. Before designation, medical examiners shall demonstrate adequate competency in aviation medicine.

1.2.4.4.2 Medical examiners shall have practical knowledge and experience of the conditions in which the holders of licences and ratings carry out their duties.

Note.— Examples of practical knowledge and experience are flight experience, simulator experience, on-site observation or any other hands-on experience deemed by the Licensing Authority to meet this requirement."

A designated medical examiner as specified in Annex 1, 1.2.4.4 (see above), is a physician who is authorized by the appropriate national authority to carry out clinical examinations as required for issue of aviation licences. Usually such physicians are engaged primarily in some other field of medical practice in the course of which they also act as designated medical examiners on request. They may occasionally be part- or full-time employees of an airline, but only infrequently are they part- or full-time employees of a Civil Aviation Administration.

The aviation medical examiners should fully understand the importance of the authority and responsibility vested in them. Incompetence in the medical fitness evaluation of an applicant might permit a physically or mentally unfit person to exercise the privileges of a licence which can have serious implications for flight safety, for the Administration and indeed also for the examiner him- or herself. However, an overly stringent approach by the examiner without due consideration of the needs and wishes of the applicant should be avoided, since this is likely to adversely affect the relationship between examiner and applicant. As most conditions of relevance to flight safety will be elicited from the history, a relationship of trust must be fostered by the examiner. Adequate aeromedical training for potential examiners and recurrent training for those designated as medical examiners is necessary but the examiner must also develop the skills needed to conduct a thorough examination in an atmosphere of trust.

The appropriate environment for the medical examination can be fostered by the medical department of the Licensing Authority, which should strive for a 'just culture' with respect to the certification process. Applicants are more likely to be forthcoming with personal information if they believe that, should they declare a condition that could have aeromedical significance, they will be treated fairly by the Authority, and that efforts to keep the applicant operating will be made wherever possible by those having decision-making authority over the issuance of Medical Assessments.

A need for special post-graduate aviation medical training has been recognized by responsible authorities in

most countries with significant civil aviation activities. No basic medical curriculum or post-graduate training in a speciality other than aviation medicine provides the specific instruction desirable for a designated medical examiner. Improving the quality of aviation medical examinations in a State will result in a more rational and uniform application of the medical provisions of Annex 1. This in turn may not only positively affect the general flight safety level within the country, but may also be expected to favour increased international recognition and reciprocity with regard to medical fitness requirements of personnel licences.

In some Contracting States medical examiners are encouraged to become involved in the medical aspects of aircraft accident investigation. However, for examiners to function effectively in this role, it is desirable that they receive formal instruction on fundamental procedures, which may also be included in an aviation medical examiner training course curriculum.

In addition to ICAO-sponsored seminars, several Contracting States offer post-graduate programmes in aviation medicine. Information on some of these programmes can be found in ICAO Training Directory, available at www.icao.int.

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ATTACHMENT

STANDARDIZED CURRICULUM FOR DESIGNATED MEDICAL EXAMINERS

Programme of lectures, clinical presentations and round-table discussions

INTRODUCTION

This curriculum may be used as a basis for a postgraduate training course in aviation medicine. However, for those involved in designing such a curriculum, it should be noted that what follows is based on a traditional 'knowledge-based' approach, rather than the more modern 'competency-based' approach, the latter being where ICAO believes the emphasis should be placed in the future. Such a competency-based approach involves determining the necessary competencies of a designated medical examiner (DME), setting a course to train for such competencies, then testing the students to ensure that they have developed these to the extent necessary for them to perform satisfactorily as a DME. For example, experience shows that whilst traditional courses may adequately train a student to understand the various abnormalities of the heart that might be of relevance to flight safety, they often do not fully address an essential competency for a DME, the ability to assess aeromedical risk of incapacitation against an acceptable level as set by the Licensing Authority i.e. the ability to assess (under the guidance of the Medical Assessor of the Licensing Authority) what determines whether or not an applicant with a medical condition is fit to be issued a Medical Assessment. For this topic to be adequately addressed, an understanding of the concept of acceptable risk of medical incapacitation must be understood. This subject is developed in Part I of this manual, particularly in Chapter 3 (Flight Crew Incapacitation). It is likely that ICAO will update its advice on training for medical examiners over the next few years, bearing in mind the need to develop competency-based curricula.

As a complement to academic activities, familiarization visits should be carried out to aviation facilities, and flight experience should be arranged, either in simulators or in the cockpit of various aircraft. In addition, visits should be made to different aeromedical speciality clinics. The latter enable participants to observe and practise recent examination and evaluation techniques.

In relation to the above curriculum, the following reference material may be utilized:
A standard textbook in aviation medicine
ICAO *Convention on International Aviation* - "the Chicago Convention" (Doc 7300/7)
ICAO Annex 1, latest edition (currently the tenth Edition, 2006)
ICAO *Manual of Civil Aviation Medicine* (Doc 8984 – this manual)
ICAO *Manual on Prevention of Problematic Use of Substances in the Aviation Workplace* (Doc 9654)
ICAO *Manual of Aircraft Accident Investigation* (Doc 6920)

The following suggested programme may be conducted in two weeks, although shorter or longer periods may be appropriate according to the circumstances.

Lecture units

1. Introduction
   a) Course organization and curriculum
   b) Human factors in the aviation system; Safety Management; development of a 'reporting culture'
   c) Responsibility of the designated medical examiner and medical assessor in aviation safety
   d) Medically related accidents – multicrew and single pilot operations
   e) Aviation medicine; history and evolution

f) International and national regulations; *Chicago Convention* - Annex 1
g) ICAO *Manual of Civil Aviation Medicine*; origin, objectives, contents.

2. Overview of Medical Requirements

a) Incapacitation: acceptable aeromedical risk of incapacitation; types of incapacitation; 'two-communication' rule; operational aspects
b) Basic principles in assessment of fitness for aviation duties
c) Barometric pressure: hypoxia; hypobaria; cabin pressurization; decompression
d) Operational and environmental conditions
e) Aviation physiology; basic principles
f) Accelerations; basic principles; effects on human systems
g) Use of medical literature in assessing medical fitness; differences between scientific study populations and licensed populations
h) Physical and mental requirements for different licenses
i) Visual requirements for different licenses
j) Colour perception requirements for different licenses
k) Hearing requirements for different licenses

3. Cardiovascular system
a) Relation to aviation duties; risk of incapacitation
b) Examination procedures; ECG, laboratory and special examinations
c) Specific cardiovascular conditions; hypertension and its treatment
d) Ischaemic heart disease; ECG findings
e) Angina pectoris
f) Assessment of satisfactory recovery from myocardial infarction
g) Cardiomyopathies; pericarditis; rheumatic heart disease
i) Arrhythmias; conduction defects
j) Congenital heart disease; post-surgical conditions.
k) Disturbance of consciousness – single and repeated episodes

4. Respiratory system
a) Relation to aviation duties, risk of incapacitation
b) Examination procedures, spirometry, peak flow, x-ray, special examinations
c) Specific respiratory conditions, asthma and its treatment, chronic obstructive pulmonary disease
d) Lung infections, tuberculosis
e) Bullae, pneumothorax; post-surgical conditions

4. Digestive system
a) Relation to aviation duties, risk of incapacitation
b) Food poisoning
c) Abdominal pain; gastrointestinal and biliary post-surgical conditions
d) Gastritis; uncomplicated peptic ulcer and its treatment; complications: recurrence, bleeding and perforations
e) Biliary tract disorders
f) Pancreatitis
g) Irritable colon
h) Hernias

5. Endocrine diseases
a) Relation to aviation duties, risk of incapacitation

b) Hyperthyroidism; hypothyroidism
c) Pituitary Disease: anterior pituitary; growth hormone. Posterior pituitary; diabetes insipidus; Addison's disease; phaeochromocytoma
d) Diabetes mellitus; basic principles; definitions; aetiology; symptomatology
    - Diagnostic criteria
    - Glucose tolerance tests
    - Classification
    - Anti-diabetic therapy
    - Operational aspects in aviation
    - Satisfactory control criteria for aviation duties.

6. Haematology
a) Relation to aviation duties, risk of incapacitation
b) Polycythaemia; anaemias; leukaemias; lymphomas
c) Platelet disorders
d) Haemoglobinopathies; geographical distribution; classification; sickling conditions.

7. Urinary system
a) Relation to aviation duties, risk of incapacitation
b) Action to be taken after discovery of abnormalities in routine dipstick urinalysis e.g haematuria; albuminuria
c) Nephritis; pyelonephritis; obstructive uropathies
d) Tuberculosis
e) Lithiasis: single episode; recurrence; post-surgical conditions.

8. Gynaecology-obstetrics
a) Relation to aviation duties, risk of incapacitation
b) Menstrual disorders.
c) Birth control
d) Pregnancy and aviation duties.
e) Miscarriage and abortion.

9. Mental fitness
a) Relation to aviation duties, risk of incapacitation
b) Assessment of mental fitness for aviation duties
c) Psychological testing of intelligence and personality
d) Psychiatric disorders in aviation personnel: neurosis; personality disorders; psychosis; organic mental illness; problematic use of substances
e) Treatment of mental diseases: anxiolytics, antidepressants (in particular selective serotonin reuptake inhibitors); cognitive behavioural therapy; treatment for problematic use of substances

10. Neurology
a) Relation to aviation duties, risk of incapacitation
b) Neurological disorders:
    - seizures – assessment of single episode;
    - epilepsy;
    - multiple sclerosis;
    - head trauma;
    - post-traumatic states;
    - vascular diseases;
    - tumours;
    - disturbance of consciousness – assessment of single and repeated episodes

c) Role of electro-encephalography in aviation medicine.

11. Ophthalmology
    a) Relation to aviation duties, risk of incapacitation
    b) Examination techniques;
        - visual acuity assessment;
        - visual aids;
        - visual fields – acceptable limits for certification;
        - ocular muscle balance;
        - assessment of pathological eye conditions;
        - glaucoma
    c) Monocularity and medical flight tests
    d) Colour vision
        - Methods of testing: pseudoisochromatic plates, lantern tests, anomaloscopy
        - Importance of standardization of tests and of test protocols

12. Otorhinolaryngology
    a) Relation to aviation duties, risk of incapacitation
    b) External ear; tympanic membrane; middle ear
    c) Post-surgical conditions
    d) Vestibular system; vertigo
    e) Hearing assessment; audiometry
    f) Nose and paranasal sinuses
    g) Special ear nose and throat tests.

13. Human Immunodeficiency Virus
    a) Relation to aviation duties, risk of incapacitation
    b) Transmission and clinical manifestations
    c) Clinical and operational assessment
    d) Treatment
    e) Risk of progression
    f) Methods of assessing fitness

14. Malignant Disease
    a) Relation to aviation duties, risk of incapacitation
    b) Different methods of treatment
    c) Defining acceptable risk post-treatment
    d) Risk of recurrence
    e) Importance of site of recurrence with respect to flight safety
    f) Using certification assessment charts

15. Fatigue
    a) Duty time regulations and flight time limitations
    b) Circadian rhythms
    c) Sleep hygiene; medication to control sleep.

16. Medication and drugs
    a) Hazards of medications, drugs and alcohol
    b) Common side effects; prescription medications; over-the-counter medications; herbal medications; 'alternative' therapies
    c) Medication for sleep disturbance

17. Flexibility
    a) Annex 1, paragraph 1.2.4.8,
    b) Accredited Medical Conclusion; consideration of knowledge, skill and experience
    c) Trained versus untrained crews; incapacitation training
    d) Medical flight tests.

18. Tropical diseases
    a) Basic principles
    b) Diseases transmitted by vectors
    c) Food and water-borne diseases
    d) Parasitic diseases.

19. Communicable Diseases
    a) Preparedness planning and prevention of spread of communicable diseases; World Health Organization International Health Regulations (2005)
    b) The SARS experience
    c) Disinsection of aircraft; disinfection of aircraft
    d) Vaccinations, prophylactic medication use in licence holders
    e) Hygiene and sanitation in relation to aviation
    f) Catering services; food, water.

20. Accident investigation and prevention
    a) Medical factors; the role of the medical examiner
    b) Identification of the victims
    c) Determination of the causes, circumstances and events.

21. General course revision; appraisal and evaluation.

PART V

Chapter 2. MEDICAL FACTS FOR PILOTS

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Chapter 2. MEDICAL FACTS FOR PILOTS

GENERAL

The designated medical examiner is frequently called upon to provide advice and briefings to aviation personnel on medical aspects of aviation. To facilitate this task, a sample of such a briefing to pilots is attached to this chapter. It briefly covers the main topics but additional information may need to be added for completeness, depending on the audience and the circumstances. It may be adapted for other aviation personnel and information and illustrations can be inserted as necessary.

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ATTACHMENT. SAMPLE BRIEFING GIVEN TO PILOTS

INTRODUCTION

Just as an aircraft is required to undergo regular checks and maintenance, you are also required to undergo regular medical examinations to ensure your fitness to fly. You do not have to be a superman to fly. Many deficiencies can be compensated, short sight, for example, by wearing spectacles or contact lenses. In some cases you may be required to demonstrate by a medical flight test that you can compensate for a certain defect of potential significance to flight safety.

It should be recalled that humans are essentially earth-bound creatures. However, if we are aware of certain aeromedical factors and pay attention to these, we can leave the earth and fly safely. What follows points out the more important factors with which you should be familiar prior to flying.

Modern industry's record in providing reliable equipment is very good. When the pilot enters the aircraft, he becomes an integral part of the man-machine system. He is just as essential to a successful flight as the control surfaces. To ignore the pilot in preflight planning would be as senseless as failing to inspect the integrity of the control surfaces or any other vital part of the machine. The pilot himself has responsibility for determining his fitness prior to entering the cockpit for flight.

GENERAL HEALTH

While piloting an aircraft, an individual should be free of conditions which are harmful to alertness, ability to make correct decisions, or affect reaction times. Persons with conditions that are apt to produce sudden incapacitation, such as seizures, serious heart trouble, uncontrolled diabetes or diabetes requiring insulin, and certain other conditions hazardous to flight, are medically unfit. Conditions such as acute infections, anaemias and peptic ulcers are disqualifying while they last. Consult your designated medical examiner when in doubt about any aspect of your health status, just as you would consult a licensed aviation mechanic when in doubt about the engine status.

SPECIFIC AEROMEDICAL FACTORS

Fatigue

Fatigue generally slows reaction times and causes errors due to inattention. In addition to the most common cause of fatigue, insufficient rest and loss of sleep, the pressures of business, financial worries and family problems can be important contributing factors. If your fatigue is marked prior to a given flight, don't fly. Ensure you obtain a good night's sleep before you fly and if scheduling prevents this, discuss your situation with an aviation medicine specialist.

Hypoxia

Hypoxia, in simple terms, is a lack of sufficient oxygen to keep the brain and other body tissues functioning properly. Wide individual variation occurs with respect to susceptibility to hypoxia. In addition to a progressive lack of oxygen at higher altitudes, anything interfering with the blood's ability to carry oxygen can contribute to hypoxia (e.g., anaemias, carbon monoxide, certain drugs).

Your brain has no built-in alarm system to let you know when you are not getting enough oxygen. A major early symptom of hypoxia is an increased sense of well-being (referred to as euphoria). This progresses to slowed reaction, impaired thinking ability, unusual fatigue, and a dull headache.

The symptoms are slow but progressive, insidious in onset, and become marked at altitudes above 10 000 feet (3 300 metres). Night vision, however, can be impaired at altitudes even lower than that.

If you observe the general rule of not flying above 10 000 feet without supplemental oxygen, you will not get into trouble.

Alcohol

Do not fly while under the influence of alcohol. An excellent rule is to allow twenty-four hours between the last drink and take-off time. Even small amounts of alcohol in the system can adversely affect judgement and decision-making abilities. Even at sea level alcohol impairs judgement and reaction time therefore *ALCOHOL AND FLYING DO NOT MIX*.

Your body metabolizes alcohol at a fixed rate, and no amount of coffee or medication will alter this rate.

Do not fly with a hangover or a "masked hangover" (symptoms suppressed by aspirin or other medication).

Medication

Self-medication or taking medicine in any form when you are flying can be extremely hazardous. Even simple home or over-the-counter remedies such as aspirin, antihistamines, cold tablets, cough mixtures, laxatives, tranquillizers and appetite suppressors may seriously impair the judgement and co-ordination needed while flying. The safest rule is to take no medicine while flying, except on the advice of your aeromedical advisor. It should also be remembered that the condition for which the medicine is required may of itself be hazardous to flying, even when the symptoms are suppressed by the medication.

Certain specific medicines which have been associated with aircraft accidents in the past are: antihistamines (widely prescribed for hay fever and other allergies); tranquillizers (prescribed for nervous conditions, hypertension, sleep disorders and other conditions); weight reducing drugs (amphetamines and other appetite suppressing drugs can produce sensations of well-being which have an adverse effect on judgement); barbiturates or nerve "tonics" (barbiturates produce a marked suppression of mental alertness).

Following general anaesthesia, a period of at least 48 hours should be spent on the ground. Twelve hours is reasonable for a local anaesthetic. If in any doubt concerning the right time to resume flying, then seek appropriate medical advice.

Spatial Disorientation

On the ground we know which way is "up" by the combined use of three senses:

a) Vision - we can see where we are in relation to fixed objects.
b) Pressure - gravitational pull on muscles and joints tells us which way is down.
c) Special parts in our inner ear - the otoliths - tell us which way is down by gravitational pull.

It should be noted that rotation of the body is detected by the fluid in the semi-circular canals of the inner ear, and this tells us when we change angular position. However, in the absence of a visual reference, such as flying into a cloud, the rotatory accelerations can be confusing, especially since their forces can be misinterpreted as gravitational pulls on the muscles and otoliths. The result is often disorientation.

Pilots should have an instructor demonstrate manoeuvres which will produce disorientation. Once experienced, later unanticipated incidents of disorientation can be overcome as long as instruments (for pilots trained to use them) or reliable ground references are available. Such a demonstration will show you how confusing the false inputs from the inner ear can be.

Pilots are susceptible to experiencing disorientation at night, and in any flight condition when outside visibility is reduced to the point that the horizon is obscured. An additional type of vertigo is known as flicker vertigo. Light, flickering at certain frequencies, from four to twenty times per second, can produce unpleasant and dangerous reactions in some persons. These reactions may include nausea, dizziness, unconsciousness, or even reactions similar to an epileptic fit. In a single engine propeller aeroplane heading into the sun, the propeller may cut across the sun to give this flashing effect, particularly during landings when the engine is throttled back. These undesirable effects may be avoided by not staring directly through the propeller for more than a moment, and by making frequent but small changes in RPM. The flickering light traversing helicopter blades has been known to cause this difficulty, as has the reflection from rotating beacons on aircraft while flying in clouds. If the beacon is bothersome, shut it off during these periods, advise air traffic control and remember to turn it back on when clear of clouds.

Carbon monoxide

Carbon monoxide (CO) is a colourless, odourless, tasteless product of an internal combustion engine and is always present in exhaust fumes. Even minute quantities of carbon monoxide breathed over a long period of time may lead to dire consequences.

For biochemical reasons, carbon monoxide has a greater ability than oxygen to combine with the haemoglobin of the blood. Furthermore, once carbon monoxide is absorbed in the blood, it sticks “like glue” to the haemoglobin and actually prevents oxygen from attaching to the haemoglobin.

Most cockpit heaters in light aircraft work by air flowing over the exhaust manifold. So if you have to use the heater, be wary if you smell exhaust fumes – there may be a leak from the engine exhaust pipe into the air used for cockpit warming. The onset of symptoms is insidious, with “blurred thinking”, a possible feeling of uneasiness, and subsequent dizziness. Later headache occurs. Immediately shut off the heater, open the air ventilators, descend to lower altitudes, and land at the nearest airfield. Consult a designated medical examiner for advice. It may take several days to fully recover and clear the body of the carbon monoxide. Use carbon monoxide detectors in the cockpit, since affected pilots may otherwise be completely unaware that they are being exposed to CO.

Vision

Reduced or impaired vision can be critical. To avoid eye fatigue in bright light, use colour-neutral (rather than coloured) sunglass lenses as this will permit normal colour discrimination. If you need to use correcting lenses for good vision make sure you keep a spare pair of spectacles within easy reach, so that you can easily find them if you if you lose or break your first pair, or develop problems with contact lenses. Visit an eye care specialist if you notice a change in visual acuity.

Middle ear discomfort or pain

Certain persons (whether pilots or passengers) have difficulty balancing the air pressure on either side of the ear drum while descending. Sometimes pressure equalization can occur at different times in each ear, resulting in a form of disorientation named 'alternobaric vertigo'. Problems arise if a head cold or throat inflammation keeps the Eustachian tube from opening properly. If this trouble occurs during descent, try swallowing, yawning, or holding the nose and mouth shut and forcibly attempting to exhale (Valsalva manoeuvre). If no relief occurs, climb back up a few thousand feet (if feasible) to relieve the pressure on the eardrum. Then descend again, using these measures. A more gradual descent may be tried, and it may be necessary to go through several climbs and descents to "stair step" down. If a nasal inhaler is available, it may afford relief. If trouble persists several hours after landing, consult your aeromedical advisor.

Note.— If you develop symptoms of a cold when airborne, you may possibly avoid trouble by using a nasal spray, kept as part of the flight kit. Take aviation medicine advice before purchasing one.

Panic

The development of panic in inexperienced pilots is a process which can give rise to a vicious circle and lead to unwise and precipitous actions. If lost or in some other predicament, forcibly take stock of yourself and do not allow panic to mushroom. Panic can be controlled. Remember, *to prevent panic, think straight*. Fear is a normal protective reaction, and occurs in normal individuals. If you believe it occurs frequently or too easily to you, seek medical advice – there are techniques that can be learned and used to reduce the effects.

Underwater diving

If you go flying after scuba diving or any underwater activity using compressed air, you should be aware that if insufficient time has elapsed between surfacing and take-off, the medical consequences can be serious or even fatal. Due to greatly increased pressures underwater, nitrogen is absorbed into the blood and tissues. The amount depends on the depth and duration of exposure. If take-off follows the dive too soon to allow the body to rid itself normally of this excess nitrogen, the gas may form bubbles in the blood or tissues causing discomfort, pain, difficulty in breathing, or even death, at altitudes of 7 000 feet (2 135 metres) or less, altitudes attained by most light planes. Older or overweight individuals are more susceptible to this condition. As a general rule, individuals should not fly within 24 hours following diving.

Occasionally a medical emergency arises as a result of compressed air diving, when a diver has been unable to adequately decompress before surfacing. In some of these cases air-evacuation is the only feasible method of getting the patient to a decompression chamber in time to treat the condition, and it should not be excluded. Flight, however, should be at the lowest possible altitude to avoid aggravating the condition. Information concerning diving, decompression and flying is readily available from various diving organizations, such as the Professional Association of Diving Instructors (PADI): http://www.padi.com/padi/default.aspx

Blood donations

Following a blood donation, time off flying is needed for the body to readjust. Allow 24 hours before flying after donation unless you have received specific medical advice that this period can be safely

shortened.

Hyperventilation

Hyperventilation, or over-breathing, is a disturbance of respiration that may occur in individuals as a result of emotional tension or anxiety. Under conditions of emotional stress, fright or pain, the breathing rate may increase, causing increased lung ventilation. More carbon dioxide is exhaled from the lungs than is produced by the body and as a result, carbon dioxide is "washed out" of the blood. The most common symptoms of hyperventilation are: dizziness; hot and cold sensations; tingling of the hands, legs and feet; muscle spasms; nausea; sleepiness; and finally unconsciousness.

In an individual who is behaving in an unusual manner, and you suspect hyperventilation or hypoxia (the initial symptoms are similar, assume the condition is hypoxia and supply oxygen. Select 100 per cent oxygen, check the oxygen supply, oxygen equipment and flow mechanism. If the condition was hypoxia, recovery is rapid. If the symptoms persist, consciously slow the breathing rate until symptoms clear and then resume normal breathing rate. Breathing can be slowed by breathing into a paper bag, and this increases the amount of carbon dioxide taken into the lungs, since expired carbon dioxide is re-breathed.

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