JAA LICENSING SECTORIAL TEAM

VERSION
15 March 2005
JAAC Adopted Version

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Final Rule
NPA – FCL 21-3 (Medical)

~~JAR-FCL 3.001~~
~~Definitions and Abbreviations~~
~~(See IEM FCL 1.001)~~

Deletion of the whole paragraph.

~~Category (of aircraft):~~

~~— Categorisation of aircraft according to specified basic characteristics, e.g. aeroplane, helicopter, glider, free balloon.~~

~~— Conversion (of a licence):~~

~~— The issue of a JAR-FCL licence on the basis of a licence issued by a non JAA State.~~

~~— Co-pilot:~~

~~— "Co-pilot" means a pilot operating other than as pilot-in-command, an aircraft for which more than one pilot is required under the list of types of aeroplanes (see Appendix 1 to JAR-FCL 1.220) or the type certification of the aircraft, or the operational regulations under which the flight is conducted, but excluding a pilot who is on board the aircraft for the sole purpose of receiving flight instruction for a licence or rating.~~

~~— Dual instruction time:~~

~~— Flight time or instrument ground time during which a person is receiving flight instruction from a properly authorised instructor.~~

~~— Flight time:~~

~~— The total time from the moment that an aircraft first moves under its own or external power for the purpose of taking off until the moment it comes to rest at the end of the flight.~~

~~— Instrument time:~~

~~— Instrument flight time or instrument ground time.~~

~~— Instrument flight time:~~

~~— Time during which a pilot is controlling an aircraft in flight solely by reference to instruments.~~

~~— Instrument ground time:~~

~~— Time during which a pilot is receiving instruction in simulated instrument flight in synthetic training devices (STDs).~~
~~— Medical Institute:~~

~~— A Medical Institute is an organisation consisting of clinical research and training facilities with a range of experts, including aeromedical specialists, available in the relevant area of aviation medicine to satisfy the technical need.~~

~~Multi-crew co-operation:~~

~~— The functioning of the flight crew as a team of co-operating members~~

led by the pilot-in-command.

— Multi-pilot aeroplanes:

— Aeroplanes certificated for operation with a minimum crew of at least two pilots.

— Night:

— The period between the end of evening civil twilight and the beginning of morning civil twilight, or such other period between sunset and sunrise as may be prescribed by the appropriate Authority.

— Other training devices:

— Training aids other than flight simulators, flight training devices or flight and navigation procedures trainers which provide means for training where a complete flight deck environment is not necessary.

— Private pilot:

— A pilot who holds a licence which prohibits the piloting of aircraft in operations for which remuneration is given.

— Professional pilot:

— A pilot who holds a licence which permits the piloting of aircraft in operations for which remuneration is given.

— Proficiency checks:

— Demonstrations of skill to revalidate or renew ratings, and including such oral examination as the examiner may require.

— Rating:

— An entry in a licence stating special conditions, privileges or limitations pertaining to that licence.

— Renewal (of e.g. a rating or approval):

— The administrative action taken after a rating or approval has lapsed that renews the privileges of the rating or approval for a further specified period consequent upon the fulfilment of specified requirements.

— Revalidation (of e.g. a rating or approval):

— The administrative action taken within the period of validity of a rating or approval that allows the holder to continue to exercise the privileges of a rating or approval for a further specified period consequent upon the fulfilment of specified requirements.

— Route sector:

— A flight comprising take-off, departure, cruise of not less than 15 minutes, arrival, approach and landing phases.

— Single-pilot aeroplanes:

— Aeroplanes certificated for operation by one pilot.

— Skill tests:

— Skill tests are demonstrations of skill for licence or rating issue,

~~including such oral examination as the examiner may require.~~

~~— Solo flight time:~~

~~— Flight time during which a student pilot is the sole occupant of an aircraft.~~

~~— Student pilot-in-command (SPIC):~~

~~— Flight time during which the flight instructor will only observe the student acting as pilot-in-command and shall not influence or control the flight of the aircraft.~~

~~— Touring Motor Glider (TMG):~~

A motor glider having a certificate of airworthiness issued or accepted by a JAA Member State having an integrally mounted, non-retractable engine and a non-retractable propeller plus those listed in Appendix 1 to JAR-FCL 1.215.

~~— It shall be capable of taking off and climbing under its own power according to its flight manual.~~

~~— Type (of aircraft):~~

~~— All aircraft of the same basic design, including all modifications except those modifications which result in a change of handling, flight characteristics or flight crew complement.~~

~~For abbreviations see IEM FCL 3.001~~

~~[Amdt.1, 01.12.00; Amdt. 2, 01.06.02]~~

~~**JAR-FCL 3.005 Applicability**~~
~~(See Appendix 1 to JAR–FCL 1.005)~~
~~(See AMC FCL 1.005 & 1.015)~~

Deletion of the whole paragraph.

~~(a) *General*~~

~~(1) The requirements set out in JAR-FCL shall apply to all arrangements made for training, testing and applications for the issue of licences, ratings, authorisations, approvals or certificates received by the Authority from 1 July 1999.~~

~~(2) Whenever licences, ratings, authorisations, approvals or certificates are mentioned in JAR-FCL, these are meant to be licences, ratings, authorisations, approvals or certificates issued in accordance with JAR-FCL. In all other cases these documents are specified as e.g. ICAO or national licences.~~

~~(3) Whenever a reference is made to JAA Member State for the purpose of mutual recognition of licences, ratings, authorisations, approvals or certificates, this means JAA full Member State.~~

~~(4) All synthetic training devices mentioned in JAR-FCL substituting an aircraft for training purposes are to be device qualified in accordance with JAR-STD and user approved in accordance with JAR-FCL by the Authority for the exercises to be conducted.~~

~~(5) Whenever a reference is made to aeroplanes this does not include microlights as defined nationally, unless otherwise specified.~~

~~(6) A licence issued on the basis of training performed outside a JAA Member State, except training done according to JAR-FCL 1.055(a)(1), shall have an entry to limit the privileges to aircraft registered in the State of licence issue.~~

~~(7) Rating(s) issued on the basis of training performed outside a JAA Member State, except training performed according to JAR-FCL 1.055(a)(1), shall be limited to aircraft registered in the State of licence issue.~~

~~(b) *Transitional arrangements*~~

~~(1) Training commenced prior to 1 July 1999 according to national regulations will be acceptable for the issue of licences or ratings under national regulations provided that training and testing is completed before 30th June 2002 for the applicable licence or rating.~~

~~(2) Licences and ratings, authorisations, approvals or medical certificates issued in accordance with the national regulations of JAA Member States before 1 July 1999 or issued in accordance with paragraph (1) above, shall continue to be valid with the same privileges, ratings and limitations, if any, provided that after 1 January 2000 all requirements for revalidation or renewal of such licences or ratings, authorisations, approvals or medical certificates shall be in accordance with the requirements of JAR-FCL, except as specified in sub paragraph (4).~~

~~(3) Holders of a licence issued in accordance with the national regulations of a JAA Member State before 1 July 1999 or in accordance with (b)(1) above, may apply to the State of licence issue for the issue of the equivalent licence specified in JAR-FCL 1 (Aeroplane) which extends the privileges to other States as set out in JAR-FCL 3.015(a)(1). For the issue of such licences, the holder shall meet the requirements set out in Appendix 1 to JAR-FCL 1.005.~~

~~(4) Holders of a licence issued in accordance with the~~

~~national regulations of a JAA Member State who do not fully meet the Section 1 requirements of JAR-FCL Part 3 (Medical) shall be permitted to continue to exercise the privileges of the national licence held.~~

~~(c) *Continuation of examiners holding national authorisations.* Examiners holding national authorisations prior to implementation date, may be authorised as JAR-FCL examiner provided that they have demonstrated a knowledge of JAR-FCL and JAR-OPS to the Authority. The authorisation will be for a maximum of 3 years. Thereafter re-authorisation will be subject to completion of the requirements set out in JAR-FCL 1.425(a) and (b).~~

~~[Amdt.1, 01.12.00; Amdt. 2, 01.06.02]~~

~~JAR-FCL 3.010~~ Basic authority to act as a flight crew member

Deletion of the whole paragraph.

~~(a) *Licence and rating*~~

~~(1) A person shall not act as a flight crew member of a civil aeroplane registered in a JAA Member State unless that person holds a valid licence and rating complying with the requirements of JAR-FCL and appropriate to the duties being performed, or an authorisation as set out in JAR-FCL 1.085 and/or 1.230. The licence shall have been issued by:~~

~~(i) a JAA Member State; or~~

(ii) another ICAO Contracting State and rendered

~~valid in accordance with JAR-FCL 3.015(b) or (c).~~

~~(2) Pilots holding national motor gliders licences/ratings/authorisations are also permitted to operate touring motor gliders under national regulations.~~

~~(3) Pilots holding a restricted national private pilot's licence are permitted, under national regulations to operate aeroplanes registered in the State of licence issue within that State's airspace.~~

~~(b) *Exercise of privileges.* The holder of a licence, rating or authorisation shall not exercise privileges other than those granted by that licence, rating or authorisation.~~

~~(c) *Appeals, Enforcement*~~

~~(1) A JAA Member State may at any time in accordance with its national procedures act on appeals, limit privileges, or suspend or revoke any licence, rating, authorisation, approval or certificate it has issued in accordance with the requirements of JAR-FCL if it is established that an applicant or a licence holder has not met, or no longer meets, the requirements of JAR-FCL or relevant national law of the State of licence issue.~~

~~(2) If a JAA Member State establishes that an applicant or licence holder of a JAR-FCL licence issued by another JAA Member State has not met, or no longer meets, the requirements of JAR-FCL or relevant national law of the State in which an aircraft is being flown, the JAA Member State shall inform the State of licence issue and the Licensing Division of the JAA Headquarters. In accordance with its national law, a JAA Member State may direct that in the interest of safety an applicant or licence holder it has duly reported to the State of licence issue and the JAA for the above reason may not pilot aircraft registered in that State or pilot any aircraft in that State's airspace.~~

JAR-FCL 3.015 Acceptance of licences, ratings, authorisations, approvals or certificates
(See Appendix 1 to JAR–FCL 1.015)
(See AMC FCL 1.005 & 1.015)

Deletion of subparagraphs (a) (2), (b), (c), (d).

(a) *Licences, ratings, authorisations, approvals or certificates issued by JAA Member States*

(1) Where a person, an organisation or a service has been licensed, issued with a rating, authorisation, approval or certificated by the Authority of a JAA Member State in accordance with the requirements of JAR–FCL and associated procedures, such licences, ratings, authorisations, approvals or certificates shall be accepted without formality by other JAA Member States.

~~(2) Training performed after 8 October 1996 and in accordance with all the requirements of JAR-FCL and associated procedures shall be accepted for the issuance of JAR-FCL licence and ratings, provided that licences in accordance with JAR-FCL shall not be issued until after 30 June 1999.~~

~~(b) *Licences issued by non-JAA States*~~

~~(1) A licence issued by a non-JAA State may be rendered valid at the discretion of the Authority of a JAA Member State for use on aircraft registered in that JAA Member State in accordance with Appendix 1 to JAR-FCL 1.015.~~

~~(2) Validation of a professional pilot's licence and a private pilot licence with instrument rating shall not exceed one year from the date of validation, provided that the basic licence remains valid. Any further validation for use on aircraft registered in any JAA Member State is subject to agreement by the JAA Member States and to any conditions seen fit within the JAA. The user of a licence validated by a JAA Member State shall comply with the requirements stated in JAR-FCL.~~

~~(3) The requirements stated in (1) and (2) above shall not apply where aircraft registered in a JAA Member State are leased to an operator in a non-JAA State, provided that the State of the operator has accepted for the period of lease the responsibility for the technical and/or operational supervision in accordance with JAR-OPS 1.165. The licences of the flight crews of the non-JAA State operator may be validated at the discretion of the Authority of the JAA Member State concerned, provided that the privileges of the flight crew licence validation are restricted for use during the lease period only on nominated aircraft in specified operations not involving a JAA operator, directly or indirectly, through a wet lease or other commercial arrangement.~~

~~(c) *Conversion of a licence issued by a non-JAA State.*~~

~~(1) A professional pilot licence and/or IR issued by a non-JAA State may be converted to a JAR-FCL licence provided that an arrangement exists between the JAA and the non-JAA State. This arrangement shall be established on the basis of reciprocity of licence acceptance and shall ensure that an equivalent level of safety exists between the training and testing requirements of the JAA and the non-JAA State. Any arrangement entered into will be reviewed~~

~~periodically, as agreed by the non-JAA State and the JAA. A licence converted according to such an arrangement shall have an entry indicating the non-JAA State upon which the conversion is based. Other Member States shall not be obliged to accept any such licence.~~

~~(2) A private pilot licence issued by a non-JAA State may be converted to a JAR-FCL licence with single-pilot aeroplane class/type ratings by complying with the requirements shown in Appendix 2 to JAR-FCL 1.015.~~

~~**[**(d) When an Authority issues a licence which deviates from JAR-FCL, an endorsement shall be made on the licence, under item XIII.**]**~~

~~[Amdt. 2, 01.06.02; Amdt. 3, 01.06.03]~~

~~JAR-~~FCL 3.025
Validity of licences and ratings
Deletion of subparagraphs (a), (c). New paragraph (b)(2) and new title to align with JAR-FCL 1.

~~(a) A licence holder shall not exercise the privileges granted by any~~

~~licence or rating issued by a JAA Member State unless the holder maintains competency by meeting the relevant requirements of JAR-FCL.~~

~~(b) The validity of the licence is determined by the validity of the ratings contained therein and the medical certificate.~~

~~(c) The licence will be issued for a maximum period of 5 years. Within this period of 5 years the licence will be re-issued by the Authority:~~

~~(1) after initial issue or renewal of a rating;~~

~~(2) when paragraph XII in the licence is completed and no further spaces remain;~~

~~(3) for any administrative reason;~~

~~(4) at the discretion of the Authority when a rating is revalidated.~~

~~Valid ratings will be transferred to the new licence document by the Authority.~~

~~The licence holder shall apply to the Authority for the re-issue of the licence.~~

~~The application shall include the necessary documentation.~~

(b) Validity of the licence and revalidation of a rating

(1) The validity of the licence is determined by the validity of the ratings contained therein and the medical certificate.

(2) When issuing, revalidating or renewing a rating, the Authority may extend the validity period of the rating until the end of the month in which the validity would otherwise expire, that date remains the expiry date of the rating.

JAR-FCL 3.065
State of Licence Issue

(For NPA and Long Term Exemption)

Amendment to paragraph (a), new paragraph (b) and renumbering of old paragraphs (b),(c) and (d).

(a) An applicant shall demonstrate the satisfactory completion of all requirements for licence issue to the Authority of ~~the State under whose authority the initial medical examination and assessment and the training and testing for the licence were carried out. Following licence issue, this State shall thereafter be referred to as~~ the 'State of licence issue' (see JAR–FCL 3.010(c)).

(b) In circumstances agreed by both Authorities, an applicant who has commenced training under the responsibility of one Authority may be permitted to complete the requirements under the responsibility of the other Authority.

The agreement shall allow for :

(1) theoretical knowledge training and examinations;
(2) medical examination and assessment;
(3) flight training and testing,

The Authorities shall agree on the 'State of licence issue'.

Renumbering thereafter.

[(c)**]** Further ratings may be obtained under JAR–FCL requirements in any JAA Member State and will be entered into the licence by the State of licence issue.

[(d)**]** For administrative convenience, e.g. revalidation, the licence holder may subsequently transfer a licence issued by the State of licence issue to another JAA Member State, provided that employment or normal residency is established in that State (see JAR–FCL 1.070). That State would thereafter become the State of licence issue and would assume the responsibility for licence issue referred to in (a) above.

[(e)**]** An applicant shall hold only one JAR–FCL licence (aeroplane) and only one medical certificate at any time.

[Amdt. 1, 01.06.00; Amdt. 2, 01.08.02; Amdt. 3, 01.07.03]

JAR-FCL 3.090
Authorised Medical Examiners (AMEs)

Adjustment to paragraph. New subparagraph (f)

(e) Authorisation. An AME will be authorised for a period not exceeding three years. Authorisation to perform medical examinations may be for Class 1 or Class 2 or both at the discretion of the Authority. To maintain proficiency and retain authorisation an AME should complete at least ten aeromedical examinations each year. For re-authorisation the AME shall have completed an adequate number of aeromedical examinations to the satisfaction of the AMS and shall also have undertaken relevant training during the period of authorisation (see AMC FCL 3.090). ~~Authorisation is invalid after the AME reaches 70 years of age~~.

(f) Enforcement. A JAA Member State may at any time in accordance with its national procedures revoke any Authorisation it has issued in accordance with the requirements of JAR-FCL if it is established that an AME has not met, or no longer meets, the requirements of JAR-FCL or relevant national law of the State of license issue.

JAR-FCL 3.105
Period of Validity of medical certificates

Adjustment to paragraph (a)(1)

(a) A medical certificate shall be valid from the date of the initial general medical examination and for:

(1) Class 1 medical certificates, 12 months, except that for holders who have passed their 40th birthday the interval is reduced to six months. ***This increase in frequency after the 40th birthday does not apply to flight engineers.***

Appendix 1 to JAR–~~FCL~~ 3.105
Validity *period/transfer* of medical ~~certificates~~ *records for Class 1 and Class 2 renewal*
(See JAR–FCL 3.105)

Adjustment to the Appendix

1 Class 1

(b) If a licence holder allows his Medical Certificate to expire by more than five years, renewal shall require an initial or extended, at AMS discretion, aeromedical examination, performed at an AMC which has obtained his ***relevant*** medical records. (***For example, the*** EEG may be omitted unless clinically indicated.)

(c) If a licence holder allows his Medical Certificate to expire by more than two years but less than five years, renewal shall require the prescribed standard or extended examination to be performed at an AMC which has obtained his ***relevant*** medical ***records*** ~~file~~, or by an AME at the discretion of the AMS, subject to the records of medical examinations for flight crew licences being made available to the medical examiners.

(d) If a licence holder allows his certificate to expire by more than 90 days but less than two years, renewal shall require the prescribed standard or extended examination to be performed at an AMC, or by an AME at the discretion of the AMS.

2 Class 2

(b) If a licence holder allows his Medical Certificate to expire by more than five years, renewal shall require an initial aeromedical examination. Prior to the ***certificate issue*** ~~examination~~ the ***relevant*** medical ***records*** ~~file~~ shall be obtained by the AME.

(c) If a licence holder allows his Medical Certificate to expire by more than ~~one~~ ***two*** year***s*** but less than five years, renewal shall require the prescribed examination to be performed. Prior to the examination the ***relevant*** medical ***records*** ~~file~~ shall be obtained by the AME.

(d) If a licence holder allows his certificate to expire by less than ***two*** ~~one~~ year**s**, renewal shall require the prescribed examination to be performed.

JAR–FCL 3.130
Cardiovascular system – Examination

Adjustment to the paragraph

(e) Estimation of serum~~/plasma~~ lipids, including cholesterol, is required to facilitate risk assessment at the examination for first issue of a medical certificate, and at the first examination after age 40 (see paragraph 2 Appendix 1 to Subpart B).

JAR–FCL 3.140
Cardiovascular system – Coronary artery disease

Adjustments to the paragraph

(a) Applicants with suspected ~~coronary artery disease~~ ***cardiac ischaemia*** shall be investigated. ~~Applicants~~ ***Those*** with asymptomatic minor coronary artery disease, requiring no treatment may ~~only~~ be considered fit by the AMS ~~subject to compliance with~~ ***if the investigations in*** paragraph 5 Appendix 1 to Subpart B ***are completed satisfactorily***.

(b) Applicants with symptomatic coronary artery disease***, or with cardiac symptoms controlled by medication,*** shall be assessed as unfit.

~~(c) [Applicants following myocardial infarction shall be assessed as unfit at the initial examination. A fit assessment may be considered by the AMS at renewal and revalidation examinations subject to compliance with paragraph 6 Appendix 1 to Subpart B].~~

(c) ***After an ischaemic cardiac event (defined as a myocardial infarction, angina, significant arrhythmia or heart failure due to ischaemia, or any type of cardiac revascularisation) initial Class 1 certification is not possible. Renewal or revalidation may be considered by the AMS if the investigations in paragraph 6 Appendix 1 to Subpart B are completed satisfactorily.***

~~(d) [Applicants following coronary by-pass surgery or coronary angioplasty/stenting shall be assessed as unfit at the initial examination. A fit assessment may be considered by the AMS at renewal and revalidation examinations subject to compliance with paragraph 7 Appendix 1 to Subpart B.]~~

JAR–FCL 3.145 Cardiovascular system – Rhythm/conduction disturbances

Adjustment to the paragraph

(a) Applicants with significant disturbance of supraventricular rhythm, including sinoatrial dysfunction, whether intermittent or established, shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart B.

(b) Applicants with asymptomatic sinus bradycardia or sinus tachycardia may be assessed as fit in the absence of underlying abnormality.

(c) Applicants with asymptomatic isolated uniform ~~atrial or~~ ***supra***-ventricular ***or ventricular*** ectopic complexes need not be assessed as unfit. Frequent or complex forms require full cardiological evaluation in compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart B.

(d) In the absence of any other abnormality, applicants with incomplete bundle branch block or stable left axis deviation may be assessed as fit.

(e) Applicants with complete right ~~or left~~ bundle branch block require cardiological evaluation on first presentation and subsequently in compliance with ***appropriate items in*** paragraph ~~8~~ ***7*** Appendix 1 to Subpart B.

(f) Applicants with complete left bundle branch block shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph 7 Appendix 1 to Subpart B.

(g) Applicants with first degree and Mobitz type 1 A-V block may be assessed as fit in the absence of underlying abnormality. Applicants with Mobitz type 2 or complete A-V block shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph 7 Appendix 1 to Subpart B.

~~(f)~~ ***(h)*** Applicants with broad and/or narrow complex tachycardias shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart B.

(i) Applicants with ventricular pre-excitation shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph 7 Appendix 1 to Subpart B.

~~(g)~~ ***(j)*** Applicants with an endocardial pacemaker shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart B.

(k) Applicants who have received ablation therapy shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph 7 Appendix 1 to Subpart B.

JAR FCL 3.170
Digestive system - Disorders

Deletion of a word

(c) Applicants with an established diagnosis or history of chronic inflammatory bowel disease shall ~~normally~~ be assessed as unfit (see paragraph 3 Appendix 3 to Subpart B).

JAR–FCL 3.235
Hearing requirements

Adjustments to the paragraph

(a) Hearing shall be tested at all examinations. The applicant shall understand correctly conversational speech when tested with each ear at a distance of 2 metres from and with his back turned towards the AME.

(b) Hearing shall be tested with pure tone audiometry at the initial examination and at subsequent revalidation or renewal examinations every five years up to the 40th birthday and every two years thereafter (see paragraph 1 Appendix 16 to Subpart B).

(c) At the initial examination for a Class 1 medical certificate there shall be no hearing loss in either ear, when tested separately, of more than 20 dB(HL) at any of the frequencies 500, 1 000 and 2 000 Hz, or of more than 35 dB(HL) at 3 000 Hz. ~~An applicant whose hearing loss is within 5 dB(HL) of these limits in two or more of the frequencies tested, shall undergo pure tone audiometry at least annually.~~

(d) At revalidation or renewal examinations, there shall be no hearing loss in either ear, when tested separately, of more than 35dB(HL) at any of the frequencies 500, 1 000, and 2 000 Hz, or of more than 50 dB(HL) at 3000 Hz. An applicant whose hearing loss is within 5 dB(HL) of these limits in two or more of the frequencies tested, shall undergo pure tone audiometry ~~at least~~ annually.

(e) At revalidation or renewal, applicants with hypoacusis may be assessed as fit by the AMS if a speech discrimination test demonstrates a satisfactory hearing ability (see paragraph 2 Appendix 16 to Subpart B).

JAR–FCL 3.250
Cardiovascular system – Examination

Adjustments to the paragraph

(a) An applicant for or holder of a Class 2 medical certificate shall not possess any abnormality of the cardiovascular system, congenital or acquired, which is likely to interfere with the safe exercise of the privileges of the applicable licence(s).

(b) A standard 12-lead resting electrocardiogram (ECG) and report are required at the examination for first issue of a medical certificate, at the first examination after the 40th birthday and at each aeromedical examination thereafter.

(c) Exercise electrocardiography is required only when clinically indicated in compliance with paragraph 1 Appendix 1 to Subpart C.

(d) Reporting of resting and exercise electrocardiograms shall be by specialists acceptable to the AMS.

(e) If two or more major risk factors (smoking, hypertension, diabetes mellitus, obesity, etc) are present in an applicant, estimation of ~~plasma~~ ***serum*** lipids and serum cholesterol is required at the examination for first issue of a medical certificate and at the first examination after age 40.

JAR–FCL 3.260
Cardiovascular system – Coronary artery disease

Adjustments to the paragraph

(a) Applicants with ***suspected cardiac ischaemia shall be investigated. Those with*** asymptomatic, minor, coronary artery disease***, requiring no treatment,*** may be considered fit by the AMS ~~subject to compliance with~~ ***if the investigations in*** paragraph 5 Appendix 1 to Subpart C ***are completed satisfactorily***.

(b) Applicants with symptomatic coronary artery disease***, or with cardiac symptoms controlled by medication,*** shall be assessed as unfit.

~~(c) Applicants following myocardial infarction shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph 6 Appendix 1 to Subpart C.~~

(c) ***After an ischaemic cardiac event (defined as a myocardial infarction, angina, significant arrhythmia or heart failure due to ischaemia, or any type of cardiac revascularisation) Class 2 certification may be considered by the AMS if the investigations in paragraph 6 Appendix 1 to Subpart C are completed satisfactorily.***

~~**[**(d) Applicants following coronary bypass surgery or coronary angioplasty/stenting shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph 7 Appendix 1 to Subpart C.**]**~~

JAR–FCL 3.265 Cardiovascular system – Rhythm/conduction disturbances

Adjustment to the paragraph

(a) Applicants with significant disturbance of supraventricular rhythm, including sinoatrial dysfunction, whether intermittent or established, shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart C.

(b) Applicants with asymptomatic sinus bradycardia or sinus tachycardia may be assessed as fit in the absence of underlying abnormality.

(c) Applicants with asymptomatic isolated uniform ~~atrial or~~ ***supra***-ventricular ***or ventricular*** ectopic complexes need not be assessed as unfit. Frequent or complex forms require full cardiological evaluation in compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart C.

(d) In the absence of any other abnormality, applicants with incomplete bundle branch block or stable left axis deviation may be assessed as fit.

(e) Applicants with complete right ~~or left~~ bundle branch block require cardiological evaluation on first presentation and subsequently in compliance with ***appropriate items in*** paragraph ~~8~~ ***7*** Appendix 1 to Subpart C.

(f) Applicants with complete left bundle branch block shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph 7 Appendix 1 to Subpart C.

(g) Applicants with first degree and Mobitz type 1 A-V block may be assessed as fit in the absence of underlying abnormality. Applicants with Mobitz type 2 or complete A-V block shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph 7 Appendix 1 to Subpart C.

~~(f)~~ ***(h)*** Applicants with broad and/or narrow complex tachycardias shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart C.

(i) Applicants with ventricular pre-excitation shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph 7 Appendix 1 to Subpart C.

~~(g)~~ ***(j)*** Applicants with an endocardial pacemaker shall be assessed as unfit. A fit assessment may be considered by the AMS subject to compliance with paragraph ~~8~~ ***7*** Appendix 1 to Subpart C.

(k) Applicants who have received ablation therapy shall be assessed as unfit. A fit assessment may be considered by the AMS in compliance with paragraph 7 Appendix 1 to Subpart C.

JAR-FCL 3.290
Digestive system - Disorders

Deletion of a word

(c) Applicants with an established diagnosis or history of chronic inflammatory bowel disease shall ~~normally~~ be assessed as unfit (see paragraph 3 Appendix 3 to Subpart C).

JAR–FCL 3.355
Hearing requirements

Adjustments to the paragraph

(a) Hearing shall be tested at all examinations. The applicant shall be able to understand correctly ordinary conversational speech when at a distance of 2 metres from and with his back turned towards the AME.

(b) If an instrument rating is to be added to the applicable licence(s), a hearing test with pure tone audiometry (see paragraph 1 Appendix 16 to Subpart C) is required at the first examination for the rating and shall be repeated every 5 years up to the 40th birthday and every 2 years thereafter.

(1) **[**At the initial examination for Class 2 Medical Certificate with instrument ratings**]** there shall be no hearing loss in either ear, when tested separately, of more than 20 dB(HL) at any of the frequencies 500, 1 000 and 2 000 Hz, or of more than 35 dB(HL) at 3 000 Hz. ~~**[**An applicant whose hearing loss is within 5 dB(HL) of these limits in two or more of the frequencies tested shall undergo pure tone audiometry at least annually.**]**~~

(2) **[**At revalidation or renewal examinations, there shall be no hearing loss in either ear, when tested separately, of more than 35 dB(HL) at any of the frequencies 500, 1000 and 2000 Hz, and of more than 50 dB(HL) at 3000 Hz. An applicant whose hearing loss is within 5 dB(HL) of these limits in two or more of the frequencies tested, shall undergo pure tone audiometry ~~at least~~ annually.**]**

(3) At revalidation or renewal examinations, applicants with hypoacusis **[**may**]** be assessed as fit if **[**by the AMS**]** if a speech discrimination test demonstrates a satisfactory hearing ability in accordance with paragraph 2 Appendix 16 to Subpart C.

JAR-FCL 3
Appendices to Subparts B & C

CONTENTS:

Appendix 1 to Subparts B & C
Cardiovascular system
(See JAR–FCL 3.130 through 3.150 and 3.250 through 3.270)

Adjustment to the Appendix; renumbering of paragraphs; adjustment to paragraphs 5-10

5 In suspected asymptomatic coronary artery disease, exercise electrocardiography shall be required **[**~~and,~~ ***followed,*** if necessary, ***by further tests (myocardial perfusion scanning, stress echocardiography, coronary angiography or equivalent investigations acceptable to the AMS) which shall show no evidence of myocardial ischaemia or significant coronary artery stenosis.*** ~~followed by scintigraphy or stress echocardiography and/or coronary angiography.~~**]**

~~**[**6 Asymtomatic applicants who have satisfactorily reduced vascular risk factors present following myocardial infarction or other myocardial ischaemic event, and who require no medication for ischaemic heart pain shall, at least 6 months following the index event have completed investigations, demonstrating:~~

6 ***After an ischaemic cardiac event, including revascularisation, applicants without symptoms shall have reduced any vascular risk factors to an appropriate level. Drugs, when used only to control cardiac symptoms, are not acceptable. All applicants should be on acceptable secondary prevention treatment.***

A coronary angiogram obtained around the time of, or during, the ischaemic cardiac event shall be available. A complete and detailed clinical report of the ischaemic event, the angiogram and any operative procedures shall be available to the AMS.

There shall be no stenosis more than 50% in any major untreated vessel, in any vein or artery graft or at the site of an angioplasty/stent, except in a vessel leading to an infarct. More than two stenoses between 30% and 50% within the vascular tree should not be acceptable.
The whole coronary vascular tree shall be assessed as satisfactory by a cardiologist acceptable to the AMS, and particular attention should be paid to multiple stenoses and/or multiple revascularisations.

An untreated stenosis greater than 30% in the left main or proximal left anterior descending coronary artery should not be acceptable.

At least 6 months from the ischaemic cardiac event, including revascularisation, the following investigations shall be completed:

(a) a***n*** ~~symptom limited 12 lead~~ exercise ECG ***(symptom limited*** to Bruce Stage IV, or equivalent***)***, ~~which a cardiologist acceptable to the AMS interprets as~~ showing no evidence of myocardial ischaemia ***nor rhythm disturbance***; ~~Scintigraphy and/or stress echocardiography may be required if the ECG is abnormal at rest;~~**]**

(b) ~~a left ventricular ejection fraction of ? 0·50 without significant abnormality of wall motion such as dyskinesia, hypokinesia or akinesia and a normal right ventricular ejection fraction;~~

an echocardiogram (or equivalent test acceptable to the AMS) showing satisfactory left ventricular function with no important abnormality of wall motion (such as dyskinesia or akinesia) and a left ventricular ejection fraction of 50% or more;

[(c) ~~a 24-hour ambulatory ECG, showing no significant conduction disturbance, nor complex, nor sustained rhythm disturbance;~~**]**

in cases of angioplasty/stenting, a myocardial perfusion scan or stress echocardiography (or equivalent test acceptable to the AMS) which shall show no evidence of reversible myocardial ischaemia. If there is any doubt about myocardial perfusion in other cases (infarction or bypass grafting) a perfusion scan will also be required;

(d) ~~a coronary angiogram shall show <30% stenosis in any vessel remote from any myocardial infarction and no functional impairment of myocardium subtended by any such vessel.~~

Further investigations, such as a 24 hour ECG, may be necessary to assess the risk of any significant rhythm disturbance.

~~[(e) Follow up with annual cardiological review by a cardiologist acceptable to the AMS, including an exercise ECG or exercise scintigraphy/stress echocardiography if the resting ECG is abnormal.]~~

~~[(f) Five yearly coronary angiography shall be considered, but may not be necessary if the exercise ECG shows no deterioration and is acceptable to the AMS.]~~

Follow-up shall be yearly (or more frequently if necessary) to ensure that there is no deterioration of cardiovascular status. It shall include a review by a specialist acceptable to the AMS, exercise ECG and cardiovascular risk assessment. Additional investigations may be required by the AMS.

After coronary artery vein bypass grafting, a myocardial perfusion scan (or equivalent test acceptable to the AMS) shall be performed if there is any indication, and in all cases within five years from the procedure.

In all cases coronary angiography, or an equivalent test acceptable to the AMS, shall be considered at any time if symptoms, signs or non-invasive tests indicate cardiac ischaemia.

AMS assessment

~~Class 1 applicants successfully completing this review shall be limited to multi-pilot operation only. Class 2 applicants successfully completing the items in paragraph 6(a), (b) and (c) of the review may be assessed as fit with safety pilot restriction.~~

Successful completion of the six month review will allow Class 1 applicants to fly multi-pilot (OML).

~~Class 2 applicants successfully completing paragraph 6(d) of the review may be assessed as fit without restriction.~~

Class 2 applicants having fulfilled the criteria mentioned in paragraph (6) may fly unrestricted, but the AMS may require a period of flying with a safety pilot before solo flying is authorised. Class 2 applicants (for renewal/revalidation) can fly, at the discretion of the AMS, with a safety pilot limitation (OSL) having completed ~~at least~~ only an exercise ECG to the standards in 6 (a) above.

~~[7 An asymptomatic applicant having satisfactorily reduced his/her vascular risk factors present, who requires no medication for ischaemic heart pain shall, at least 6 months after coronary artery by-pass surgery or angioplasty/stenting have completed investigations demonstrating:]~~

~~[(a) a symptom limited 12 lead exercise ECG to Bruce Stage IV, or equivalent, which a cardiologist acceptable to the AMS interprets as showing no evidence of myocardial ischaemia. Scintigraphy and/or stress echocardiography may be required if the ECG is abnormal at rest;]~~

~~(b) a left ventricular ejection fraction of ?0·50 without significant abnormality of wall motion such as dyskinesia, hypokinesia or akinesia and a normal right ventricular ejection fraction;~~

~~[(c) a 24-hour ambulatory ECG shall show no significant conduction disturbance, nor complex, nor sustained rhythm disturbance, nor evidence of myocardial ischaemia;]~~

~~[(d) a coronary angiogram which shall show <30% stenosis in any major epicardial vessel (or its graft(s)) which has not been subjected to revascularisation (i.e. arterial or saphenous vein graft, coronary angioplasty, or stenting). Furthermore, there shall be no lesion(s) >30% stenosis in any angioplasted/stented vessel. No functional impairment of the myocardium is permitted, the single exception being in the territory of a vessel which has substended a demonstrably completed myocardial infarction (see para 6 to Appendix 1 to Subpart B & C above). In such a circumstance the overall left ventricular ejection must exceed 0·50. Multiple angioplasty dilatations/stenting in the same or more than one vessel shall require very close supervision/denial.]~~

~~[(e) Follow up with annual cardiological review by a cardiologist acceptable to the AMS, including exercise ECG or exercise scintigraphy/stress echocardiography if the resting ECG is abnormal.]~~

~~[(f) Five yearly coronary angiography shall be considered, but may not be necessary if the exercise ECG shows no deterioration and is acceptable to the AMS.]~~

~~*AMS assessment*~~

~~Class 1 applicants successfully completing this review shall be limited to multi-pilot operations only. Class 2 applicants successfully completing the items in paragraphs (a), (b) and (c) of this review may be assessed as fit with safety pilot restriction.~~

~~Class 2 applicants successfully completing paragraph 7(d) of this review may be assessed without restriction.~~

~~8~~ ***7*** ~~(a)~~Any significant ~~disorder of~~ rhythm or conduction ***disturbance*** requires evaluation by a cardiologist acceptable to the AMS ***and appropriate follow-up in the case of a fit assessment***.

(a) Such evaluation shall include:

~~(1) a resting and exercise ECG to Bruce Stage IV, or equivalent, which a cardiologist acceptable to the AMS interprets as showing no significant myocardial ischaemia. Myocardial scintigraphy/stress echocardiography may be required if the ECG is abnormal at rest;~~

(1) ***Exercise ECG to the Bruce protocol or equivalent. The test should be to maximum effort or symptom limited. Bruce stage 4 shall be achieved and no significant abnormality of rhythm or conduction, nor evidence of myocardial ischaemia shall be demonstrated. Withdrawal of cardioactive medication prior to the test should be considered.***

(2) ~~a~~ 24-hour ambulatory ECG ~~showing no~~ ***which shall demonstrate no*** significant ***rhythm or*** conduction disturbance~~; nor complex, nor sustained rhythm disturbance, nor evidence of myocardial ischaemia. (See guidance material for limits of tolerance);~~

(3) ~~a~~ 2D Doppler echocardiogram ***which shall*** show~~ing~~ no significant selective chamber enlargement, ~~nor~~ ***or*** **significant** structural, ~~nor~~ ***or*** functional abnormality, ***and a left ventricular ejection fraction of at least 50%***. ~~of the heart valves nor the myocardium and may include~~

~~(4) a coronary angiogram which shall show no significant coronary artery disease as defined in paragraphs 5, 6 and 7 of Appendix 1 to Subparts B & C;~~

(b) Further evaluation may include:

(1) Repeat 24-hour ECG recording;

~~(5)~~ ***(2)*** electrophysiological ***study;*** ~~investigation which a cardiologist acceptable to the AMS shall interpret as failing to demonstrate features which might predispose the applicant to incapacitation.~~

(3) myocardial perfusion scanning, or equivalent test;

(4) cardiac MRI or equivalent test;

(5) coronary angiogram or equivalent test (see Appendix 1 paragraph 6).

~~(b) In cases as described in JAR-FCL 3.145 and 3.265(a), (e), (f) and (g) any fit assessment by the AMS shall be restricted to multi-pilot operation (Class 1 'OML') or safety pilot limitation (Class 2 'OSL'), noting that:~~

~~(1) one atrial or junctional ectopic complex per minute on a resting ECG may require no further evaluation; and~~

~~(2) one ventricular ectopic complex per minute on a resting ECG may require no further evaluation.~~

~~(3) after one year following the first appearance of complete right bundle branch block or three years for left bundle branch block the OML/OSL limitation may be lifted provided repeat evaluation in accordance with 8(a) (1-3) above reveals no change.~~

(c) AMS Assessment Class 1

(1) Atrial fibrillation/flutter

(i) Initial Class 1 certification shall be limited to applicants with a single episode of arrhythmia which is considered by the AMS to be unlikely to recur.

(ii) Revalidation/renewal Class 1 shall be determined by the AMS.

(2) Complete right bundle branch block

(i) Initial Class 1 certification may be considered by the AMS if the applicant is under age 40 years. If over age 40 years, initial Class 1 applicants should demonstrate a period of stability, normally 12 months.

(ii) Unrestricted Class 1 revalidation/renewal may be considered if the applicant is under age 40 years. A n OML should beapplied for 12 months for those over 40 years of age .

(3) Complete left bundle branch block

Investigation of the coronary arteries is necessary in applicants over age 40.

(i) Initial Class 1 applicants should demonstrate a 3 year period of stability.

(ii) Unrestricted Class 1 revalidation/renewal may be considered after a 3 year period with an OML applied.

(4) Ventricular pre-excitation

(i) Asymptomatic Class 1 applicants with pre-excitation may be considered by the AMS for revalidation/renewal with OML.

(ii) Asymptomatic initial Class 1 applicants with pre-exitation may be considered by the AMS if an electrophysiological study, including adequate drug-induced autonomic stimulation reveals no inducible re-entry tachycardia and the existence of multiple pathways is excluded.

(5) Pacemaker

~~(c)~~ Following permanent implantation of a subendocardial pacemaker a fit assessment ***which shall be no sooner than*** ~~may be considered by the AMS~~ three months after insertion ~~provided~~ ***shall require***:

(1) ~~there is~~ no other disqualifying ~~disorder~~ ***condition***;

(2) a bipolar lead system ~~has been used~~;

(3) ***that*** the applicant is not pacemaker dependent;

~~(4) a symptom limited 12 lead exercise ECG to Bruce Stage IV, or equivalent, reviewed by a cardiologist acceptable to the AMS, shows no abnormality inappropriate to the indication for which the pacemaker was inserted. Myocardial scintigraphy/stress echocardiography may be required.~~

~~(5) a 2D Doppler echocardiogram shows no significant selective chamber enlargement, nor structural, nor functional abnormality of any heart valve or of the myocardium;~~

~~(6) a Holter recording shall demonstrate no symptomatic or asymptomatic paroxysmal tachyarrhythmia;~~

~~(7) a six monthly follow up by a cardiologist acceptable to the AMS with a pacemaker check and Holter monitoring is completed;~~

(4) regular follow -up including a pacemaker check; and

~~(8)~~ ***(5)*** ~~recertification~~ ***Revalidation/renewal*** is restricted to multi-crew operation (Class 1 'OML'). ~~Class 2 certification without restriction may be applicable according to AMS assessment~~.

(6) Ablation

Class 1 applicants having undergone successful catheter ablation shall be restricted to OML operations for at least one year, unless an electrophysiological study, undertaken at a minimum of two months after the ablation, demonstrates satisfactory results. For those in whom the long term outcome cannot be assured by invasive or non-invasive testing, an additional period of restriction and / or observation may be necesssary.

(d) AMS assessment Class 2

The AMS assessment Class 2 should follow the Class 1 assessment procedures. An OSL or OPL restriction may be considered.

Renumbering thereafter

~~10~~ ***9*** (a) ....

(b) *Valvular Abnormalities*

(1)

.....

(5) Mitral leaflet prolapse/mitral regurgitation. Asymptomatic applicants with isolated mid-systolic click may need no restriction. Applicants with uncomplicated minor regurgitation ~~shall~~ ***may need to*** be restricted to multi-pilot operations ***as determined by the AMS***. Applicants with evidence of volume overloading of the left ventricle demonstrated by increased left ventricular end-diastolic diameter shall be assessed as unfit. ~~Annual~~ ***Periodic*** review ~~by a cardiologist acceptable to the AMS~~ and assessment ***as determined*** by the AMS is required.

(c) .....

Renumbering of remaining paragraphs thereafter

Appendix 3 to Subparts B and C
Digestive System
(See JAR-FCL 3.165, 3.170, 3.285 and 3.290)

Adjustment to paragraph 3

Established ~~C~~**c**hronic inflammatory bowel disease (~~regional ileitis,~~ ***Crohn's Disease***, ulcerative colitis~~, diverticulitis~~) is disqualifying. ***In cases of ulcerative colitis*** ~~Re-~~certification (Class 1 and 2) ~~and initial certification (Class 2)~~ may be considered by the AMS if there is full remission ***(minimum of one year)*** and, ***for Class 1,*** ~~minimal, if any,~~ ***minimum*** medication ***only*** is ***required*** ~~being taken~~. ***Systemic steroids are not acceptable***. ***In Cases of Crohn's disease, certification (Class 1 and Class 2) may be considered by the AMS if there is full remission (minimum of one year, without medication) and, for Class 1, disease was minimal and has completely excised surgically, and medication is not required.*** ~~Regular follow up is required and multi-pilot~~ ~~(~~***A*** Class 1 'OML'~~)~~ or ~~safety pilot~~ ~~(~~Class 2 'OSL'~~)~~ restriction may be appropriate.

Appendix 16 to Subparts B and C
Hearing requirements
(See JAR–FCL 3.235 and 3.355)

Adjustment to the Appendix

1 The pure tone audiogram shall cover ~~at least~~ the frequencies from ***500 to 3000***–~~8 000~~ Hz. Frequency thresholds shall be determined as follows:

~~250 Hz~~
500 Hz
1 000 Hz
2 000 Hz
3 000 Hz
~~4 000 Hz~~
~~6 000 Hz~~
~~8 000 Hz~~

IEM FCL 3.095(a) & (b)
Summary of minimum ~~periodic~~ requirements

Adjustment to the table

LICENCE	CLASS 1 COMMERCIAL PILOT AIRLINE TRANSPORT PILOT	CLASS 2 STUDENT PILOT PRIVATE PILOT
INITIAL EXAMINATION (Reference JAR–FCL 3.100)	AMC	AMC OR AME *
ISSUE OF MEDICAL CERTIFICATE (JAR-FCL 3.100)	Initial: AMS Renewal: AMC or AME	AMC or AME
VALIDITY OF CERTIFICATE ROUTINE MEDICAL EXAMINATION (3.105)	Under 40 – 1 year 40 and over – 6 monthly ***Flight engineers: 1 year***	Under 30 – 5 years ~~Under 50 – 2 years~~ ***30 - 49*** - 2 years 50 and over – 1 year
CHEST X-RAY (3.155 and 3.275)	At initial	If indicated
ELECTROENCEPHALOGRAM (3.210 and 3.330)	At initial	If indicated
HAEMOGLOBIN (3.180 and 3.300)	At initial then every examination	At initial
ELECTROCARDIOGRAM (3.130 and 3.250)	At initial then under 30 – 5 yearly 30 – 39 – 2 yearly 40 – 49 – annually 50 and over – 6 monthly	At initial then ~~age~~ 40 – 49 – 2 yearly 50 and over – annually
AUDIOGRAM (3.235 and 3.355)	At initial then under 40 – 5 yearly 40 and over – 2 yearly	At initial issue of instrument rating then under 40 – 5 yearly 40 and over – 2 yearly
COMPREHENSIVE OTORHINOLARYNGOLOGICAL EXAMINATION (3.230 and 3.350)	At initial then under 40 – 5 yearly 40 and over – 2 yearly	At initial by AME
COMPREHENSIVE OPHTHALMOLOGICAL EXAMINATION (3.215 and 3.335)	At initial then ~~under 40 5 yearly~~ ~~40 and over 2 yearly~~ ***every 2 years if refractive correction is required for medical certification***	At initial by AME ***then every 5 years if refractive error is over +/- 5 dioptres***
LIPID PROFILE (3.130 and 3.250)	At initial then age 40	If two or more coronary risk factors are identified at initial then age 40
PULMONARY FUNCTION TESTS (3.155 and 3.275)	At initial then peak flow at age 30, 35, 40 then 4 yearly	Peak flow at initial then at age 40 Then 4-yearly
URINALYSIS (3.185 and 3.305)	At initial then every examination	At initial then every examination

IEM FCL 3.095 (c)
Adjustment to box 234 (Audiometry)

MEDICAL EXAMINATION REPORT

(201) Examination Category	(202) Height	(203) Weight	(204) Eye Colour	(205) Hair Colour	(206) Blood Pressure-seated mmHg		(207) Pulse - resting	
					Systolic	Diastolic	Rate	Rhythm
Initial ☐ Extended ☐ Renewal/Reval ☐ Special referral ☐	cm	kg						

Clinical exam: Check each item

	Normal	Abnormal		Normal	Abnormal
(208) Head, face, neck, scalp (209) Mouth, throat, teeth			(218) Abdomen, hernia, liver, spleen (219) Anus, rectum		
(210) Nose, sinuses			(220) Genito - urinary system		
(211) Ears, drums, eardrum motility			(221) Endocrine system		
(212) Eyes - orbit & adnexa; visual fields			(222) Upper & lower limbs, joints		
(213) Eyes - pupils and optic fundi			(223) Spine, other musculoskeletal		
(214) Eyes - ocular motility; nystagmus			(224) Neurologic - reflexes, etc.		
(215) Lungs, chest, breasts			(225) Psychiatric		
(216) Heart (217) Vascular system			(226) Skin, identifying marks and lymphatics (227) General systemic		

(228) **Notes:** Describe every abnormal finding. Enter applicable item number before each comment.

Visual acuity

(229) *Distant vision at 5m /6m*

		Corrected to	Glasses	Contact lenses
Right eye, uncorr.		Corrected to		
Left eye, uncorr.		Corrected to		
Both eyes, uncorr.		Corrected to		

(230) *Intermediate vision*

N14 at 100 cm	Uncorrected Yes	Uncorrected No	Corrected Yes	Corrected No
Right eye				
Left eye				
Both eyes				

(231) *Near vision*

N5 at 30-50 cm	Uncorrected Yes	Uncorrected No	Corrected Yes	Corrected No
Right eye				
Left eye				
Both eyes				

(232) **Glasses** Yes ☐ No ☐ Type:

(233) **Contact lenses** Yes ☐ No ☐ Type:

Refraction	Sph	Cyl	Axis	Add
Right eye				
Left eye				

(234) **Hearing** (when 241 not performed)

	Right ear	Left ear
Conversional voice test at 2 m back turned to examiner	Yes ☐ No ☐	Yes ☐ No ☐

Audiometry

Hz	500	1000	2000	3000
Right				
Left				

(235) **Urinanalysis** Normal ☐ Abnormal ☐

Glucose	Protein	Blood	Other

(236) **Pulmonary function**

Peak Expiratory Flow l/min

Normal ☐ Abnormal ☐

(237) **Haemoglobin**

g/dl

Normal ☐ Abnormal ☐

Accompanying Reports

	Not performed	Normal	Abnormal
(238) ECG			
(239) Audiogram			
(240) Ophthalmology			
(241) ORL (ENT)			
(242) Chest X-ray			
(243) Blood lipids			
(244) Pulmonary function			
(245) EEG			
Other			

(246) **Colour perception**

Pseudo-isochromatic plates Type:

No of plates: No of errors:

(247) **Aviation medical examiner's recommendation**

Name of applicant: Date of birth:

_____

_____

Fit Class _____

Medical certificate issued class _____

Unfit class_____ (JAR -FCL para_____)

Deferred for further evaluation. If yes, why and to whom?

(248) **Comments, restrictions, limitations:**

(249) **Medical examiner's declaration:**

<table>
<tr><td colspan="3">I hereby certify that I/my AME group have personally examined the applicant named on this medical examination report and that this report with any attachment embodies my findings completely and correctly.</td></tr>
<tr><td>(250) Place and date:</td><td rowspan="2">Examiner's Name and Address:(Block Capitals)

Telephone No.:
Telefax No.:</td><td rowspan="2">AME Stamp with AME No.:</td></tr>
<tr><td>Authorised Medical Examiners Signature:</td></tr>
</table>

IEM FCL 3.100 *(1)*
Medical certificates

Changes to the medical certificates

MEDICAL CERTIFICATION

MINIMUM PERIODIC REQUIREMENTS

ABBREVIATED TEXT

Full text refer to JAR - FCL 3.105, Subpart B and C and Appendices 1 to 18

INITIAL EXAMINATION	***CLASS 1*** ***CPL ATPL*** ***AMC***	***CLASS 2*** ***PPL*** ***AMC or AME***
Max. medical certificate validity (45 days for re-exam) No extensions	Under 40 - 12 months 40 plus - 6 months	Under 30 - 60 months 30 – 49 - 24 months 50 plus - 12 months
Haemoglobin	Every examination	If indicated
Electrocardiogram	Under 30 - 5 yearly 30–39 - 2 yearly 40–49 - Annually 50 plus - 6 monthly	40 – 49 - 2 yearly 50 plus - Annually
Audiogram	Under 40 - 5 yearly 40 plus - 2 yearly	Initial Instrument Rating Under 40 - 5 yearly 40 plus - 2 yearly
Extended otorhinolaryng	Under 40 - 5 yearly 40 plus - 2 yearly	If indicated
Extended ophthalmology	Under 40 - 5 yearly 40 plus - 2 yearly	Initial then if indicated
Lipid profile	Age 40	If 2 or more risk factors initial and at age 40
Pulmonary Peak Flow	Ages 30, 35, 40, then 4 yearly	Age 40, then 4 yearly
Urinalysis	Every examination	Every examination

Any test may be required at any time if clinically indicated

LOGO

NAME OF NATIONAL AUTHORITY

NATIONAL LANGUAGE 1/2
MEDICAL CERTIFICATE CLASS 1/2

PERTAINING TO A FLIGHT CREW LICENCE

I	Nat.lang./*State of Issue*	**II**	**Nat. Lang./* Medical Certificate Class 1/2 (Class of certificate)**
III	Nat. lang./*JAA Licence No(s) (if Held) and/or NAA licence/reference No(s) (if applicable)*:	IX	National lang./** Expiry date: Class 1 (dd/mm/yyyy): Class 2 (dd/mm/yyyy):
IV	National language:/ *Last and first name of holder*:	XIII	National lang./*Limitations*: *** Code. Description :
XIV	National lang.:/*Date of birth: (dd/mm/yyyy)*	X	Nat. lang./**** *Date of issue*: (dd/mm/yyyy)
VI	National lang./*Nationality*:		
VII	National language/ *Signature of holder*:	XI	Signature of issuing officer: National lang./*Stamp*:

IX. Nat. lang./ Expiry date of this certificate (dd/mm/yyyy)	Class 1 (dd/mm/yyyy)	
	Class 2 (dd/mm/yyyy)	

Nat. lang./ Examination date: (dd/mm/yyyy)			
Nat. lang./Expiry date of previous Medical Certificate			
Nat. lang./ Advisory Information	Most recent (dd/mm/yyyy)	Next (dd/mm/yyyy)	
Nat. lang/ECG			
Nat. lang. / Audiogram/ extended ENT			
Nat. lang./ Ophtalmology (when required)			
Nat. lang./Peak flow			

2 3 4

* Need not be included here if already on front page
** If the Class 1 expiry date is included in the table at the end of the certificate, along with the other dates, it needs not be included here
*** Either the code plus the written description is placed in this section, or just the code. If just the code, a written description (in English) of what the code means needs to be included elsewhere on the certificate
**** Date of issue is date the certificate is issued and signed

MEDICAL CERTIFICATION

MINIMUM PERIODIC REQUIREMENTS

ABBREVIATED TEXT

Full text refer to JAR-FCL 3.105, Subpart B and C and Appendices 1 to 18

INITIAL EXAMINATION	*CLASS 1 CPL ATPL* *AMC*	*CLASS 2 PPL* *AMC or AME*
Max. medical certificate validity (45 days for re-exam) No extensions	Under 40 - 12 months 40 plus - 6 months	Under 30 - 60 months 30 – 49 - 24 months 50plus - 12 months
Haemoglobin	Every examination	If indicated
Electrocardiogram	Under 30 - 5 yearly 30–39 - 2 yearly 40–49 - Annually 50 plus - 6 monthly	40 – 49 - 2 yearly 50 plus - Annually
Audiogram	Under 40 - 5 yearly 40 plus - 2 yearly	Initial Instrument Rating Under 40 - 5 yearly 40 plus - 2 yearly
Extended otorhinolaryng	Under 40 - 5 yearly 40 plus - 2 yearly	If indicated
Extended ophthalmology	Under 40 - 5 yearly 40 plus - 2 yearly	Initial then if indicated
Lipid profile	Age 40	If 2 or more risk factors initial and at age 40
Pulmonary Peak Flow	Ages 30, 35, 40, then 4 yearly	Age 40, then 4 yearly
Urinanalysis	Every examination	Every examination

Any test may be required at any time if clinically indicated

LOGO

NAME OF NATIONAL AUTHORITY

NATIONAL LANGUAGE 2
MEDICAL CERTIFICATE CLASS 2

PERTAINING TO A
FLIGHT CREW LICENCE

I	Nat. lang./*State of Issue*	**Nat. Lang./* *Medical certificate Class 2* (Class of certificate)**	
III	Nat. lang.:/JAA Licence No(s)(if held) and/or NAA licence/reference No(s) (if applicable):	IX National lang./** Expiry date Class 2 (dd/mm/yyyy):	
IV	National language/ *Last and first name of holder:*	XIII National lang./*Limitations*: *** Code. Description:	
XIV	National lang.:/*Date of birth* ®*(dd/mm/yyyy)*	X Nat. lang./*** *Date of issue (dd/mm/yyyy)*	
VI	National lang./*Nationality*:		
VII	National language/ *Signature of holder:*	XI *signature/of issuing officer:* National lang./*Stamp*:	

IX. National language /Expiry date of this certificate Class 2: (dd/mm/yyyy)	

Nat. lang./ Examination date: *(dd/mm/yyyy)*			
Nat lang/Expiry date of previous Medical Certificate			
Nat. lang./ Advisory Information	Most recent (dd/mm/yyyy)	Next (dd/mm/yyyy)	
Nat. lang/ECG			
Nat. lang./ Audiogram/ extended ENT			
Nat. lang./ Ophthalmology (when required)			
Nat. lang./Peak flow			

2 3 4

* Need not be included here if already on front page
** If the Class 1 expiry date is included in the table at the end of the certificate, along with the other dates, it needs not be included here
*** Either the code plus the written description is placed in this section, or just the code. If just the code, a written description (in English) of what the code means needs to be included elsewhere on the certificate
**** Date of issue is date the certificate is issued and signed

Deletion of the form:
Notification of denial of medical certificate
(2-A-33)

IEM FCL.3.100 *(2)*

New Subnumber

CODE	LIMITATION, CONDITION, VARIATION	IMPOSED BY	REMOVED BY
TML	VALID ONLY FOR ..... MONTHS	AME/AMC/AMS	AMS
VDL	SHALL WEAR CORRECTIVE LENSES **[**AND CARRY A SPARE SET OF SPECTACLES**]**	AME/AMC/AMS	AMS
VML	SHALL WEAR MULTIFOCAL LENSES **[**AND CARRY A SPARE SET OF SPECTICLES**]**	AME/AMC/AMS	AMS
VNL	SHALL HAVE AVAILABLE CORRECTIVE **[**SPECTACLES FOR NEAR VISION AND CARRY A SPARE SET OF SPECTACLES**]**	AME/AMC/AMS	AMS
VCL	**[**VALID**]** BY DAY ONLY	AMS	AMS
OML	VALID ONLY AS OR WITH QUALIFIED CO-PILOT	AMS	AMS
OCL	VALID ONLY AS CO-PILOT	AMS	AMS
OSL	VALID ONLY WITH SAFETY PILOT AND IN AIRCRAFT WITH DUAL CONTROLS	AMS	AMS
OAL	RESTRICTED TO DEMONSTRATED AIRCRAFT TYPE	AMS	AMS
OPL	VALID ONLY WITHOUT PASSENGERS	AMS	AMS
APL	VALID ONLY WITH APPROVED PROSTHESIS	AMS	AMS
AHL	VALID ONLY WITH APPROVED HAND CONTROLS	AMS	AMS
AGL	VALID ONLY WITH APPROVED EYE PROTECTION	AMS	AMS
SSL	(SPECIAL RESTRICTIONS AS SPECIFIED)	AMS	AMS
SIC	SPECIAL INSTRUCTIONS – CONTACT AMS	AMS	AMS
AMS	**[**RECERTIFICATION OR RENEWAL ONLY**]** BY AMS	AMS	AMS
[RXO**]**	**[**REQUIRES SPECIALIST OPHTHALMOLOGICAL EXAMINATIONS**]**	**[**AME/AMC/AMS**]**	**[**AMS**]**

LIMITATIONS, CONDITIONS AND VARIATIONS

LIMITATION [TML]

- **TML** **'VALID ONLY FOR _____ MONTHS'**

EXPLANATION:
The period of validity of your medical certificate has been limited to the duration as shown above for the reasons explained to you by your Authorised Medical Examiner. This period of validity commences on the date of your medical examination. Any period of validity remaining on your previous medical certificate is now no longer valid. You should present for re-examination when advised and follow any medical recommendations. **[**(Reference JAR-FCL 3.105(e)).**]**

CHAPTER 1 - GENERAL

THE AEROMEDICAL HEALTH EXAMINATION

Editorial Change in 7th paragraph

Examining a healthy person may seem an easy task but also a rather futile thing to do, for what can you expect to find where nothing is wrong? In reality the periodic examination of airmen is both difficult and demanding, but may also be quite rewarding when performed with interest, care and thoroughness.

A licence holder is legally obliged to undergo regular health examinations, performed by either an Authorised Medical Examiner (AME) or an Aeromedical Centre (AMC) – and he may resent the cost or the inconvenience of complying with the regulations. The airman may appear to be in perfect health, and more often than not will he himself believe this to be the case. At the same time he may reasonably fear that if something is wrong after all then this might cost him his medical certificate, i.e. his livelihood. This situation may lead the airman to feel nervous and tense at the examination, but almost invariably he will try to present himself as perfectly healthy. Fortunately most examinations will confirm that he is indeed in good health and fit for flying. But even if he is experiencing a mental or physical problem he may – consciously or subconsciously – repress it and in either case the AME may not receive the usual help from his examinee to guide him towards the site of any problem. To find a sign of early disease or malfunction under these circumstances takes skill, experience and the utmost thoroughness.

It is important that the aeromedical examination is performed in a way that encourages the airman to discuss freely and openly whatever problems – medical or otherwise – he may have, but the situation is not ideal for developing the usual doctor-patient relationship between AME and airman. An airman is not a patient and so has little encouragement to confide more than is required by the regulations. On the other hand, the AME gains little without the airman's confidence as most information of value is voluntary.

There is no specific route for the AME to follow in order to ensure an aeromedical examination of quality, but some important factors are:

1 Professional competence – as highly trained technical professionals all airmen appreciate professionalism in others.

2 Thoroughness – the airman himself may be unaware of the significance of minor signs and symptoms. It is of vital importance to review all systems at each examination and the airman's statement of 'unchanged since last examination' should only be the start rather than the end of any history. Often the airman will not be aware of anything wrong or that his minor symptoms are significant. In this latter situation only a very careful and thorough examination will reveal the problem. An unknown intestinal cancer may be suspected from a declining haemoglobin, still within normal range, and early diagnosis and intervention will most certainly improve the prognosis. Decreased visual acuity, reduced hearing, reflex anomalies, changes in blood picture or ECG are all signs and symptoms that may go unnoticed by the airman himself but which can be the first indication of serious underlying pathology. Further, there must be ample time to discuss the airman's employment (if professional air crew), or flying interest (if a private pilot) as information thus obtained is frequently as productive as the physical examination itself.

During the health examination ~~detail is essential~~ ***care should be taken*** so that minor progressive changes can be noted at the earliest stages, often before symptoms become evident.

THE CONCEPT OF AEROMEDICAL RISK ASSESSMENT

2 editorial changes

Professional Pilots

…

Private Pilots

There are no world wide figures for fatal accidents to private pilots. Those North American and European statistics available would indicate a fatal accident rate one hundred times greater than that of large jet passenger aircraft. It would therefore seem reasonable to set a target accident rate for private flying a hundred times greater than that of public transport flights i.e. 1 per 107 x 100 or 1 per 105 flying hours.

If one again considers the pilot is part of the operating system and his health only a part of the risk to that system, then the target for medical cause for accidents in private aviation should be less than 1 per 10~~6~~**6** flying hours i.e. 10^{-6} to 10^{-7}.

~~The concept of aeromedical risk assessment (continued)~~

In general, private pilots do not fly with another qualified pilot and so acute incapacitation poses an immediate threat to the safety of the flight, throughout its duration. The risk of fatality arising from incapacitation in flight must therefore be that of the incapacitation (10^{-6} to 10^{-7}).

CHAPTER 11 - AVIATION PSYCHIATRY

Various changes to this section of the Manual

1 INTRODUCTION

Adjustments to paragraph c

This chapter will outline the major categories of psychiatric diagnoses and consider how those more commonly seen in aviators may influence the assessment of fitness for entry into a career in aviation, or for the continuation of flying duties in the established airman.

In the aviation community, psychiatric disorders, including alcoholism, represent the second most common medical reason for the loss of flying licences.

About 80% of all accidents and 60% of fatal accidents are due to human failure, a high proportion through some error of judgement.

Information processing and the capacity to make decisions and initiate a suitable response may be disturbed by psychiatric illness, organic mental illness resulting from brain injury or damage, infectious illnesses or the influence of drugs. Such disorders may be the cause of both acute or subtle incapacitation in flight. It is of paramount importance therefore that any condition which might lead to such error is identified and investigated before air crew licensing is agreed.

Medical requirements for fitness of any given role are decided by the tasks to be performed in that role. The aviator needs:

a To be aware of his position in space – this requires an adequate sensory input, visual, auditory, proprioceptive etc.

b The mental capacity to process this sensory information and to initiate the appropriate action to control the aircraft safely.

c The necessary physical capacity to carry out the course of action decided upon.

~~These psychiatric requirements form the basis of the physical, visual, hearing and other sensory requimerents. The second forms the basis of the mental fitness required for air crew licensing.~~

The psychiatric requirements for fitness are determined largely by the second of these tasks.

2 GENERAL PSYCHIATRIC REQUIREMENTS

Adjustments to paragraphs c, d, and e

Medical standards of mental fitness for all categories of air crew require that particular attention should be paid to the following:

a psychosis;

b personality disorders, especially if severe enough to have resulted in overt acts;

c ~~mental abnormality and neurosis~~ , **neurotic disorders**;

d alcoholism **or alcohol misuse;**

e use or ~~abuse~~ ***misuse*** of psychotropic drugs or other substances with or without dependency.

The applicant should have no established medical history or clinical diagnosis of any psychiatric disease or disability, condition or disorder, acute or chronic, congenital or acquired, which is likely to interfere with the safe exercise of the privileges of the applicable licence(s).

3 CLINICAL PSYCHIATRY IN AVIATION MEDICINE

Adjustments to the table and correction of ICD classifications

There are several systems of classification used in psychiatry. While differing from one another in important ways all of them share similar principles. For detailed information on current classification of psychiatric illness, such as that of the International Classification of Disease (ICD10~~-R~~) and the American Psychiatric Association Diagnostic and Statistical Manual

Classification (~~DSM IIIR 1987~~ ***DSM IV***) reference should be made to standard psychiatric text books.

For the purpose of this chapter a simplified but practical basic classification of mental disorder***s*** will be used and where classification indices are shown these are from ICD10-~~R~~.

Basic Classification of Mental Disorder
Personality disorder
Mental retardation
Neuroses Acute/Chronic ***Neurotic,stress-related and somatoform disorders***
Organic psychoses
Functional psychoses, schizophrenia, affective psychoses
Mood disorders
Disorders of adjustment
Other disorders
Disorder***s*** specific to childhood

In the various systems of classification, mental retardation and personality disorders are separated from mental illness. Mental retardation is present continuously from very early life, personality disorders being recognised from the end of adolescence.

Mental illness arises after a period of normality in adult life.

It should be noted that psychiatric disorders likely to be met in aviation personnel are limited to adult psychiatry and because of the nature of the training required it is axiomatic that an individual with significant mental retardation would be unlikely to consider, or be considered for entry into a flying career. Mental retardation and disorders specific to childhood will, therefore not be considered further in this chapter.

The mental illnesses in this classification are sub-divided into two major groups:

a The neuroses, being evidenced by anxiety, depression, insomnia, obsessional thoughts etc., arising in a setting of unaltered contact with reality and whose symptoms are close to normal experience.

b The psychoses, which are major mental illnesses, are usually characterised by severe symptoms such as delusions and hallucinations and by a lack of insight. These are further divided into the organic and functional psychoses, the former presenting with a demonstrable physical abnormality, such as general paralysis of the insane, or delirium tremens. The functional psychoses have, to date, demonstrated no underlying physical cause and include schizophrenia and the affective psychoses.

4 DEFINITION OF SOME MENTAL AND BEHAVIOURAL DISORDERS

Correction of ICD classification in paragraph 4.1

4.1 Disorders of adult personality and behaviour (ICD F60-~~F68~~ *F69*)

.....

4.2 Neurotic, stress-related and somatoform disorders (F40-F48)

Adjustments and editorial changes in paragraphs c, d, e and f

a *Phobic anxiety disorders (F40)*

.....

b *Panic disorder (F41)*

.....

c *Obsessive compulsive disorders (F42)*

The essential feature here is that of recurrent obsessional thoughts or compulsive acts. Obsessional thoughts are ideas, images or impulses ~~and~~ ***that*** enter the individual's mind again and again in a stereotype***d*** form. They are almost invariably distressing and the patient often tries unsuccessfully to resist them. They are, however, recognised as his/her own thoughts, even though they are involuntary and often repugnant.

……

d *Post traumatic stress disorder~~s~~ (F43.1)*

.....

e *Generalised anxiety disorder ~~(neurosis)~~ (F41.1)*

The A***a***nxiety is generalised and persistent but not restricted to, or even strongly predominating in any particular environmental circumstances. The symptoms are variable but include complaints of persisting nervousness, trembling, muscular tension, sweating, lightheadedness, palpitations, dizziness and epigastric discomfort. Fears that the individual or a relative will shortly become ill, or have an accident, are frequently expressed.

f *Mixed anxiety and depressive disorder~~s~~* (F41.2)

Anxiety depression or neurotic depression should be used when symptoms of anxiety and depression are both present but neither is clearly predominant and neither type of symptom is present to the extent that justifies a diagnosis, if each is considered separately.

4.3 **Schizophrenia, schizotypal and delusional disorders (F20-F29)**

Addition of ICD classification, editorial changes

The schizophrenic disorders are characterised in general by fundamental and characteristic distortion***s*** of thinking and perception, and affects that are inappropriate or blunted. Clear consciousness and intellectual capacity are usually maintained although certain cognitive deficits may evolve in the course of time.

The most important psychopathological features include thought echo, thought insertion or withdrawal, thought broadcasting, delusional perception and delusions of control, influence or passivity, hallucinatory voices commenting or discussing the patient in the third person, thought disorder***s*** and negative symptoms. The course of the disorder can be either continuous or episodic with progressive or stable deficit, or there can be one or more episodes with complete or incomplete remission.

Such a diagnosis should not be made in the presence of extensive depressive or manic symptoms unless it is clear that the schizophrenic symptoms antedate the disturbance of affect.

Schizophrenia should not be diagnosed in the presence of overt brain disease or during states of drug intoxication or withdrawal. ***(F06.2 and F10-F19).***

4.4 **Mood (affective) disorders *(F30-F39)***

Adjustments to paragraph 4.4, renumbering, addition of new paragraph 4 b

…..

a ~~*Manic Disorders Hypomania*~~ ***Manic episodes (F30)***

~~a~~ ***1 Hypomania (F30.0)***

A disorder characterised by persistent mild elevation of mood with increased energy ***and*** activity and usually marked feelings of well-being and both physical and mental efficiency. Increased sociability, talkativeness, over-familiarity, increased sexual energy and a decreased need for sleep are often present but not to the extent that they lead to severe disruption of work or result in social rejection. Conversely, irritability, conceit and boorish

behaviour may take the place of the more usual euphoric sociability. These disturbances of mood and behaviour are not accompanied by hallucinations or delusions.

~~b~~ ***2*** *Mania without psychotic symptoms (F30.1) and Mania with psychotic symptoms (F30.2)*

Here, mood is elevated out of keeping with the patient's circumstances and may vary from carefree, jovial to almost uncontrollable excitement. This elation is accompanied by increased energy, over-activity, pressure of speech and a decreased need for sleep. Attention cannot be sustained and there is often marked distractibility. Self esteem is inflated with grandiose ideas and over confidence. Loss of normal social inhibitions may result in reckless, foolhardy and inappropriate behaviour.

In addition to the clinical picture described, delusions ***(usually grandiose)*** or hallucinations ***(usually voices speaking directly to the pacient)*** may be super-added or the excitement, excessive motor activity and flights of ideas, become so extreme that the subject is incomprehensible or inaccessible to ordinary communication.

~~c~~ ***3*** *Bipolar affective disorders ~~(cyclothymia)~~ (F31)*

This disorder is characterised by two or more episodes in which the patient's mood and activity levels are significantly disturbed, this disturbance consisting on some occasions of an elevation of mood and increased energy and activity (hypermania ***hypomania*** or mania) and on others of a lowering of mood and decreased energy and activity (depression).

b Depressive episodes (F32)

In typical mild, moderate or severe depressive episodes the patient suffers from lowering of mood, reduction of energy and decrease in activity. Capacity for enjoyment, interest and concentration is reduced, and marked tiredness after even minimum effort is common. Sleep is usually disturbed and appetite diminished. Self-esteem and self-confidence are almost always reduced and, even in the mild form, some ideas of guilt or worthlessness are often present. The lowered mood varies little from day to day, is unresponsible to circumstances and may be accompanied by so-called 'somatic' symptoms, such as loss of interest and pleasurable feelings, waking in the morning several hours before the usual time, depression worst in the morning, marked psychomotor retardation, agitation, loss of appetite, weight loss and loss of libido. Depending upon the number and severity of the symptoms, a depressive episode may be specified as mild, moderate or severe.

4.5 **Organic, including symptomatic, mental disorders (F00-F09)**

No changes

5 NORMAL MENTAL DEVELOPMENT

Editorial change in paragraph a, addition of one sentence to the last paragraph of this subchapter

There are three ways of dealing with anxiety:

a The normal, healthy adult will naturally feel anxious when his safety is under threat. This anxiety increases in proportion to the degree of danger, being reduced by action aimed at decreasing the danger and disappears when this has been resolved. Re-exposure to the same threat will cause the same amount of anxiety or less.

b …

c .....

.....A personality disorder is a chronic state dating from childhood or adolescence and is often referred to as emotional immaturity. The individual tends to learn neither from experience nor punishment and cure is rare. ***The prognosis is usually poor.***

6 PREDISPOSITION TO PSYCHIATRIC DISEASE

No changes

7 PSYCHOLOGICAL TESTING OF INTELLIGEN CE
No changes

8 PSYCHOLOGICAL TESTING OF PERSONALITY
No changes

9 PERSONALITY DISORDERS (F60-~~68~~ *69*)
Correction of ICD classification in heading, one editorial change in paragraph 3

.....

The term 'personality' refers to the enduring ~~qualities~~ ***features*** an individual shows in his way of behaving in a wide variety of circumstances. ....

9.1 **Sociopathic personality disorders**
Adjustments to paragraphs a, b and c

*a ~~Antisocial~~ **Dissocial** personality disorder (F60.2)*

Persons with this disorder show a bewildering variety of abnormal features. Basically four features are usefully recognised. A failure to make loving relationships, lack of guilt, impulsive actions and a failure to learn from past experience. The individual is self-centred and heartless. This lack of feeling is in marked contrast to a usually superficial charm. Marriage is marked by a lack of concern for the partner, sometimes violence, and many end in separation or divorce.

Impulsive behaviour patterns are reflected by an unstable work record, often with frequent dismissal, the whole pattern of the individual's life lacks any plan or goal. Offences against the law often commence in adolescence with petty acts of larceny, lying, truancy and vandalism. Some violent, dangerous and incorrigible criminals are representative of this group. ***This diagnosis includes sociopathic personality disorder, associal or antisocial personality disorder.***

Alcohol and drug abuse makes such behaviour patterns more extreme.

*b ~~Explosive~~ **Emotionally unstable** personality disorder (F60.3)*

People with this disorder cannot adequately control their emotions and are subject to sudden and unrestrained outpourings of anger. These outbursts may also include physical violence leading at times to serious injury. Unlike the antisocial ***dissocial*** personality this group do***es*** not have other difficulties in their relationships. ***This personality disorder includes explosive personality disorder. There are two types: impulsive type (F60.30) and borderline type (F60.31).***

*c ~~Asthenic~~ **Dependent** personality disorder (F60.7)*

People with this disorder appear weak-willed and unduly compliant, passively falling in with others wishes. They avoid responsibility and lack self reliance. Some are more determined but achieve their aims by relying upon other people's assistance while protesting their own helplessness. Some drift down the social scale, others may be found among the long term unemployed and the homeless.

9.2 **Sociopathic personality disorders and fitness for aviation duties**
Adjustments to the first sub-paragraph

From the preceding brief description of a representative group of sociopathic personality disorders it should be abundantly clear ~~than~~ ***that*** an individual with such a disorder must be assessed as unfit for any class of flying licence ~~or ATCO duties~~. ....

~~**10 ANXIETY BASED DISORDERS (THE NEUROSES)**~~
Revision of paragraph 10.1

10 *NEUROTIC, STRESS RELATED AND SOMATOFORM DISORDERS (F40-48)*

10.1 **Anxiety disorders(F40-43)**

~~Anxiety disorders include phobias, panic attacks, obsessive-comulsive disorders, post traumatic stress disorders and generalised anxiety disorders. Also included are the various forms of clinical depression, mild or moderate in degree except those with psychotic features such as delusions (seeparagraph 11 b below). Somatoform disorders include hysterical or conversation disorders, hypochondriasis and some pain disorders.~~

~~(Dissociative disorders include multiple personality, fugue, amnesia and similar conditions – these are totally incompatible with any form of flight status and will not be considered further in this chapter.)~~

Neurotic, stress-related and somatoform disorders have been brought together in one large group because of their historical inter-relationships and the association of many of them with psychological stress.

The diagnostic categories included within this section of neurotic stress-related and somatoform disorders are the ones reffering to the phobies, panic attacks, obsessive-compulsive disorders, post traumatic stress disorder and generalized anxiety disorder.

There are also included the various forms of clinical depression of mild or moderate degreee excepting those with psychotic features such as delusions (see paragraph 11 b below).

A mixture of symptoms is common, especially the ones of depression and anxiety. In this situation it is usually best to try to decide which is the predominant symptom for diagnosis purposes.

Somatoform disorders include somatization disorder, hypocondrial disorder, somatoform autonomic dysfunction.

Dissociative (conversive) disorders include amnesia, fugues, stupor, multiple personality and other similar situations; these are totally incompatible with any form of flight status and will not be considered further in this chapter.

Anxiety is the chief characteristic of the ~~neuroses~~ **neurotic disorders**. Depression, mild or moderate in degree, also occur with some neuroses.

a ~~*Anxiety neurosis*~~ ***Generalized anxiety disorder*** *(F41.1)*

The individual complains of increased anxiety which makes life uncomfortable. The anxiety usually covers many things such as health, money or safety. This anxiety state may be acute and short-lived, or chronic – of lower intensity and more prolonged. Anxiety leads to over-arousal causing difficulty in falling asleep and nocturnal restlessness. Because worries keep crowding into the forefront of the mind concentration becomes impaired, prevents the proper retention of information, leading to a complaint that the memory is failing. Irritability with colleagues at work especially at home after work, and associated tension headaches, worse towards the end of the day are common.

The illness can often be traced to an identifiable stress, such as money difficulties or domestic friction. The prognosis for cure may be gauged from the history.

If there has been a previous psychiatric illness, a marked predisposition to neurosis, and if the precipitating cause cannot be permanently corrected, the chance of a permanent cure is not great.

If, however, the neurosis was precipitated by maladjustment to a situation which is capable of correction, the prognosis is good.

Such anxiety states usually occur in people who are markedly prone to anxiety and are relatively rare among flight crew.

Anxiety states in flying personnel are more commonly confined to one specific aspect of flying, such as fear of flying in cloud or high altitude flying. Such a localised anxiety is called a phobic anxiety neurosis, in contrast to the general anxiety neurosis where the anxiety is much more diffuse.

b *Phobic ~~neuroses~~ **anxiety disorders** (F40)*

Many normal people have aversions to certain objects, notably snakes and spiders, which date from childhood and have not been caused by any actual frightening experience. Other than avoidance, these illogical fears cause little interference with the individual's life. They have usually been present since early life and become less intense with age.

A phobic ~~neurosis~~ ***disorder*** is a much more intense and incapacitating fear, again frequently illogical, which interferes with the individual's life to such an extent that medical aid is often sought. A common example is claustrophobia ***(a specific phobia)***, or a fear of entering enclosed space, the act of so doing or even the thought of so doing, causing apprehension, faints, palpitations, sweating, nausea, tremor and panic.

The phobic ~~neurosis~~ ***disorder*** is an acquired anxiety neurosis confined to one specific situation and is relatively common among flight crew. Early experiences in flying training or the stress of flying training may sometimes caused a generalised anxiety state in individuals with a low threshold for anxiety. Trained and experienced flight crew with a high anxiety threshold, occasionally develop significant anxiety about a single aspect of flying. There are potentially many experiences which may precipitate such a phobic ~~neurosis~~ ***disorder*** and if of sufficient intensity may, in a vulnerable individual, require that his career is terminated.

A special form of phobic anxiety disorders is flying phobia.

c Panic disorder (episodic paroxismal anxiety) (F410)

The essential feature is recurrent attacks of severe anxiety (panic), which are not restricted to any particular situation or set of circumstances and the attacks are therefore impredictable. The dominant symptoms include a sudden onset of palpitations, chest pain, choking sensations, dizziness and feelings of unreality (depersonalizations or derealization).

~~c~~ ***d*** *Obsessive-compulsive ~~neurosis~~ **disorder** (F42)*

An obsession is a thought or urge to undertake a specific action which recurs repetitively and insistently in the mind. When this type of symptom becomes so persistent that it interferes with normal mental life and activities the illness is an obsessive neurosis. These obsessions may take many forms. Some sufferers must dress according to a strict ritual which, if broken, demands that it is started again from the beginning. If the basis is a fear of dirt or contagion the individual may feel compelled to wash the hands each time anything is touched. In the extreme form can waste so much time that normal work becomes impossible. Such symptoms are most often seen in those individuals with a meticulous perfectionist or rigid personality. Because such symptoms often date from early life and are usually resistant to treatment this disorder can usually be identified at the initial medical examination and the individual excluded from training.

~~d *Hysterical neurosis (F44)*~~
revised text in sub-paragraph f

~~e *Hypochondriasis*~~

~~In this form of neurotic illness the dominant symptom is the worry that disease is present in one bodily system or another. The basis of this fear may be as a result of excessive awareness of the sensations, such as the heart beat. Throughout life vast numbers of sensations from the skin, viscera, muscles and joints are streamed into the brain but do not normally reach awareness unless attention is specifically directed towards them. The hypochondriac patient may for example be continuously conscious of his heart beat and with its changes in rate and force become convinced that he suffers from a serious cardiac disorder. The anxiety produced causes an increase in tachycardia and adds to the conviction that he suffers from disease. This brings with it excess anxiety and depression with an associated irritability, tension, headaches, difficulty in sleep and pre-occupation with the symptom, thus reducing working efficiency.~~

f *De-personalisation neurosis (F48)*

This syndrome is characterised by feelings of unreality and de-personalisation as though the individual were an observer of his own life situation rather than an active participant in it. Emotions become dulled and actions mechanical. Most cases are secondary to an anxiety neurosis, personality disorder, or form part of an organic or functional psychosis.

g *Depressive neurosis (reactive depresion) (F48-1) (F31)*

The depressive illness is characterised by an excessive sadness. Depression because of bereavement or failure, like anxiety in the present of a threat, is a normal everyday experience. Such depression with a clear cause usually lifts in a short period of time. When it persists for months with an intensity sufficient to prevent an individual from continuing with his normal life and work a depressive reaction has developed. In this illness depression is the presenting symptom and the sufferer can clearly identify its cause. The intensity of the depression may remain constant or if it varies throughout the day rarely reaches suicidal level and it is usually possible to distract the individual's attention from his gloom. Reason is not affected and delusions of guilt and sinfulness do not occur while good contact with reality is maintained (Cf Para 11(b) Affective Disorders). If sleep is affected it is usually manifested by difficulty in falling asleep and may also be accompanied by symptoms indicated above under anxiety neuroses.

The individual's history may indicate that he has always reacted badly to adversity and, if so, may well develop further similar illnesses of this nature in the future.

e Reaction to severe stress and adjustment disorders (F43.0, F43.1, F43.2)

1 Acute stress reaction (F43.0)

That is a transient disorder that develops in an individual without any other apparent mental disorder in response to exceptional physical and mental stress and which usually subsides within hours or days.

h ***2*** *Posttraumatic stress disorder (F43.1)*

As the name implies this neurosis arises in response to an overwhelming event outside of normal human experience. Emotional and psychiatric adjustment to such a mishap can be significantly disturbed in a variety of groups of individuals directly or indirectly involved in the event:

i Those directly involved in aircraft accidents/incidents – the crew, cabin staff, passengers and those involved immediately on the ground;

ii professional disaster workers – police, ambulance personnel, fire fighters, hospital staff etc.;

iii relatives and friends of those involved;

iv the community – witnessing or involved in the incidents and also supervisors, leaders and co-workers who may feel some responsibility or guilt;

v the emotionally unstable who over-identify.

Symptoms may arise at any time after the event, sometimes many years afterwards. There is always a vivid memory of the event with flashbacks continually intruding into consciousness.

Psychological avoidance may produce numbing of affect or depressive symptoms. Conversely, signs of hyper-arousal may be evident with hyper-vigilance manifest by jumpiness, irritability, sleep disturbances etc. A frank depressive disorder may be the first presentation. Panic disorders may also be a presenting symptom.

The disorders in this section are thought to arise always as a direct consequence of acute severe stress or continued trauma. These disorders can be regarded as maladaptive responses to severe or continued stress, in that they interfere with successful coping mechanisms and therefore lead to problems of social functioning.

Predisposing factors, such as personality traits (e.g. compulsive, asthenic) or previous history of neurotic illness may lower the threshold for the development of the syndrome or aggravate its course but they are neither necessary nor sufficient to explain its occurrence. Typical features include episodes of repeated reliving of the trauma in intrusive memories ("flashbacks"), dreams or nightmares, occuring against the persisting background of a sense of "numbness" and emotional blunting, detachment from other people, unresponsiveness to surroundings, anhedonia and avoidance of activities and situations reminiscent of the trauma. There is usually a startle of autonomic hiperarousal with hipervigilence and enhanced startal reaction and insomnia. Anxiety and depression are commonly associated with the above symptoms and signs, and suicidal ideation is not infrequent. The onset follows the trauma with a latency period that may range from a few weeks to months. The course is fluctuating but recovery can be expected in the majority of cases. In a small proportion of cases the condition may follow a chronic course over many years with eventual transition to an enduring personality change (F62.0).

Alcohol and substance abuse may occur as a secondary phenomenon in a misguided attempt to lessen the symptomatology.

Risk factors for the development of a disorder include the nature and intensity of the stressors, the nature of the involvement (direct or indirectly as a witness). There is no sex difference but older age groups would appear to report an increased incidence of anxiety symptoms. Previous exposure to disaster, such as the case of ambulance/medical staff, may help to avoid the development of symptoms, but this is not invariably so.

The goal of intervention must be to limit symptoms and return individuals to normality as quickly as possible by attending to these emotional reactions. Education into the normal emotional reaction to physically and emotionally traumatic experiences is very important. Victims should be made aware of the range of reactions which may occur and should be clearly warned about the risk of increasing drug and alcohol use, of memory and cognitive disturbances and of intrusive thoughts. Encouragement to ventilate their experiences by 'talking through' seems important.

Most victims respond well to these simple measures but a proportion not responding will need formal psychiatric counselling and possibly chemotherapy.

The use of beta blockade and anti-depressive medications, together with psychotherapy offers considerable hope of alleviation of symptoms.

The importance of this stress reaction in aviators lies not only in the symptomatic disorders described above but the very real potential for the development of loss of confidence in, and a fear of flying. Such a development would almost certainly lead to disqualification from continuing certification in a high proportion of such individuals. The role of the airline medical officer, the authorised medical examiner and the psychiatric services, is paramount in such situations.

3 Adjustment disorders (F43.2)

The manifestations vary and include depressed mood, anxiety or worry in a mixture of this, a feeling of inability to cope, as well as some degree of disability in the performance of daily routine.

f ~~*Hysterical neurosis*~~ ***Dissociative (conversive) disorders*** *(F44)*

~~In hysteria there is a loss of function without organic cause. The symptom is such that it usually solves a problem for the sufferer. The form of symptoms is usually a loss of neurological function, such as numbness or paresis, and the sufferer's attitude to such symptoms is characteristic, always attributing it to a cause or causes beyond his control, the onus for cure being put upon the physician. The hysterical symptoms may be divided into two groups:~~

These disorders have previously been classified as various types of "conversion hysteria" but nowadays it is found more appropriate to avoid the term "hysteria" because of its various meanings.

The common themes that are shared by dissociative or conversion disorders are a partial or complete loss of the normal integration between memories of the past, awareness of identify and immediate sensations and control of bodily movements, as well.

They are presumed to be psychogenic in origin, being associated closely in time with traumatic events, insoluble and intolerable problems or disturbed relationships. The symptoms often represent the patient's concept of how a physical illness would manifest. Medical examination and investigation do not reveal the presence of any known physical or neurological disorder. In addition there is evidence that the loss of function is an expression of emotional conflicts or needs. The symptoms may develop in close relationship to psychological stress, and they often appear suddenly. These symptoms can be classified in two groups:

i conversion symptoms – a loss of bodily function solving the pacient's dilemma. ***There are dissociative motor disorders including afonia, disfonia; dissociative convulsions, dissociative anesthesia and sensory loss;***

ii dissociative reactions as an alteration of consciousness such as loss of memory~~, coma, fugue etc. again resolving a specific conflict.~~ ***usually of important recent events (dissociative amnesia) or dissociative fugue, dissociative stupor, a.s.o.***

Hysteria is rare in sophisticated sicieties but does **These dissorders** occur in highly emotional, over-drammatic individuals**.**

g Somatoform disorders (F45)

The main feature is a repeated claim of some presentation assumed physical symptoms together with persistent requests for medical investigations, inspite of repeated negative findings and reassurances by doctors that the symptoms have no physical basis. The individual shows a refusal to discuss the possibility of a psychological cause, even if the symptoms onset and evolution prove a close relationship to unhappy life events or hardships and conflicts.

With this kind of disorders there is a behaviour or focusing on catching the attention of the people around; and that behaviour is common with the individuals having an acute feeling of the incapacity to persuade the physicians about the somatic nature of their illness and the need of a new investigation.

Somatoform disorders include:

1 Somatization disorder (F45.0)

The main features are multiple, recurrent and frequently changing physical symptoms that have persisted many years before the individual's coming to the psychiatrist.

The symptoms can affect each of the body parts nevertheless most of the common sensations are the gastrointestinal ones (pain, feeling bloated and full of gas, regurgitation of food, nausea, vomiting) and also the skin symptoms (unpleasant numbness or tinkling, burning sensations, itching) the sexual and menstrual complains are also common.

The course of the disorder is chronic and fluctuating and is often associated with disruption of social, interpersonal and family behaviour.

2 Hypochondriacal disorder (F45.2)

The essential feature is a persistent preocupation with the possibility of having one or more serious and progressive physical disorders. The individuals manifest persistent somatic complaints or a persistent preocupation with their physical appearance.

Normal or commonplace sensations are often considered by these individuals as normal and distressing, and attention is usually focuses upon only one or two organs or systems of the body. Marked depression and anxiety are often present and may justify additional diagnosis.

There is persistent refusal to accept medical reassurance that there is no real physical cause for the symptoms in discussion.

3 Somatoform autonomic dysfunction (F45.3)

Symptoms are presented by the individual as if they were due to a physical disorder of a system or organ that is largely or completely under autonomic innervation and control, i.e. the cardiovascular, gastrointestinal, respiratory and urogenital systems.

The most common and significant complains are the ones referring to the cardiovascular system (cardiac neurosis or Da Costa's syndrome or neurocirculatory asthenia), to the respiratory system (hyperventilation, psychogenic cough), to the gastrointestinal system (gastric neurosis, neurotic diarrhoea, irritable bowel syndrome, flatulence) and also to the urogenital system (dysuria and increased frequency of micturition).

The symptoms are usually of two types neither of which indicates a physical disorder or the organ or system concerned. Firstly there are complains based upon objective signs of autonomic arousal, such as palpitations, sweating, flushing, tremor and expression of fear and distress about the possibility of a physical disorder. Secondly there are subjective complains of a non-specific or changing nature, such as fleeting aches and pains, sensations of burning, heaviness, tightness and feelings of being bloated and distended, which are referred by the individual to a specific organ or system.

h Neurasthenia (F48.0)

In many countries neurasthenia is not generally used as a diagnostic category. Many of the cases so diagnosed in countries where this diagnostic is in use would probably meet the current criteria for depressive disorder or anxiety disorder. They are however, individuals whose symptoms fit the description of neurasthenia better than that of any other syndrom, and such cases seem to be more frequent in some cultures than in others.

With neurasthenia there is a variety of unpleasant physical feelings such as: dizziness, tension headaches, feeling of a general instability, irritability, anhedonia, sleep disturbance, worry about decreasing mental or bodily wellbeing.

i Dysthymia (F34.1)

In this form of a chronic depression, lasting at least several years, there is much in common with the concepts of depressive neurosis and neurotic depression.

What is characteristic for dysthymia is that the depressive mood episodes do not have a long enough duration to justify a diagnostic of severe, moderate or mild recurrent depressive disorder (F33). Periods of normal mood rarely last for longer than a few weeks.

10.2 **Assessment of neurotic disorders**

No changes

11 THE PSYCHOSES

Revision of paragraph 11.1

The psychotic disorders are those presenting with gross impairment of the individual's ability to perceive reality and are usually characterised by severe symptoms of delusions, hallucinations and total lack of insight.

11.1 **Functional psychotic disorders**

Include such disorders as schizophrenia, ~~manic depressive (bipolar mood) disorders, major depression,~~ ***delusional disorder, acute and transient psychotic disorders, mood disorders, bipolar affective disorder (manic-depressive psychosis***), paranoid disorders and others. A history of, or the occurrence of, such disorders should be considered permanently disqualifying for any class of flying licence, unless in certain rare cases a cause can be unequivocally identified as one which is transient, has ceased and will never recur. While such judgement may be difficult at times the decision should always err on the side of caution. Some psychoses permanently change the personality so that following recovery or remission the individual remains unfit for flying by reason of the personality damage. The functional psychoses may also recur without warning and for this reason a history of even a single attack must be permanently disbarring.

a ~~The schizophrenic~~ ***Schizophrenia, schizotypal and delusional*** *disorders(F20-F29)*

1 Schizophrenia (F20)

Schizophrenia is characterised by a loosening of the bonds between the different aspects of mental life. Mood, memory, perception, motor activity, reality, language and thinking cease to be co-ordinated. There is a severe interference with thought processes and eventual disorganisation of the personality.

The symptoms that occur in schizophrenia are numerous and include delusions, auditory and visual hallucinations, thought blocking, feelings of being controlled by outside influences (radio, television, telepathy etc.) and blunting of emotion, all arising in a setting of clear consciousness.

More important than the individual symptom, or symptom-complex, is the change in personality of which the patient is often aware, with a loss of emotional warmth, an air of secrecy or unexplained mood fluctuations. When fully developed it is no longer possible to establish a close rapport with the patient who usually prefers to remain in isolation. Others may be restless with inappropriate affect, with smiling or grimacing, or assume odd and long sustained ~~poses~~ **posturings,** such as occur in the catatonic variant.

Schizophrenia is the most frequent cause of admission of the young adult to psychiatric hospitals and its highest incidence ~~is the age group 25-35 years.~~ ***between 17 - 25 years for the young men and 25–35 years for females.*** In recent years treatment with phenothiazines and other psychotrophic drugs has greatly improved the prognosis and the florid may remit with treatment. Nevertheless such a diagnosis, once made, must, as stated above, be a permanent bar to the holding or acquisition of any class of flying licence ~~or ATCO licence~~.

2 Schizotypal disorder (F21)

A disorder characterized by eccentric behaviour and anomalies of thinking and affect which resemble those in schizophrenia, although no definite and characteristic schizophrenic anormalies occur at any stage.

3 Persistent delusional disorders (F22)

The major symptom in this group is a conviction of persecution and unlike the paranoid reaction in schizophrenia, where reason is clearly affected, the paranoid reaction occurs in a setting of clear sanity. The paranoid reaction is elaborate and frequently starts with a belief that some inner personal secret has been discovered and made public so that passing strangers and acquaintances know of it, or the individual may become convinced that his failure to attain promotion is due to victimisation by his superiors. The key symptomatology is that of an over-valued idea in an otherwise rational being. Logical argument does not enable them to see that their views are wrong and much time and money can be wasted on repeated lawsuits in an effort to prove the correctness of their viewpoint. ***This includes: paranoia,***

***paranoid psychosis, paranoid state, paraphrenia and Sensitiver Beziehungswahn*.** Such a condition is very resistant to treatment and the individual who develops such a psychosis is most unlikely ever to be considered as fit to hold any class of flying ~~or ATCO~~ licence.

4 Acute and transient psychotic disorders (F23)

There are a heterogenous group of disorders characterized by the acute concept of psychotic symptoms such as delusions, hallucinations and perceptual disturbances and by the severe disruption of behaviour. Acute onset is defined as a crescendo development of a clearly normal clinical picture in about 2 weeks or less. There is possible an abrupt concept (onset within 48 hours).

b ~~*Affective disorders (affective psychoses)*~~ ***Mood (affective) disorders*** *(F30-F39)*

These disorders are severe illnesses in which the primary symptoms are excess of sadness or joy. These illnesses tend to recur, often periodically, but with a complete return to normality between the attacks.

In manic-depressive illness (depressed type (F32)) energy is reduced and gloom is profound. Sleep may be significantly impaired and early morning waking and rumination is common. Delusional symptoms, usually of guilt or impending doom, may occur and suicidal intentions may arise in the most severely affected. Reason is otherwise not impaired although the stream of thought may be significantly slowed. *(This text is moved to b 3)*

~~In manic-depressive illness (manic type (F30)) which is much more rare, the patient becomes over active and joyful. There is a bounding self confidence and a feeling that any task could be capably tackled, even those well outside of the individual's normal province. The increase in energy and drive leads to reduction in sleep and judgement is very severely impaired by a complete loss of self critical faculties.~~ *(This text is moved to b 1)*

~~In manic-depressive psychoses (cyclothymia (F31)) attacks of depression and elation alternate. The affective psychoses are more common in patients who normally have periods of elation marked by ambition, enthusiasm and optimism and periods of depression with pessimism and a sense of futility.~~

Some individuals will have no more than a single depressive illness in their life, from which a complete recovery may be made. The dilemma facing the AMS is to identify those who will make a full recovery and never relapse.

When the patient has hitherto been free of excessive mood swings and then the depression follows a non-recurring stress, such as death of a close relative etc. the prognosis for freedom from further attacks is good.

The occurrence of even a single attack of a hypomanic or manic illness must lead to a denial of any form of flying status, whether or not the condition has been controlled by ~~lithium or any other~~ medication.

1 Manic episodes (F30)

In manic-depressive illness (manic type (F30)) which is much more rare, the patient becomes over active and joyful. There is a bounding self confidence and a feeling that any task could be capably tackled, even those well outside of the individual's normal province. The increase in energy and drive leads to reduction in sleep and judgement is very severely impaired by a complete loss of self critical faculties.

2 Bipolar affective disorder (F31)

This is the manic-depressive illness or the manic-depressive psychosis. There are 2 or more episodes in which the patient's mood and activity levels are significantly disturbed (hypomanic, manic, depressed or mixed).

3 Depressive episode (F32)

In manic-depressive illness (depressed type (F32)) energy is reduced and gloom is profound. Sleep may be significantly impaired and early morning waking and rumination is common. Delusional symptoms, usually of guilt or impending doom, may occur and suicidal intentions may arise in the most severely affected. Reason is otherwise not impaired although the stream of thought may be significantly slowed.

4 Recurrent depressive disorder (F33)

This disorder is characterized by repeated episodes of depression as described for depressive episode (F32) without any history of independent episodes of mood elevation and increased energy (mania).

5 Cyclothymia (F34.0)

Cyclothymic disorder is symptomatically a mild form of bipolar disorder, characterized by episodes of hypomania and mild depression.

A persistent instability of mood involving numerous periods of depression and mild elation, none of which is sufficiently severe or prolonged to justify a diagnosis of bipolar affective disorder (F31) or recurrent depressive disorder (F33).

~~c Paranoid states (F22)~~
This text is moved to a 3

~~The major symptom in this group is a conviction of persecution and unlike the paranoid reaction in schizophrenia, where reason is clearly affected, the paranoid reaction occurs in a setting of clear sanity. The paranoid reaction is elaborate and frequently starts with a belief that some inner personal secret has been discovered and made public so that passing strangers and acquaintances know of it, or the individual may become convinced that his failure to attain promotion is due to victimisation by his superiors. The key symptomatology is that of an over-valued idea in an otherwise rational being. Logical argument does not enable them to see that their views are wrong and much time and money can be wasted on repeated lawsuits in an effort to prove the correctness of their viewpoint. Such a condition is very resistant to treatment and the individual who develops such a psychosis is most unlikely ever to be considered as fit to hold any class of flying or ATCO licence.~~

~~11.2~~ **12 Organic ~~psychotic~~ *(including symptomatic) mental* disorders (F00-F09)**
Adjustment to title of paragraph 11.2 and change of number

~~11.3~~ **13 Post traumatic psychiatric disorders**
No changes except change of number

~~11.4~~ **14 Immunological disorders**
No changes except change of number

~~11.5~~ **15 HIV disease (B22-0)**
Adjustments to last paragraph and change of number

It would seem reasonable to suggest that with such regular surveillance, informed psychiatric***/***~~psychometric~~ ***psychologic*** assessment and monitoring of disease markers, that restricted medical certification could safely be sustained in stages 1 and 2. Further progression of the infection would not permit continued medical certification (See also the Chapter on sexually transmitted diseases).

~~12~~ 16 THE AGEING PILOT

No changes except change of number

~~13~~ 17 SUICIDE

No changes except change of number

~~14~~ 18 DRUG,ALCOHOL OR OTHER SUBSTANCE USE, ABUSE AND DEPENDENCE

MENTAL AND BEHAVIOURAL DISORDERS DUE TO PSYCHOACTIVE SUBSTANCE USE (F10-F19)

New paragraph 18.1

In ICD-10, mental and behavioural disorders due to use of psychoactive substances are classified by the third-character of the code according to substance, and by the fourth and fifth character according to clinical condition. Amongst licensed personnel in the aviation workplace, mental and behavioural disorders due to the use of alcohol (F10) are far more common than those due to any other psychoactive drugs (F11-F19), with the possible exception of nicotine (F17). Most attention will therefore be given here to alcohol, but some additional comments will be made regarding other drugs.

18.1 ~~**Drug independence og substance type**~~

Mental and behavioural disorders due to the use of alcohol (F10)

~~Drug use is the ingestion, injection, inhalation or absorption into the body by any other means, of any substance with psychotropic effects, whether socially acceptable or not.~~

~~Drug abuse is defined as persistent or excessive use of pharmacological agents unrelated to, or consistent with, acceptable medical practice.~~

~~Drug dependence may be defined as a state, psychological – and sometimes also physical – which is characterised by behavioural and other responses. These always include a compulsion to take a drug on a periodic or continuous basis, in order to experience its psychoactive effects. Sometimes this is done to avoid the physical and psychological discomforts of its absence.~~

~~Drug use and abuse is related to social acceptance. The social use of drugs other than alcohol has become more accepted since the 1960s with widespread use of prescribed psychotropic medication as well as illicit substances such as Cannabis, L.S.D., 'speed' (amphetamines) etc.~~

Prescribed medication must be aeromedically reviewed prior to resuming flying (JAR–FCL 3.115). All other substances, whether naturally occurring or manufactured, are unacceptable in aviation – their effects are variable and unpredictable. Some have subtle, long-term effects, Cannabis alters time relationships and L.S.D. produces 'flash-back'. Statistical data concerning drug abuse is scarce and inaccurate however, all sources indicate ever increasing consumption. Many are unaware of the risks involved and respond well to education. Drugs alter the mental state, interfere with judgement, alertness, vision and co-ordination and where abuse or dependence upon any such psychoactive substances is suspected the airman should be immediately assessed as temporarily unfit and individually assessed under supervision of the AMS. If dependence on such drugs is confirmed a temporarily unfit assessment should continue until treatment has been shown to be completed successfully, the individual is on no medication and fully rehabilitated. The management protocol for alcohol dependence is a useful model to follow or adjust according to AMS advice.

~~Drugs of dependence may be classified according to their pharmacological action as narcotic analgesics, central nervous system depressants, stimulants and hallucinogens. Physical dependence may occur and is characterised by specific withdrawal syndromes when consumption is abruptly stopped or substantially reduced. This dependence is common with morphine, alcohol, barbiturates and amphetamine dependence. Other drugs produce only psychological dependence.~~

~~Little is known for certain about the prevalence of different types of drug dependence. The information from sources such as criminal statistics, facts from pharmacies, hospital~~

~~admissions, police statistics and special surveys, is unreliable since the majority of drug abuse goes entirely undetected.~~

~~There is no single cause of drug dependence. It is generally agreed that three factors are important, availability of drugs, a vulnerable personality and social pressures. Once regular usage is established, pharmacological factors become important in determining dependence. Drug dependence is essentially a psychological rather than a physiological phenomenon where drugs are used to reduce anxiety or alter mood in a way which is a pleasurable or desirable experience. Drug effects are greatly influenced by the social setting in which they are taken and such influences are especially significant in initiating drug use in a non-medical context, the commonest examples being smoking and drinking.~~

~~The use of alcohol as a customary antidote to the stresses of life in the Western culture has long been hallowed by tradition. The problems which it may present are discussed in the next section.~~

a Acute intoxication with alcohol (F10.0)

This is a concern in the aviation workplace, even when it is otherwise uncomplicated (F10.00), by virtue of the way in which it impairs psychomotor performance. This may potentially lead to accidents and injury (F10.01) of a minor or catastrophic form. These potential complication arguably render it impossible by definition to consider any episode **of acute intoxication in a pilot on duty as "uncomplicated". (ie F10.00 is a category which is effectively excluded on principle in this population).**

b Harmful use of alcohol (F10.1)

That is associated with damage to the physical (e.g. hepatities) or mental health of the individual (e.g. depressive episodes), but in the absence of a diagnosis of the alcohol dependence syndrome (F10.2). Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis (F10.52), Korsakokoff´s psychosis (F10.6), and alcoholic dementia (F10.73).

c The alcohol dependence syndrome (F10.2)

This is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features may be identified during the preceding year:

- ***i A strong desire/compulsion to drink;***
- ***ii difficulties in controlling drinking;***
- ***iii a physiological withdrawal syndrome associated with abstinence (F10.3);***
- ***iv increased tolerance to alcohol;***
- ***v neglect of other activities due to drinking;***
- ***vi persistence of drinking despite harmful consequences.***

d Alcohol withdrawal (F10.3)

That is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions (F10.31), or delirium ("Delirium tremens", F10.4).

A variety of screening tests are available to assist in the detection of alcohol use/misuse:

i Breathalyser
The breath alcohol meter is easy to use and provides immediate results. It is useful in screening for intoxication, but does not detect harmful use, dependence or other complications of alcohol use.

ii Gamma glutamyl transpeptidase (GGT)
GGT is raised in about 80% of heavy drinkers, but is not a completely specific marker for harmful use of alcohol.

iii Mean corpuscular volume (MCV)

The MCV is raised above normal values in about 60% of alcohol dependant people and, like GGT, is not a completely specific marker. The values takes several weeks to return to normal during abstinence.

iv Carbohydrate deficient transferrin (CDT)
CDT has similar properties to GGT in so far its use as a screening test is concerned. It is more specific to heavy drinking than GGT, but perhaps less sensitive to intermittent "binge" drinking.

All of these tests may also be useful to confirm and monitor abstinence during follow-up of a person who has been previously identified as have a drinking problem. However, the usefulness of GGT, MCV & CDT for this purpose is confined primarily to those cases where it has been demonstrated that the test has been abnormal during periods of drinking. Where it is known that the test has remained normal during a period of heavy drinking, it is clearly unlikely to be useful in the monitoring process (unless subsequent heavier drinking produces an abnormality, where previous "less heavy" drinking has not to do so). In some cases, particularly where a patient presents following successful treatment, test results obtained during a period of heavy drinking may not be available. In such cases, all 3 tests should be conducted at regular intervals (usually by the AP - see below) in support of the monitoring process. However, an awareness of the limitation of the value of these tests must then be maintained, since there can be certainty that any of them will become abnormal if drinking is resumed.

18.2 Medical Validation
New paragraph

The experience of certain major and airlines authorities is that success in rehabilitation of the alcohol dependent pilot can be achieved by early intervention and treatment, adhering to the strict protocol outline below. By using this programme it has been possible to return air crew to active flying with three to four months.

a Immediate action

The individual must be assessed as temporarily unfit on reasonable suspicion of intoxication whilst on duty, harmful use of alcohol, alcohol dependence, or other alcohol related problems. This action may be taken by airline´s own medical officer or by the AME.

In support of the ensuing assessment process, it is essential that information is obtained from all possible sources. In addition to taking the individual´s history the medical examiner/AP may find it helpful to see a close relative, usually the partner, to develop the history further nd to obtain some idea of the domestic picture. However, partners/relative should not normally be put under any pressure to provide such assistance. A report should also be obtained from the patient´s family doctor who should be involved and kept informed of progress throughout the programme. The opinion of the pilot´s training captain is often invaluable if this can be discreetly obtained without pre-judging the issue or suggesting to the employer that such a problem must exist. The individual must be seen by an AP. If the opinion given is that the problem is not related to alcohol, or other psychiatric disorder, the report should be available to, and reviewed by, the AS of the licensing Authority before the individual may be considered fit to return to flying. There may occasionally be information on file that is unknown to the airline or family doctor. Before divulging/obtaining the above reports, it is important to obtain written consent from the individual concerned.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required on the part of the OP. The action taken will depend in part upon the Company drug and alcohol policy. However, where possible, it is important to obtain na objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcohol meter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient´s consent. However, a smell of alcohol is rather subjective physical sign, and such tests offer the opportunity to confirm objectively that a

person was or was not intoxicated. Given that blood alcohol concentration falls rapidly with abstinence, such testing should be conducted as soon as possible. Obviously refusal of testing, and any reasons given for this, should also be recorded carefully.

b Treatment and rehabilitation

If psychiatric opinion and examination confirm "alcohol, psychotropic drug or substance abuse with or without dependency" then a rehabilitation programme can be considered, including, if necessary, an in-patient treatment. The treatment programme undertaken should be entirely at the discretion of the treating psychiatrist and may or may not include pharmacotherapy with disulfuram and/or acamprosate. If dependency is not confirmed a treatment programme including a four weeks inpatient can be considered.

The JAR requirement is a stringent one, and constitutes more than would normally be clinically indicated in many cases. Where the diagnosis is considered by the AP not to constitute "alcohol, psychotropic drug or substance abuse with or without dependency" (and it will be noted that this terminology does not conform to ICD 10 diagnostic terminology), but where there is still a degree of concern regarding an alcohol related matter, then the AP and AS, but an unambiguous diagnosis of "alcohol abuse" clearly requires a four week residential treatment programme under current regulations. Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.

An isolated offence of driving under the influence of alcohol does not fulfil ICD-10 criteria for harmful use of alcohol (notably the threshold breath/blood alcohol concentration) vary from one member state to another. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed. Depending upon the number of such offences identified, it might be considered appropriate to arrange for a pilot to receive a 4 week residential treatment programme. In isolated cases, out-patient or day-patient treatment might be recommended by the AS/AP as being sufficient. It might be noted that de FAA now prohibits the licensing of pilots who are convicted of 2 or more drink-driving offences within a 3 year period.

c Follow-up and monitoring

The Aeromedical Section of the Authority should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care.

The AP should review the patient after discharge from in-patient care and again immediately before or after revalidation. On-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should be for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilots retires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, confirmative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated in support of the monitoring process (see above).

Continued attendance at Alcoholics Anonymous or an equivalent organisation, or follow-up by the treatment programme after discharge, should be required in most cases. It should also be required that a peer group member on the same aircraft fleet should act as a "buddy" to supervise the individual´s progress and report to the relevant authority at intervals.

d Treatment goals

In most cases, total abstinence will be the only acceptable treatment goal. For less serious cases (eg an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such

circumstances in-patients treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinence should both be considered mandatory.

e Revalidation

At the end of the twelve weeks, provided that abstention is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation (Class 1 "OML" or Class 2 "OSL") is required, assuming good progress. Failure to enter the programme or to maintain the protocol must lead to continued suspension of the licence.

f Relapse

Following treatment, relapse may lead to permanent withdrawal of the aviation licence. However, the definition of a relapse is sometimes not clear cut, and each case should be assessed carefully by an aviation psychiatrist.

14.2 **Drug dependence of alcohol type (problem drinking or alcohol dependence)**

~~Unlike other drugs of addiction alcohol is widely available and can be purchased legally in most countries. Alcohol dependence is a vast and increasing problem in the Western Hemisphere and only a small proportion of problem drinkers within the community at large are known to specialised agencies. Problem drinking often goes undetected because excessive drinkers go to great lengths to conceal their drinking.~~

~~Drug dependence of the alcohol type should be diagnosed if the individual's consumption of alcohol regularly exceeds the amount culturally permitted. Dependence is very difficult to cure and represents a hazard to flight safety since judgement is impaired by alcohol and reaction time is slowed during the hangover phase. For these reasons a diagnosis of alcohol dependence is a bar to holding a flying licence. The individual should be assessed as medically unfit and the resumption of flying status should be permitted only when the applicant has undergone a course of treatment, abstains completely and only then if the prognosis for continuing abstinence is good. The diagnosis is often difficult as the great majority have no insight into their illness and rarely ask for help.~~

~~A wide spectrum of alcohol related disabilities may arise from excessive consumption of alcohol. It may lead to physical damage in several ways. It can have a direct toxic effect on certain tissues, notably the liver, brain and heart. It is often accompanied by a poor diet which may lead to protein and B-vitamin deficiency. Excessive drinkers are also prone to accidents, particularly head injury, and the general neglect of health can lead to increased susceptibility to infection. A clue to the diagnosis might be provided by the smell of alcohol on the applicant's breath during routine medical examination. Tremor of the outstretched hands, chronic conjunctivitis, liver enlargement, absence of deep reflexes or other findings should prompt the medical examiner to look more closely for evidence of alcohol abuse. Alimentary disorders are common and gastritis and peptic ulceration, cirrhosis of the liver, oesophageal varices and acute and chronic pancreatitis are all recognised as complications of excessive alcohol intake. Nervous system involvement includes peripheral neuropathies, cerebellar degeneration and epilepsy. Frequently the first indication may be a major epileptic fit resulting from alcohol withdrawal. Other physical complications are too numerous to detail but include anaemia, cardiomyopathy, episodic hypoglycaemia, vitamin deficiencies etc.~~

~~Where the index of suspicion is high there are several laboratory tests which can be used to detect the heavy drinker, though none gives an unequivocal answer. The more sensitive tests can give 'false positives' when there is disease of the liver, heart, lung, kidneys or blood or if certain inducing drugs have been taken such as anticonvulsants, steroids or allopurinol. However, abnormal values in the pilot population are strong pointers to the possibility of alcohol abuse. The three most useful being:~~

~~a *Gamma glutamyl transpeptidase (GGT)*~~

~~The level is raised in about 80% of problem drinkers, both men and women, whether or not there is demonstrable liver damage. The greater the intake, the greater the rise in GGT.~~

~~b *Mean corpuscular volume (MCV)*~~

~~The MCV is raised above normal values in about 60% of alcohol dependant people and more commonly in women than men. If other causes are excluded a raised MCV is a strong pointer to excess drinking. The value takes several weeks to return to normal after abstinence.~~

~~c *Blood alcohol concentration*~~

~~A high level does not distinguish between an isolated drinking episode and chronic abuse. But in practical terms, if someone does not appear intoxicated with blood levels about 80 mg/100 mls, he is likely to be a regular heavy drinker. Similarly, a candidate arriving for a pre-arranged medical appointment with a blood-alcohol level > 20 mg% has a drinking problem.~~

18.3 Mental and behavioural disorders due to the use of other psychoactive drugs (F11-F19)

Intoxication, harmful use, dependence, psychotic disorders and disorders associated with psychoactive drugs other than alcohol are much less common against aircrew. However, when they are identified they are potentially a very serious concern and should always ~~do~~ be assessed by an AP. The ICD-10 classification specifies diagnosis according to the following groups of substances:

Opioids (F11)
Cannabinoids (F12)
Sedatives or hypnotics (F13)
Cocaine (F14)
Caffeine (F15)
Hallucinogens (F16)
Tobacco (F17)
Volatile solvents (F18)
Multiple and other substances (F19)

In general, illicit drug use will involve substances in categories F11, F12, F13, F14, F15, F16 and F19. The use of volatile solvents (F18), although usually associated with teenage years, and although technically not illegal, would be an equal cause for concern in the aviation environment if it should occur.

Socially acceptable drug use in categories F15 and F17 will not normally pose a clinical or occupational problem. However, significant problems can arise with respect to use of these substances, and this may sometimes require psychiatric or other medical assessment. Excess caffeine use can cause or exacerbate somatic symptoms of anxiety. Technically, of course, harmful use of tobacco (F17.1) includes a wide range of medical conditions all of which might render a licence holder unfit to exercise the privileges of that licence. However, psychiatric assessment would only be appropriate where problems of tobacco dependence and withdrawal were specifically the cause of concern.

Prescribe drug use (F13, or sometimes F11) may pose problems for licensed personnel, especially if the pilot and physician do not notify the occupational physician, the AME or the aviation authority. Prescription of drugs in these categories should always be associated with suspension of the medical certificate. Dependence or other problems arising from prescribed drug use should be subject to assessment by an AP.

18.4 Medical Validation

Drugs alter the mental state, interfere with judgement, alertness, vision and co-ordination and where abuse or dependence upon any such psychoactive substances is suspected the airman/woman should be immediately assessed as temporarily unfit and individually assessed under supervision of the AS. If dependence on such drugs is confirmed a temporarily unfit

assessment should continue until treatment has been shown to be completely successfully, the individual is on no medication and fully rehabilitated. The management protocol for alcohol dependence is a useful model to follow or adjust according to AMS advice.

~~14.3 **Management**~~

~~The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this programme it has been possible to return air crew to active flying within three to four months.~~

~~a The individual must be assessed as temporarily unfit on reasonable suspicion of alcohol or other drug abuse. This action may be taken by the airline's own medical officer or by the authorised medical examiner. In making such a diagnosis it is essential that information is obtained from all possible sources. In addition to taking the individual's history the medical examiner/psychiatrist should insist upon seeing a close relative, usually the partner, to develop the history further and to obtain some idea of the domestic picture. A report should also be obtained from the patient's family doctor who should be involved and kept informed of progress throughout the programme. The opinion of the pilot's training captain is often invaluable if this can be discreetly obtained without pre-judging the issue or suggesting to the employer that such a problem may exist. The individual must be seen by a psychiatrist experienced in dealing with air crew and familiar with the aviation environment. If the opinion given is that the problem is not related to alcohol or drug abuse the report should be available to, and reviewed by, the AMS of the licensing Authority before the individual may be considered fit to return to flying. There may occasionally be information on file which is unknown to the airline or family doctor.~~

~~b If psychiatric opinion and examination confirm alcohol or drug abuse, then it is mandatory that a residential in-patient course of at least four weeks is completed. The treatment programme undertaken should be entirely at the discretion of the treating psychiatrist and may or may not include such therapy as aversion therapy, using disulfuram (Antabuse).~~

~~c The Aeromedical Section of the Authority should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care.~~

~~d A second review should be required by the psychiatrist four weeks following discharge and the overall review pattern should be at two, four, six and twelve weeks following discharge. The discharge review will require supportive, confirmative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review biochemical analysis is required to ensure that liver enzyme levels are not rising, suggesting that abstention is not complete.~~

e At the end of the twelve weeks, provided that abstention is secure, the pilot may be allowed to resume his flying role but only in a multicrew capacity. From this time it must be a requirement that there is continued attendance at Alcoholics Anonymous or the equivalent organisation. It should also be required that a peer group member on the same aircraft fleet is arranged and is required to supervise the individual's progress and report to the relevant authority at intervals.

~~f Follow up should be continued at three-monthly intervals. A period of three years is recommended, during which blood tests will continue to be required and the multicrew limitation (Class 1 'OML' or Class 2 'OSL') requirement maintained.~~

~~Failure to enter the programme or to maintain the protocol must lead to continued suspension of the licence.~~

~~Following treatment relapse may lead to permanent withdrawal of the aviation licence.~~

~~15~~ 19 PSYCHIATRIC TREATMENT

New paragraph

159.1 Medication and drugs

According to the JAR-FCL 3.205 and 3.325 Psychiatric requirements (class 1 and class 2), and according to the JAR-FCL 3.115, psychiatric disorders that need the use of medication or drugs are incompatible with flying status.

The use of psychiatric medication such as, neuroleptic, antidepressant, normothimic, barbiturates, anxiolitic, hypnotic and others, which may affect alertness and upper brain functions should be forbidden, even for therapeutical purposes and under medical supervision.

In order to preserve the quality of sleep, during stop-overs in long-hauls flights, and only for this purpose, the ingestion of very short half-life hypnotics, may be tolerated, but always under medical supervision.

159.2 Psychotherapy

Different approaches of psychotherapy should be used according to different mental disorders. If pilots undergo psychoanalysis treatment, they must be considered unfit for flying during its course, due to necessary respect of unconscious defence mechanisms.

The most appropriate technique is known as Psychotherapy Brief, centralised in concept of the Focus, (the symptoms which lead the pilot to the psychotherapist).

The aim of psychotherapy should be helping the pilot to solve conflicts, and make decisions.

Chapter 18 – Tropical Medicine
Replace with new version

1 Introduction

1.1 Definition of the tropics

The Sun, spherical shape and rotation of the earth result in characteristic meteorological phenomena. Because the transmission of solar energy to the earth depends on geographical latitude (the higher the latitude the lower the transmission), air circulation systems build up. At the equator, air is lifted up, resulting in areas of low pressure. The humidity precipitates as heavy rain. With higher latitudes less energy reaches the ground, the dry air sinks down, and areas of high pressure are formed.

The areas of low pressure around the equator (between 23,5 ° North and 23,5 ° South) are described as the tropics, the areas of high pressure to the North and South as, Subtropics. With high solar radiation (as in summer) the continents are warmer than that of the oceans, areas of low pressure and sea wind are typical, the latter transporting humid maritime air resulting in monsoon rains. The tropical and subtropical climates result from these conditions. Where there is high temperature and high humidity, high precipitation results, giving rise to rain forests in the tropics. Very low precipitation with a dry and desert climate is typical for the subtropics. To the North and South more temperate climates result.

1.2 Medical stress factors in the tropics

Not only geographic location and climate relate to possible health effects in areas outside the temperate zones. Therefore, the standard of development and life standard have to be considered as well. Regarding these facts medical advice given here is not restricted to the tropics proper but to Subtropics as well. On the other hand, some tropical countries have health systems similar to industrial countries and pose much less risk.

Medical stress factors in the tropics can be caused by the climate, factors related to travel (jet lag, means of transport etc.), and insects (because of the warm climate). These insects can act as vectors of diseases. Other factors can be the low standard of hygiene, infectious diseases, socio-economic problems and psychosocial stress.

The **climate** – a humid and hot tropical, more than a dry and hot subtropical climate – can be a significant stress factor. Sufficient fluid intake, protection against solar radiation, suitable clothing etc. should be recommended.

Because of economic constraints **the standards of hygiene** are mostly lower than in temperate climates. The means for treatment of drinking water and sewage are very often not adequate.

High humidity and warm to hot temperatures are favourable conditions for a large variety of **insects**. Theses can act as vectors of several diseases.

The unfavourable conditions caused by the environment, can result in a host of **infectious diseases** typical for, or very common in the tropics. The worldwide mortality from tropical diseases is estimated as 22 million people.

The risk of acquiring infectious disease is more likely whilst travelling abroad, but it depends on the kind of travel and activities undertaken. This also applies to the kind of disease acquired. Of the various health problems that may occur in some tropical zones,15 - 25 %, may be caused by diseases, specific to the particular zone. Certain other types of infectious diseases are more common in the tropics than in temperate zones. The most frequent infection acquired is traveller's diarrhoea. Next come infections of respiratory tract, malaria, and Hepatitis A. Giving advice to flight crews about malaria, Hepatitis A and B, yellow fever and travellers diarrhoea, is most important.

There are a lot of **psychosocial stress** factors that can affect people who are travelling abroad. One is staying away from home for long time (e.g. flight crews stationed abroad). Other types of stress may

result even from being away only for a short time. There may be intercultural conflicts, unfamiliar working situations, living in strange surroundings, being in the company of strangers from an unfamiliar cultural heritage (socio-cultural factors), foreign languages, a bad infrastructure plus the problems that can occur in every-day-life. These may result in anxiety and phobic disorders. Cumulative stress may result in burnout, alcohol abuse etc. Alcohol consumption is easier abroad because the normal social control is absent. Where a longer stay abroad is intended, addiction disorders, alcohol abuse, psychiatric disorders etc. should be excluded.

Psychiatric disorders have to be considered in any counselling. Up to 25 % of the population, could possibly experience, at least one relevant psychiatric disturbance in a lifetime. Being confronted with a host of stress factors, may lead to such an event being more likely to happen. Anxiety and psychotic disorders may often appear together. "Abroad" neurosis and psychosis can manifest itself as well. When a depressive disorder or psychosis is diagnosed, the side effects of Mefloquin medication (malaria chemo-prophylaxis and/or treatment) have to be excluded. In divers, a similar disorder may be caused by decompression sickness. Anoxia can also cause similar symptoms. Exogenous psychosis has to be taken into account. Alcohol abuse can also be a clinical sign of an underlying anxiety disorder.

2 Medical Travel Advice

Medical Travel Advice for Flight Crews

- Information about the relevant risks in the proposed area to be visited
- Information about,
    - General precautions
    - Hints for behaviour abroad
    - Malaria prophylaxis
- Information about vaccination
- Information about personal protection
    - Information about medication for self therapy

Those who are physically and mentally fit, acclimatise more easily for service in tropical climates. The traveller should abstain from visiting the tropics, if they have any existing disease, which the tropical climate may exacerbate.

The medical travel advice has to minimize the risks of staying in the tropics by informing the traveller of the problems and possible precautions. If possible, 4 to 6 weeks should be allowed to start any prophylaxis. This will allow a build up of sufficient immunization status. **Flight crew should be informed about the risks in tropical areas and have the appropriate vaccinations before starting any flight duties in these areas.**

The medical travel advice should be individual and not schematic. It is primarily intended for flight crew and is directed to cockpit and cabin crew. It has to differentiate depending on the kind of duties and activities undertaken such as, staying in the tropics for short layovers, or for a long-time stationing, staying in crew hotels or compounds, undertaking adventure trips of short or long duration etc. Furthermore, individual factors such as intelligence, readiness for risks, general views (e.g. aversion against remedies), experience, individual disposition (age, diseases etc.) have to be taken into account. The doctor giving the advice has to find out about the persons planned activities such as cross country walking, climbing, diving, actual health state, possible allergies possible immune defects, vaccination state, previous malaria chemo-prophylaxis including tolerance, possible or even planned pregnancy etc. Epidemiological data, the time of travel (rainy or dry season), the climate at the destination, have also to be considered. The possibility of a lower standard of medical care being available at the tropical destination should also be taken into account.

Risks and prophylaxis must be objectively presented, with matter-of-fact information about the possible dangers, so that the traveller can decide. Exaggeration should be avoided. The" need to know", has to be differentiated from the" nice to know". Written information can complete, but not replace the spoken information.

Medical travel advice depends on

Destination Time of travel Duration of travel Character of stay (short layover/long stay), short or long adventurous trips, or only staying in crew hotel, Close contact with local population) Climate Epidemiological data

Individual Factors in medical travel advice

Personality, general view, intelligence, readiness for risks Experience Particular activities planned Age, physical and mental condition, individual disposition (previous or actual diseases, allergies, medication) Vaccination state Tolerance of previous malaria chemo-prophylaxis Actual or even planned pregnancy

3 Medical Travel Prophylaxis

Medical Travel Precautions:

1.	**Exposure prophylaxis**	- General recommendations - Protection against sun and climate - Food and beverage hygiene - Protection against insects
2.	**Vaccination Prophylaxis**	- Active (and passive) vaccinations
3.	**Medical prophylaxis**	- Malaria chemo-prophylaxis - Prophylaxis against traveller's diarrhoea (only exceptionally!)

3.1 Exposure prophylaxis – general recommendations

Exposure Prophylaxis is avoiding those factors, which may cause or deterriorate health problems. It is the basis of all the precautions and prophylactic means against any disease, which can exist in the tropics and subtropics.

In the context of exposure prophylaxis, swimming and wading in tropical ponds, lakes or rivers should be discouraged (there is a danger of infection with schistosomiasis) as well as walking barefooted on beaches etc. (infection with ankylostoma). Wearing adequate footwear on the ordinary beach, or in the calm waters of exotic beaches, can protect against such infections such as ankylostoma , and the stings of maritime fauna (sea-urchin, stingray, corals). The inexperienced traveller may fear snake-bites. These and bites of scorpions are extremely rare, under normal travel arrangements.

Respiratory Tract Infections are often underestimated. Nevertheless, they remain the second-most common health disorder contracted abroad after travel diarrhoea. The reasons can include the change of climate, moving between hot and humid conditions outside, to the cool air in rooms with air-conditioning, cool draughts in cars and public transport, as well as temporary immune suppression due to sunburn. Dust and dirt from city streets are also main contributory factors. Exposure prophylaxis can be very important, if this type of problem is to be avoided.

Intensive **solar radiation** in low latitudes and altitude, reflection from water and snow surfaces, can result in significant UV exposure to the skin and eyes (More care is required in the southern hemisphere, where there is greater UV exposure due to the ozone gap). Acute dangers are photo-dermatitis, which causes sunburn, and can lead to meningeal irritation. In extreme cases, cerebral oedema may occur, in combination with excessive heat emission. Sunstroke can occur, with keratitis, conjunctivitis, snow blindness in mountain areas, and temporary immune suppression. The chronic consequences can result in skin tumours, accelerated aging of skin (due to destruction of elastic fibres), chronic photo-dermatitis and cataract. Adequate sun protection must be afforded, especially during the strongest exposure around noon time, by using the appropriate clothing, by wearing sensible headgear and by using sun

cream with a high sun protection factor (at least factor 20) and minimizing the time of exposure. The so-called sun blockers should be water resistant and contain a high percentage of micro-pigments). The use of sunglasses is important.

There are many **skin disorders** that can occur abroad due to the climate. Increased sweating may result in Pityriasis versicolor, intertriginous excema and mycosis (fungal infections) of the skin. Therefore, cotton underwear and clothing, frequent cold showers and possible local therapy with anti-mycotics should be recommended. Superficial skin injuries, insect stings and bites can lead to super infection and inflammation etc. Ulcers can occur due to bad hygienic conditions, or contact with sea-water. Local therapy with anti-mycotics, antibiotics etc. may be helpful.

Some travellers suffer from constipation at the beginning of their stay abroad. This is mainly due to the fluid intake being too little or changing the nutrition. Stool consistency decreases with continued residence. The use of laxatives is not usually necessary („Travelling can expand the mind and loosen the bowel.").

Furthermore, an appropriate **medical kit** should be recommended. The contents depend on the duration, the destination and the kind of travel, as well as on the traveller's individual situation.

After a certain time, or after termination of a longer stay abroad, or on clinical indication, a **Routine medical examination** should be carried out. This should include an examination for intestinal parasites

The **teeth** should be checked and made good, especially before longer stays abroad. On one hand dental care is not guaranteed everywhere, on the other hand, tooth pain may greatly reduce the well being of a person. Inflammation or infection of a tooth may result in barodontitis. This condition can be very painful and can occur when the pressure of the cabin changes. **Inflammation or infection of the teeth makes aircrew unfit for flying duties.**

General recommendations when staying in the tropics

- Protection against solar radiation (sun blocker, sun protection factor at least 12), sunglasses, headgear/hats
- Fair coloured, light, loose fitting clothing out of natural fibres
- Appropriate fluid intake (at least 2 to 3 litres daily,) a good guide may be the colour of urine. The colour should be a pale yellow and not dark yellow.
- Air conditioning (bedrooms should be cooled down before entering, switch off A/C at night)
- No skin penetrating procedures (piercing, tattoo, chiropody)
- No swimming in freshwater (lakes, ponds, rivers) and sea- water, near settlements and sewage dumps
- No barefoot walking at beaches
- No touching of animals
- The advice of local people should be taken.
- Do not believe advisers who trivialize the potential dangers
- Care must be taken to avoid violent crime (no open valuables or money, "low profile" clothing, no jewellery or very expensive watches should be displayed
- Make enquiries from local people about safety issues. Do not go out alone. Avoid provocative behaviour, only small amounts of money should be carried.
- Do not play the "hero", have a small bill at hand for possible assailants, better losing some money than your life
- Take care with food, beverage and general hygiene
- Ensure local protection against insects
- **Always take care. Never relax!**

3.2 Special considerations for Flights on short notice

Flights on short notice, can pose special problems. Frequently, the time until departure is too short for the appropriate preparation, because flight and destination may have been planned at the last-minute. Often, travel advice is totally ignored. Furthermore, the time for immunizations is often too short. Therefore, all prophylactic means may become disregarded.

This possible outcome has to be prevented. For flights on short notice a thorough briefing has to be carried out. General preventative means, food, beverage and personal hygiene as well as malaria precautions can be followed even on these kinds of flights. Boosters of most vaccinations and appropriate immunization may be possible as well.

Where there is a possibility that flight crews may have many of such types of flight, they should be briefed and immunized before they should be engaged in flights to tropical areas. Maintaining vaccination status and carrying sufficient Chemo-prophylaxis for malaria can be delegated to crew members themselves.

4 Vaccinations

4.1 General Considerations

Vaccination is the most efficient means of prophylaxis for a number of infectious diseases. Vaccination is generally effective and well tolerated. Therefore it is one of the most efficient medical measures to hand. The individual is protected and the public are protected, because the vaccinated person cannot transmit the respective disease any more.

Flight crews are unfit for flight duties for at least 24 hours after a vaccination.

4.1.1 Information and Documentation

Vaccination requires personal informed consent. The person to be vaccinated has to be fully informed about the vaccination in sufficient time prior to a planned vaccination. The information should include a description of the disease to be prevented, and its treatment (What kind of vaccine is it? What if any, are the benefits, both individually and collective. What are the contraindications, possible side effects and what could be the complications. What is the duration of immune protection being given by the vaccination? What boosters will be required? What is the recommended behaviour after the vaccination?). All the information given should be documented and show that written consent has been given.

After any vaccination, the date, type, manufacturers-number, stamp and signature of the vaccinating physician has to be written down on the appropriate document (The international vaccination certificate of the WHO is one recommendation.). Any missing documentation of any former vaccination, prior to a booster vaccination, should not delay or even exclude a planned vaccination. A probable booster vaccination over and above the basic scheme does not normally have any side effects.

4.1.2 Side effects and complications

Slight erythema, swelling and pain are not uncommon at the site of the inoculation. There may be a slightly elevated body temperature in the first three days after vaccination. This is common and of no consequence. An antipyretic can be prescribed, where this might be anticipated.

Allergic reactions and anaphylactic shock are only rare complications. Nevertheless, these reactions should be anticipated. Emergency equipment and emergency drugs (injections such as Adrenaline injections of 1 -1000, Glucocorticoids, H1 and H2 blocking agents, Aminophylline, as well as Beta-agonist aerosols) should be on hand to manage anaphylactic reactions. Those who have been vaccinated should stay under medical supervision for 30 minutes after vaccination.

4.1.3 Scheduling vaccinations

The immune protection afforded by vaccinations, should be completed prior to flights into tropical areas. The onset of the effect of the respective vaccination has to be taken into account. The briefing and vaccinating physician, has to check whether a basic immunization or a booster immunization is required. For a **basic primary immunization schedule,** a certain number of inoculations have to be performed, over a certain period of time. **Booster immunizations** have to be performed at certain intervals after a basic programme, to prolong the immunization protection. Should the interval between the

inoculations of the primary schedule, or the maximal interval between basic and booster immunization be exceeded, a new basic schedule should **not** be started all over again, the required booster can be given **without any profound side effects**. There are no maximal intervals between vaccinations either. Every inoculation counts. Every tropical medicine briefing, should be used to check the immunization status for Tetanus, Diphtheria and Poliomyelitis, etc. With children, the immunization status for measles, rubella, mumps etc should also be checked.

Scheduling inoculations, of a primary immunization programme, the minimum interval, until onset of effectiveness of the respective vaccination, has to be taken into account. The immunization schedule should be completed in good time, prior to the flight to tropical area. A sufficient **protection** builds up about 10 – 14 days after last booster inoculation, or the last inoculation of a basic schedule. The vaccination programme has to be scheduled respectively. A certain minimum time for a programme, prior to the flight, has to be taken into account. This should not be misinterpreted. No vaccination should left out or missed. If there is any doubt, it is better to travel having been given a vaccination, which is not yet fully efficient, rather than not having been vaccinated at all.

Minimum interval between vaccination and departure into tropical areas for important vaccinations (modified after Hartmann, P. MMW 20/2000)

Kind of vaccination	Time interval prior to departure*
Tetanus, Diphtheria	Possible until departure
Polio	Possible until departure
Hepatitis A	Possible until departure
Hepatitis B	3 – 4 weeks
Typhoid	1 – 2 weeks
Yellow Fever	10 days

* Flight operations should not be carried out for 24 hours after vaccination

If different vaccinations have to be given at the same time, live vaccines can interfere with one another. Therefore live vaccines should be given either on the same day or with a minimum interval of four weeks. The vaccinations for Yellow Fever, Measles, Mumps, Rubella, Oral Poliomyelitis Vaccine and the BCG, are in this group. The oral live vaccine for Typhoid does not require any minimum interval. Live vaccine status, can however be jeopardized by immuno- globulins. Therefore live vaccines should not be given before 90 days after the inoculation of immune globulins. Vice versa after live vaccines, a certain minimum interval must be allowed before an inoculation of immuno- globulins; i.e. 7-10 days after vaccination against Yellow Fever, and 14 days after vaccination against Measles, Mumps and Rubella. With inactivated vaccines no intervals are necessary when given with other vaccines either live or inactivated.

If surgical operations are necessary after vaccinations, they should not be performed in the first three days after inactivated vaccines have been given, and not in the first 14 days after live vaccines have been given, such as Yellow Fever, Measles, Mumps, Rubella, Oral Poliomyelitis Vaccine, Oral Typhoid Vaccine and BCG. Urgent operations can be done right away.

For Booster immunizations the effective period of the respective vaccination has to be taken into account.

The effectiveness and the effective period of vaccinations (modified after Steffen, R., von Sonnenburg, F. in W. Lang, T. Löscher, Tropenmedizin in Klinik und Praxis, 3. Auflage, Thieme, 2000). This schedule is up to date as of Jun 2004, it should be checked periodically to see if there have been any changes.

Vaccination	Application	Effectiveness (%)	Effective from	Effective period
Cholera parenteral	i.d., s.c., i.m.	< 50	d 6 (first immunization), d 1 (booster *)	Officially 6 m Effective 3 – 6 m
Cholera oral (WC-BS)	p.o.	60 - 86	d 6 (first vaccination), d 1 (booster *)	Officially 6 m Effective 3 – 6 m
Cholera oral	p.o.	13 - 100	d 6 (first immunization),	Officially 6 m

(CVD-103 HgR)			d 1 (booster *)	Effective 3 – 6 m
Diphtheria	i.m.	~ 80	4 w	5 (-10) yrs
ESME (Tick borne Encephalitis)	i.m.	99		> 3 yrs
Hepatitis A	i.m.	> 99	d 14 (evtl. d 0)	10 (- 30) yrs
Hepatitis B	i.m.	~ 90	d 30 – d 60	Responder lifelong
Influenza	i.m.	70 - 90		> 1 yr
Japanese Encephalitis	s.c.	> 90		> 4 yrs
Meningococcal Meningitis	s.c.	70 -90	d 7	1 – 3 yrs
MMR (Measles, Mumps, Rubella)	i.m.	90 - 95		lifelong
Pest	i.m.	?	A couple of d	6 m
Poliomyelitis (IPV)	i.m.	> 99	4 – 6 w	10 yrs
Poliomyelitis (OPV)	p.o.	> 99	4 w	Life-long
Tetanus	i.m.	> 99	4 w	10 yrs
Rabies	i.m. (s.c.)	> 99	~ 7 d	2 – 3 yrs
Tuberculosis (BCG)	i.c.	0 -80	Not sure	10 yrs
Typhoid F. Ty 21 a	p.o.	~ 70	d 14	1 – 3 yrs
Typhoid F. Vi	i.m.	~70	d 14	2 – 3 yrs
Yellow Fever	s.c.	> 99	d 10 (first immunization) d 1 (booster *)	Officially 10 yrs Effective lifelong ?

* If vaccinated within effective period of former immunization

4.1.4 Combination vaccines

In order to promote the compliance of vaccinations, a couple of combination vaccines have been developed in the past years. Different studies have shown that the immuno-genicity of the individual components are not reduced by such a combination, but actually enhanced. The combination vaccines for Hepatitis A and B (Twinrix®) and for Tetanus, Diphtheria and Poliomyelitis (Revaxis®) are of special interest for frequent travellers.

4.1.5 Contraindications

General Contraindications of Vaccinations (modified after Zieger, Flug-u. Reisemed.5, 1/98)

Acute febrile diseases (A Common cold or a sub-febrile temperatures below 38,5 °C are not a contraindication!). A time interval of up to 2 weeks after recovery should be allowed. A post exposure vaccination against Rabies should be given right away.
During incubation of infectious diseases
Purulent infections of skin and the mucosa
Severe acute allergic conditions
Allergies against the components of a particular vaccine
Acute diseases of CNS
Epilepsy (except for febrile convulsions and seizures some years ago)
Pregnancy if applicable, especially with live vaccines
Live vaccines where there is immunodeficiency or immune suppression (e.g. due to steroids, Immuno-suppressive agents, chemotherapy, radio-therapy) etc. note 1.
I.m. injection during oral anticoagulation therapy

Note 1. Under certain circumstances it may be possible where there is a real indication. The serologic control of a successful vaccination is recommended

4.2 Vaccinations in Travel Medicine

When briefing flight crews and other people who travel, a distinction has to be made between mandatory vaccinations, generally recommended vaccinations and specific travel vaccinations.

Mandatory vaccinations according to the WHO, used to be the vaccinations against Smallpox, Cholera and Yellow Fever. Smallpox was eradicated in the 70's of the last century. The injection type of vaccination against Cholera showed no sufficient effect, and was omitted from the list of mandatory vaccinations. Nevertheless one should be aware, that the vaccination against Cholera might be demanded by certain border controls. This is against the general practice and scientific findings. It is often done in order to extract money dishonestly, by exaggerating the risk.

The vaccination against Yellow Fever is now the only mandatory vaccination, when travelling to certain countries. Some countries (16 countries in tropical Africa and French Guyana) demand the vaccination for every person entering that particular country. Other countries require YF, only for those who have visited an endemic area within the last 6 days. The vaccination against meningo-coccal meningitis is mandatory for pilgrims who are travelling to Mecca. For flight crews taking pilgrims to Saudi Arabia, this vaccination is also mandatory.

The **generally recommended vaccinations** against Tetanus, Diphtheria and Poliomyelitis are also recommended as a matter of principle. The immunization status should be checked and a booster given if necessary. The combination vaccines are generally recommended. If a tetanus immunization is necessary because of an injury, a combination vaccine with diphtheria vaccine, or diphtheria and poliomyelitis vaccine, should be used.

The indication for **specific travel vaccinations** depends on the areas to be visited, the time (rainy or dry season etc.), the duration and the style of travel (staying in the hotel or travelling around during the layover). These vaccinations should ensure an optimal protection for the flight crew or the traveller. For members of flight crew, immunization for Hepatitis A and Yellow Fever are recommended in general, others depend on each and every situation.

Specific Travel Vaccinations

1. **Hepatitis A**
2. **Hepatitis B**
3. **Typhoid Fever**
4. **Meningo-coccal meningitis**
5. **Rabies**
6. **Japanese Encephalitis**
7. **Cholera**
8. **ESME (Tick Borne Encephalitis)**

4.2.1 Tetanus

Spores of Clostridium tetani can be found world wide, especially on or within the soil. The soil in the tropics in particular, contains high concentrations of these spores. The infection can occur after almost any injury. There is a higher risk of this type of infection in tropical areas. Under such anaerobic conditions (as in necrosis, deep wounds, with foreign bodies or infected wounds) the spores transform into vegetative stages, multiply and produce the neurotoxins, tetanospasmin and tetanolysin. Only tetanospasmin has clinical effects. The neurotoxin is transported within the neurons, in a retrograde way into the CNS, where it blocks the inhibitor neurotransmitters at the pre-synaptic neurons. The classic syndrome then develops, with muscle spasm, risus sardonicus, trismus and opisthotonus.

As a prophylactic it is sensible for this vaccination to be given. In the case of an injury, careful wound toilet should be undertaken, as well as checking the vaccination state, and where applicable a booster should be given.

The basic immunization schedule consists of three inoculations with tetanus toxoid (Tetanol®) (0 – 4 to 8 weeks – 6 to 12 months). Boosters are necessary every ten years. As mentioned before, there are no intervals too long between inoculations, every inoculation counts. Therefore, an incomplete or complete basic immunization does not have to be started again from the beginning, if the intervals mentioned above are exceeded. **The vaccination is generally recommended, especially for flight crew. Before**

entering tropical zones at least two inoculations should have been given. If applicable the occasion should also be used to immunize against diphtheria, or even diphtheria and poliomyelitis simultaneously, with the respective combination vaccines.

Should, in case of an injury, an incomplete immunization status be detected, a basic immunization schedule should be completed or should be started. Under certain conditions an **additional passive immunization** with tetanus antitoxin (tetanus immuno-globulin) has to be applied (see table).

Tetanus Vaccination in Case of Injury (after STIKO-Recommendations, Epidemiology Bulletin 28/01)

Number of previous inoculations	Clean, minor wounds		All other types of wounds[1]	
	Td or DT[2]	TIG[3]	Td or DT[2]	TIG[3]
Unknown	Yes	No	Yes	Yes
0 - 1	Yes	No	Yes	Yes
2	Yes	No	Yes	No[4]
3 or more	No[5]	No	No[6]	No

1 - Deep and / or dirty (with dust, soil, saliva, stool contaminated) wounds, injuries with damaged/open tissue and reduced oxygen supply or foreign bodies (i.e. contused, ruptured, bite, stabbing or shooting injury)
- Severe burns or coagulation
- Tissue necrosis
- Septic necrosis

2- Children under 6 years DT, older persons Td (i.e. Tetanus-Diphtheria) Vaccine with reduced amount of diphtheria toxoid in comparison with DT

3- TIG = Tetanus Immuno-globulin, in general 250 IE are given, the dose can be elevated to 500 IE; TIG is used with Td/DT-if necessary simultaneously.

4 - Yes, if injury happened longer than 24 h ago.

5 - Yes, if more than 10 years since last inoculation have passed.

6 - Yes, if more than 5 years since last inoculation have passed.

4.2.2 Diphtheria

Diphtheria occurs as a result of an infection by an organism, which is called Corynebacterium diphtheriae. In temperate zones it affects mainly the respiratory system, and is transmitted by droplet infection all the year round, with a higher number of infectious cases during the cold season (be careful of asymptomatic carriers!). A highly effective exotoxin is the pathological agent. After initial general symptoms the main infection starts with the development of pseudo-membranes involving the pharynx, the nose, the larynx and trachea and bronchi. Eventually the highly potent toxin may cause complications such as myocarditis and polyneuritis, which may be lethal. (In tropical areas, wound diphtheria is common, but does not have such an insidious course.)

Because the therapy has to be started urgently, the diagnosis has to be established by the clinical appearance (pseudo-membranes and Caesar´s neck, due to enlarged cervical lymph nodes). The definitive diagnosis follows by a bacteriological demonstration of C. diphtheriae.

The basic immunization consists of three inoculations with diphtheria toxin, which is inactivated by formol. These should be given at (0 – 4 to 8 weeks – 6 to 12 months). The vaccine for adults contains only 5 (at least 2) IE diphtheria toxoid (in contrast to the children's vaccine which has the greater amount). This should be used after age 6 or 7. Boosters are necessary every ten years. As mentioned before, there are no intervals too long between inoculations, every inoculation counts. An incomplete or a complete basic immunization schedule does not have to be started again from the beginning, if the intervals mentioned above are exceeded. **The vaccination is generally recommended, especially for flight crew. Before entering tropical zones at least two inoculations should have been given**. If applicable the occasion should be used to immunize against tetanus, or even tetanus and poliomyelitis simultaneously with the respective combination vaccines. Even after having had the diphtheria infection, there is no protection against another infection without proper immunization.

Adverse side effects of the vaccination can be local reactions at the site of inoculation, febrile general reactions, rarely thrombocytopenia or neurological complications, such as neuritis. **Contraindications**, apart from the general contraindications against vaccinations, can be haematological and neurological side effects after a former inoculation.

4.2.3 Poliomyelitis

Poliomyelitis is caused by three strains of poliomyelitis virus. It is normally transmitted by, the oral-faecal route. A transmission by droplet infection is also possible. There is a risk of infection from poor levels of hygiene, large crowds of people etc. The clinical course can vary from an abortive infection to a pre-paralytic, or to a paralytic poliomyelitis. The latter shows a case fatality rate of 5 – 10 %. Vaccination is usually carried out using an oral poliomyelitis vaccine (OPV, Sabin) or an inactivated poliomyelitis vaccine (IPV, Salk). Both vaccines contain all three strains of virus. There is an epidemiological situation in some European countries, with a very low risk of infection on the one hand, and the certain risk of vaccine associated paralytic poliomyelitis (VAPP) and of contact poliomyelitis (risk < 1: 4 million, < 1: 15 million respectively) on the other. In these countries OPV has been omitted in favour of IPV from the vaccination schedule (e.g. Germany). These countries recommend a vaccination for poliomyelitis for patients above 18 years of age, with a former basic immunization, only for travels into endemic areas. **The vaccination is generally recommended for all flight crew therefore,** immunizations that have been started with OPV can be completed with IPV.

Vaccination against Poliomyelitis

Indication	**All persons with missing or incomplete basic immunization** **In some countries: after age of 18 years a booster is only necessary when exposure is possible. No more boosters need be given as a routine**
Vaccine	**Inactivated vaccine IPV** **Live vaccine OPV**
Vaccination Scheme	**Depends on** **Which producer: - 2 x 1 ml with interval of 8 w better 6 m i.m. (IPV-Virelon®)** **- 3 x 0,5 ml (0 - 4 to 8 w - 12 m) i.m. (IPV-Mérieux®)** **- 3 x 0,5 ml (0 – 4 to 8 w – 6 m) (OPV)** **(care must be taken with the interval of OPV with other live vaccines)**
Effective Period	**IPV: 10 yrs (?), after that booster** **OPV: 10 yrs (lifelong), after that booster**
N.B.	**IPV: no intervals with other vaccinations required** **In certain countries OPV is not used any more because of the risk of VAPP (only for containing epidemics)** **Immunizations begun with OPV can be completed with IPV**

4.2.4 Yellow Fever

Yellow Fever is endemic in the tropical rain forest zones of South America and Africa and is caused by a Flavivirus. Endemic and infectious zones can be readily distinguished. In **endemic zones** the virus circulates within a so-called sylvatic cycle between monkeys as reservoir and mosquitoes as vectors (Haemagogus and Sabethes mosquitos in South America, Aedes in Africa). In **infectious zones** (found within endemic zones) transmission to man occurs due to an urban cycle with anthropophilic Aedes mosquitoes as vectors. Epidemics can be caused in the same way.

Yellow Fever is a viral haemorrhagic fever. The severity of the disease varies from a virtually unnoticeable or mild course (especially found in endemic zones) to severe and even lethal, classic or haemorrhagic yellow fever. In the latter cases the general condition rapidly deteriorates, with failure of the liver and the kidneys. There is generalized haemorrhagic diathesis with haematemesis, melaena, metorrhagia, haemorrhages in the skin and mucosa. Involvement of heart and CNS are common. 7 to 10 days after onset of symptoms the patients may die. The mortality of yellow fever in general is 10 to 20 %, and up to 50 % with classical yellow fever.

Vaccination against YF is recommended when visiting endemic zones. It is mandatory when entering certain countries of the endemic zones and, after having visited endemic zones within the last 6 days, when entering certain other countries of the endemic zones and outside. The vaccination may also be necessary when travelling within countries of the endemic zones, e.g. Brazil and Ecuador. **Flight Crews should be vaccinated even if they only fly over endemic areas, because an immunization might be required after a diversion to an airport, which is in the endemic zone. Therefore all flight crew operating in Africa or South America should be vaccinated against Yellow Fever.**

The vaccine consists of a highly effective, attenuated live vaccine. The substantial residual virulence of the vaccine should be taken into account when vaccinating patients who are immuno-suppressed (HIV positive patients can be immunized with a CD4-count > 400 / µl.). The vaccine virus is bred on eggs or chicken fibro-blasts, therefore chicken protein allergy might be a contraindication or at least relative contraindication. On the day of vaccination, and for the three successive days after the vaccination, those who have had a vaccination, should not do anything requiring muscular exertion or exposure (e.g. sport, sauna or being out in the strong sun and receiving UV exposure). **Side effects** can be slight, local reactions at the site of inoculation (up to 10 % of those vaccinated). After, 4 – 6 days there may be more general reactions, such as an elevated body temperature and malaise (about 10 % of those vaccinated). The malaise, headache and muscle pain usually lasts for about 24 hours (2 – 5 % of those vaccinated). **Contraindications** are acute febrile diseases within the last two weeks, immuno suppression and immune defects (see above), corticoid medication, allergy against chicken protein and age < 6m.

Only Authorized Vaccination Centres may give the Yellow Fever vaccine. These Centres only, certify the vaccination on the official vaccination certificate. The stamp is valid from ten days until 10 years after inoculation. In case of contraindications, an exemption certificate has to be given (The text should state that “No vaccination was possible on medical grounds”.). One should be aware that the health authorities of certain countries might not acknowledge the exemption certificate.

Yellow Fever Vaccination

Indication	
	Travel into infection zones
	According to health regulations of certain countries for every visitor or after visits of endemic zones within the last 6 days
Vaccine	**Live Vaccine of attenuated virus of 17 D - strain**
Vaccination Scheme	*1 x 0,5 ml sub.cut or im.*
Effectiveness	**Reliable, probably lifelong**
Validity	**As mandatory vaccination: from d_{10} until 10yrs after vaccination**
N.B.	**Vaccination only by authorized vaccination centres**
	Intervals to be observed with other live vaccines
	Care must be taken with the chicken protein allergy and HIV infection!

4.2.5 Hepatitis A

Hepatitis A is an acute viral infection affecting the liver. The infection is predominantly self- limiting. In children the clinical course is mostly unnoticed. Even though the case fatality rate is overall only about 0,2 %, it increases by age (> 40 a: 2 %, > 50 a: 2,7. Moreover, recovery may take a couple of months, because of a protracted course or a delayed recovery.

Hepatitis A is acquired by faecal-oral transmission (especially in children by smear infection) by contaminated food and beverages. Raw seafood and oysters are a predominant source of infection. For exposure prophylaxis, good hygiene is effective because of the high resistance of Hepatitis A-virus against the environmental influence. In spite of this, vaccination is very effective because of the low hygiene standards and high rate of infectivity in the tropics.

A very effective, and inactivated type of vaccine, has existed since 1992. The effective period is 10 years. The new vaccine only needs two inoculations with an interval of six months in between. Even after the first inoculation an immune protection of six months to one year, can result. At the latest, two weeks before departure to tropical areas, the first inoculation should be given. Nevertheless, a later inoculation should not be omitted, because the immune protection will have built up a couple of days after arrival. Because of the high infection rate in children, even in first world areas in former days, a lot of the older aircrew might have had hepatitis A as a child even without knowing about it. Therefore, the titre of Anti-HAV of patients born before 1950-1960, with otherwise unexplained jaundice, or after a longer stay in third world areas, should be checked prior to the vaccination. Only patients with no titre (the threshold of immune protection being around, 20 IU/l) need a vaccination. Nevertheless, a vaccination of patients with titre of Anti-HAV is not harmful.

Hepatitis A Vaccination

Indication:	**Wide indication, travels overseas and to the Mediterranean and Eastern Europe** **Patients born before 1950-1960 depending on titre of Anti-HAV**
Vaccine:	**Inactivated vaccine (formalin activated virus)** **(HAVRIX®, VAQTA®, Epaxal®, HAVpur®)**
Vaccination Scheme:	**0 - 6 (to 12) months, i.m.** **Immune protection starts after 2 – 4 w for 6 to 12 m**
Booster:	**After 10yrs**
N.B.:	**Testing of titre of Anti-HAV in patients born before 1950-1960**

4.2.6 Hepatitis B

Hepatitis B is transmitted parenterally (blood, blood products and body fluids like sperm, vaginal fluid). 10 % of infected persons develop chronic hepatitis with complications such as cirrhosis of liver or hepato- cellular carcinoma. Whilst staying in the tropics, sources of Hep B infection are, unprotected sexual contacts, close contact to local population, acupuncture, piercing, tattooing, dental treatment, and contact with blood, in or after traffic accidents. The % risk depends on the length of stay.

Beside exposure prophylaxis, an effective recombinant vaccine exists. Flight crews need this vaccination only under particular circumstances. Indications are long or frequent stays, as well as close contact to local population in areas which are highly endemic, adventure trips, sport with high risk of injuries, possible sexual contacts, possible medical or dental treatment, tattoos or piercing. Only in high- risk groups does a titre control need to be done, about 6 weeks after completing the vaccination. The patients should be advised that even after a successful vaccination, unnecessary exposure could still result in infection with Hepatits C or HIV. Prior to departure two inoculations should have been completed.

In Non-Responders (4 – 8 w after the last of 3 inoculations titre < 10 IU/l) another inoculation should be given. An inoculation with a double or fourfold dose (e.g. vaccine for patients under dialysis), or in combination with influenza vaccination can be administered, probably sub-cutaneously, to enhance the effect. If the titre of Anti HBs has risen once above 100 IU/l the immune protection will last for 10 years.

Hepatitis B Vaccination

Indication:	**long time stay, close contact to local population, adventure tours, bad hygiene**
Vaccine:	**Recombined vaccine (Engerix B®, Gen H-B-Vax®)**
Vaccination Scheme:	**0 - 4 w - 6 (to 12) months, i.m.**
	Rapid scheme d_0 - d_7 - d_{21} - 12 m i.m.
Booster:	**Depending on titre of Anti HBs**
	< 100 IE/ml ® another inoculation
	> 100 IE/ml ® booster after 10 years

4.2.7 Combination vaccine Hepatitis A and B

A combination vaccine of Hepatitis A and B (Twinrix®) exists, reducing the number of inoculations for those who need both vaccinations (0 - 4 w - 6 (to 12) m). The effective period is identical with the single vaccinations. As with the single vaccination against Hepatitis B at least two inoculations should have been completed prior to departure. A rapid scheme (d_0, d_7, d_{21}, 12 m) is possible. An immunization begun with mono vaccines can be completed with the combination vaccine.

4.2.8 Typhoid Fever

Typhoid fever (enteric fever) occurs worldwide. It is rare in industrial countries (0,24 - 3,7 cases/100.000),. It is more widespread in the third world (up to 540/100.000 with a mortality world-wide of 66.000/a). The areas of high risk are Latin America, Africa except Tunisia, and the Indian subcontinent. Most of the cases diagnosed in temperate areas have been infected whilst travelling. The risk of infection whilst staying in endemic areas varies between 2 – 12: 100.000, depending on the style of travelling. The case fatality rate is below 1 %. A well-known victim was aviation pioneer Wilbur Wright.

Typhoid Fever is a highly febrile infection caused by certain kinds of Salmonella, due to the contamination of food and beverages, by faeces. Life-threatening complications are intestinal haemorrhage and intestinal perforation. Paratyphus runs a similar slightly milder course.

Beside exposure prophylaxis, a vaccination is indicated in areas of high risk for low budget travellers, where there may be lower hygienic standards and the traveller may come into close contact with the local population. This does not apply for flight crew. However, flight missions visiting epidemic areas may warrant immunization. Two kinds of vaccines exist. A live vaccine consists of an apathogenic defect mutant of Salmonella typhi (Typhoral L®). The inactivated vaccine is administered parenterally i.m., as a single inoculation. Antibodies can be found up to three years after vaccination.

Vaccination against typhoid fever

Indication:	**Travelling under simple conditions, with close contact with local population,**
	Where there are lower standards of hygiene, stays > 4 w, epidemics or catastrophes
Vaccines:	**- Oral live vaccine (Typhoral L®, Vivotif®)**
	- Injectable inactivated vaccine Typherix®, TyphimVi®)
Vaccination Scheme:	**- Live vaccine: d_1, d_3, d_5 1 capsule**
	- Inactivated vaccine: a single inoculation i.m. or s.c. into deltoid muscle
N.B.:	**During vaccination with the oral live vaccine there should be no chemo-prophylaxis against Malaria or the administration of antibiotics**

4.2.9 Meningococcal Meningitis

Meningococci exist worldwide, permanent epidemic areas reach from Brazil in the west to the sub-Saharan Sahel Zone in Africa, to the Arabian Peninsula and to the Indian subcontinent. The African Meningitis belt is located in the Sahel Zone and south of it. Particularly during the dry periods (December to June) epidemics occur in intervals over several years, e.g. pilgrims to Mecca. The infection is spread by large groups of people, such as Mecca pilgrims and high density of housing, such as in shantytowns, slum or mass tented areas.

The causative agents are gram-negative diplococci, Neisseria meningitidis. Eight serogroups A, B, C, X, Y, Z, W 135 und W 29 exist. Within the Meningitis belt infections with serotype A can be found, whereas in middle Europe, Australia and North America, infections with serotypes B and C occur. Meningococi are transmitted face to face by droplet infection. The reservoir is the nasopharyngeal area of healthy carriers. During an epidemic, up to 10 % of the population are carriers that can infect mainly susceptible non-immune children. The clinical course varies between an asymptomatic infection of the nasopharyngeal tract, (this is the most frequent type) to an acute meningococcaemia with light fever and petechiae. This may develop in 10% of those with the asymptomatic infection. The more serious infection has a case fatality rate of about 10 %, especially in children and juveniles and leaves long time residuals in up to 20 %. **If close contact with infected persons has occurred over a period of several hours (> 8 h) such as within an aeroplane, a prophylactic dose of Rifampicin is recommended.**

The polysaccharide vaccine protects against sero-groups A and C or additionally sero-groups W 135 und Y. The immunization is effective 10 to 14 days after the last inoculation and lasts at least for three years. Those vaccinated should be older than two years.

Beside exposure prophylaxis, the vaccination is indicated for travel in rural basic areas and where there is close contact with the population in these areas. It is mandatory for pilgrims to Mecca (Art. 84, International Health Regulations). Serotype W 135 is responsible for the most infection in this group. Therefore, the vaccine protecting against this serotype is recommended and is mandatory from 2002 onwards. **For flight crews transporting pilgrims to Saudi Arabia on pilgrim flights the vaccination might be mandatory, whether entering the country or not.**

Vaccination against Meningococcal Meningitis

Indication	**Long-time stay in risk areas. Travel into rural areas under basic conditions and with close contact with the local population in these high risk areas** **Mandatory for pilgrimage to Mecca or flight crew transporting pilgrims upon entry to Saudi Arabia** **Under certain circumstances probably required by certain countries upon entry from risk areas**
Vaccine	**Inactivated vaccine, depending on producer** **-Tetravalent vaccine with serotypes A, C, W 135, Y (Mencevax ACWY®)**
Vaccination Scheme	**1 x 0,5 ml s.c.**
Effectiveness	**Reliable immune protection from 1 - 2 w after vaccination lasting 3yrs**
N.B.	**Mandatory vaccination valid from 10 d after until 3yrs after vaccination** **No protection against serotype B (Europe, South America)**

4.2.10 Rabies

Rabies occurs worldwide, especially in Latin America, Africa, and Asia. The reservoir and main source of infection are stray dogs, in America also blood sucking bats. The worldwide mortality is 35.000 to 50.000 per year, 85 % of them in Asia, particularly India. In Europe only Romania, Russia and Turkey are risk areas. After the disease has been contracted it is 100% lethal, unless the traveller has been vaccinated or can reach medical assistance where the vaccine is available.

After bites from animals suspected of having rabies there are some local things that can be done which might be lifesaving. These consist primarily of meticulous sterilisation of the wound, plus to follow, an active and probably additional passive immunization schedule.

A pre travel vaccination is necessary only for those staying for a long time, or planning adventure trips into the countryside where there is a high risk and where an effective and well-tolerated vaccination (vaccine from India has serious adverse effects!) cannot be obtained within 24 hours. This does not apply to flight crew.

At days 0, 7 and 21 (alternatively 0, 28, 56) the inoculation is administered i.m. To maintain the immunization, if the risk continues, a booster is recommended after one year and subsequently at 5 years.

4.2.11 Japanese Encephalitis

Japanese Encephalitis is the most common viral encephalitis worldwide. The frequency differs between the Eastern Asia from Siberia, Korea and Japan to South East Asia and the Indian subcontinent as well as Taiwan, Philippines, the Mariane Islands and Guam. The disease has been spreading further worldwide in more recent years.

Birds are a reservoir, with an augmenting reservoir in pigs. The infection occurs in areas with rice paddies, where the vectors breed. The vector is the Culex mosquito, which is active from dawn to dusk. The virus circulates between these vectors and the reservoirs. Humans get infected when the density of the mosquito increases. Birds may carry the infection from the rural to the urban areas. Sporadic infections can occur all through the year. During the monsoon season the mosquito population can expand a great deal, causing epidemics.

In travellers Japanese Encephalitis is very rare. Nevertheless, an infection may be lethal. Beside exposure prophylaxis, the vaccination is indicated for individual travellers, who spend more than 4 weeks during the summer monsoon (May to October) in rural areas in endemic zones or who do extensive cross-country expeditions. This does not normally apply to flight crew. Only with extensive outdoor activities in endemic areas longer than 4 weeks duration is a vaccination warranted for flight crews. The inactivated vaccine contains inactivated virus from mouse brains (Producers Biken or Connard). It is not licensed in every European country, but can be obtained by international pharmacies. In case of adverse side effects the immunizing physician is liable. Those to be vaccinated should be informed about this situation.

Vaccination against Japanese Encephalitis

Indication:	**Individual travels >4 w in rural areas of endemic zones**
Vaccine:	**Inactivated vaccine with inactivated virus from mouse brain**
Vaccination Scheme:	**1 ml s.c on days 0 - 7 - 28**
	An alternative rapid scheme at days: 0 – 7 - 14
	A booster after 1 – 2 years
Effective period: 4 years	
Side effects:	**local at site of inoculation (rare).**

4.2.12 Cholera

Cholera is neither a typical travel nor a typical tropical disease. It occurs as epidemics in third world countries because of the insufficient cleansing treatment of drinking water and sewage. Occasionally cases do occur in travellers, where there has been neglect in food and beverage hygiene.

The causative agents are different serovars of Vibrio Cholerae. The disease is characterized by diarrhoea with vomiting. Therapy consists of fluid replacement. Antibiotics hamper the toxin formation of V. Cholerae and may thus shorten the course of the disease.

The parenteral vaccine of inactivated Vibrio is given (2 x 0,2 – 2 ml s.c. with an interval of 1 – 2 w). It was once a mandatory vaccination. It does not give effective protection and is not recommended any more. Oral live vaccines, which are not licensed in several countries, are well tolerated and effective over a period of 6 to 12 months. Indications are for journeys under basic conditions with a high infection risk. This does not apply to flight crew. The best protection against cholera is appropriate food and beverage hygiene.

4.2.13 Tick Born Encephalitis

Tick born Encephalitis is a viral disease. The central European variant, is also known as ESME, and occurs in Central and Eastern Europe, from Southern Germany and Switzerland to the Urals, and to the south of Sweden and Finland. The Far East or Russian variant, also known as RSSE, occurs from the Baltic States in the west, throughout Russia to the Pacific Ocean.

The causative agent is a flavivirus, transmitted by ticks. In endemic areas the virus circulates between ticks and wild animals. Humans staying in forests areas, walking through long grass etc. can be infected due to tick bites. Infections often have a clinically unnoticeable or uncomplicated febrile course. Overall the prognosis is good, apart from the rare (5 %) who may develop the severe meningo-encephalitic type of the disease, which if not fatal, may leave long term residual neurological damage (in 30%), up to 2% may be lethal.

Beside exposure prophylaxis, a vaccination is indicated for repeated, long-time and professional stays, in forest areas in endemic zones, or for those living or with extensive outdoor activities in rural areas of endemic zones. This does not apply to most flight crews. The vaccine consists of inactivated FSME virus, by cross immunity it protects against RSSE virus infections as well. The inactivated vaccine is well tolerated. Occasional side effects are only local or febrile general reactions. Special contraindications do not exist. Pre-existing diseases of CNS or immune system and severe allergies are relative contraindications. The vaccine Encepur® is licensed for persons over 12 years of age.

Vaccination against Tick Born Encephalitis

Indication:	**Repeated, long-term or occupational stays in forest areas of endemic areas (Or living in rural areas of endemic zones)**
Vaccine:	**Inactivated vaccine w ith inactivated virus**
Vaccination Scheme:	**3 x 0,5 ml i.m. , 0 - 1 to 3 m - 9 to 12 m** **Booster after 3 to 5 years** **Alternative rapid scheme d_0, d_7, d_{21}** **Booster after 1 year**
Effectiveness:	**Sero-conversion in 99 %, protection rate 60 to 70 %**
N.B.:	**If applicable active or passive immunization (hyper-immuno-globulin) is possible up to 96 hr after tick bite (not suitable for children)**

4.2.14 Vaccination Schemes for Flight Crews

Vaccination Schemes for Flight Crews: Recommmended Vaccinations

Missions in Europe and North America	
Generally recommended vaccinations	Tetanus
	Diphtheria
	Poliomyelitis
	Hepatitis A[1]

[1] if operating to Mediterranean destinations or Eastern Europe

Missions in Tropical and subtropical Zones	
Generally recom mended vaccinations	Tetanus
	Diphtheria
	Poliomyelitis
	Hepatitis A
Additionally recommended vaccinations	Yellow Fever[3]
Recommended under certain circumstances[2]	Meningitis[4] Typhoid Fever
	Hepatitis B
Malaria prophylaxis	Exposure prophylaxis
	Chemoprophylaxis[5]
	Making sure of early diagnosis and treatment[6]

[2] Recommended if crews perform adventurous trips or live under probably lower levels of hygiene during layover, or stay longer than four weeks in a tropic area
[3] Mandatory upon entry into certain countries, mandatory upon entry in to certain other countries after having visited endemic zones
[4] Mandatory upon entry into Saudi Arabia, especially if transporting pilgrims, the tetravalent vaccine has to be used and is recommended otherwise, too
[5] Recommended according to actual national and WHO recommendations during layover in high risk destinations in West Africa or East Africa or during longer layovers in risk areas
[6] An early diagnosis and treatment of Malaria should be available at all destinations and at the home base in case of symptoms suspicious of malaria for all flight crews operating in tropical and subtropical areas

5 Malaria

Malaria is a febrile, potentially lethal infection. The causative agents are plasmodia, a kind of protozoa transmitted by the evening/night active, female Anopheles mosquito. Four kinds of plasmodia are pathogenic in humans, of which three can cause a variety of severe clinical conditions.

Plasmodia and malaria

Causative agent	**Type of malaria**	**Incubation Period**	**Type of Fever**	**Prognosis**
Pl. malariae	Malaria quartan	16 – 50 (longer possible)	Fever attacks every 3 d	No spontaneous recovery
Pl. vivax	Malaria tertian	12 - 20 d (up to 10 months. possible)	Fever attacks every 2 d	Spontaneous recovery possible
Pl. ovale	Malaria tertian	12 – 20 d (longer periods are possible)	Fever attacks every 2 d	Spontaneous recovery possible
Pl. falciparum	Falciparum Malaria	7 – 30 d (longer periods are possible)	Irregular fever attacks	Without treatment mostly lethal

Malaria occurs in the tropics and subtropics, depending on the habitats of the vector mosquito Anopheles. In Asia and South America a risk of infection exists up to an altitude of 1.800m, in Africa it can go up to 2.600m. The main risk areas (in order of decreasing risk) are West Africa, East Africa (particularly Kenya), and South Africa. Without the proper precautions, the risk is as follows (example West Africa):

2.500 Travellers (= 5 Jumbos)→ 60 cases of malaria → 1 Fatality

The risk of malaria varies by the season. (There is a higher risk, during and immediately after the rainy season). In urban centres of the tropics, malaria transmission is occurring with increasing frequency. This is especially noticeable in the western African cities of Lagos, Accra, Abidjan, Dakar and Banjul. **Flight crews staying in these cities during their layovers (even short layovers) have a significant risk of being infected unless all the precautions are taken.**

Falciparum Malaria, the most dangerous form of malaria (case fatality rate 2 to 3,5 %), makes up the majority of malaria cases imported to Europe. It is mostly picked up in tropical Africa.

Even with meticulous malaria prophylaxis, it is not always 100 % safe**. In any patients with fever or other suspicious symptoms after staying in risk areas, malaria has to be suspected before anything else, and diagnostic measures must start immediately.**

In any case of fever, malaria has always to be suspected.

In any case of fever, always do a

thick and thin blood film. It must be done to exclude malaria.

5.1 Malaria Prophylaxis

1. Exposure prophylaxis
2. Chemo - prophylaxis (drug prophylaxis)
3. Establish an early diagnosis and therapy.
If applicable standby therapy (probably malaria quick test)

There are three elements of malaria prevention, which are based on each other. The kind of prophylaxis (only exposure prophylaxis), or exposure prophylaxis with standby therapy, or exposure prophylaxis plus chemo-prophylaxis, probably in combination with standby therapy). This all depends on the destination, season, style and duration of stay, as well as individual factors such as previous diseases, probable medication and probable intolerance of anti-malarials. Furthermore, the risks of the adverse side effects of chemo-prophylaxis, have to be weighed up against how effective is the method of prophylaxis and how great is the risk of getting malaria. General recommendations for relevant malaria areas may be a great help for physicians giving advice for malaria prophylaxis.

The relevant recommendations have been worked out by several scientific organisations, adapted to the actual epidemiological situation and published. The recommendations of the WHO are published in the brochure “International Travel and Health” (WHO Library, Genf 2003 ref. http://www.who.int/ith/english/index.htm). A couple of national recommendations exist, too. The Swiss and German and some other National recommendations for example differentiate for countries, travel areas and seasons. Therefore, the preventative measures can be adapted to the local epidemiological situation.

5.1.1 Exposure Prophylaxis

Exposure prophylaxis of Malaria is to protect against mosquito bites. It has to be carried out throughout the active time of the vectors – from dusk throughout the night to dawn. Local Area prevention can reduce the risk of malaria by 90 %.

1. Cover as much as possible of the body surface by fair-coloured, loose-fitting cotton clothes (Long trousers, long sleeves).

2. Uncovered skin should be treated with insect repellents (e.g. Bayrepel, DEET. Permethrin is not favoured in some countries). These products should not be used on damaged areas of skin or children < 2 yrs

3. Staying inside with closed rooms during evening and night. Rooms should be mosquito-proof: use mosquito screens, air conditioning, and if applicable insecticides.

4. Mosquito nets are recommended (they should be big enough not to be touched while sleeping, loose ends should be fixed under mattress). If applicable mosquito nets impregnated by Permethrin.

Electric vaporizers, mosquito coils and insecticides reduce the number of mosquitoes, but can produce possible irritating and toxic substances. Insecticides containing pyrethroids are often considered inappropriate.

5.1.2 Chemo-prophylaxis

The decision for an **additional** medical prophylaxis has to take into account, the risk of infection, the efficacy e.g. the resistance situation, and the adverse side effects. This is especially so for long-term prophylaxis where the side effects have to be balanced against the possible benefit. Therefore, the decision to use chemo-prophylaxis, and to use certain anti-malarials, has to be based on a meticulous risk-benefit-calculation. Chemo-prophylaxis does not replace, but supplements, exposure prophylaxis. However, it has to be taken into account that no prophylactic drug is 100 % effective.

As with antibiotics, the sub-therapeutic levels of an anti-malarial as used in chemo-prophylaxis, can result in resistance. Resistance exists using Chloroquine and other antimalarials, especially with Pl. falciparum and Pl. vivax. According to the resistance situation the WHO has defined **resistance areas (**A, B, C), for which certain prophylaxis regimes are recommended. These areas are not defined according to transmission of malaria. Therefore, the malaria risk does not depend on the resistance zone.

If a mission into an endemic area has to be started so early, that a sufficient blood level of the anti-malarial chosen cannot be achieved, a rapid saturation is possible with Chloroquine or Mefloquine. **Mefloquine is not approved for pilots.** However, chemo-prophylaxis with **Atovaquone + Proguanil (Malarone®)** has to be started only the day before entering the malaria risk area and **is recommended instead.**

a) Chloroquine (e.g. Resochin®) + Proguanil (e.g. Paludrine®)

The effectiveness of this combination of two anti-malarial medications is only about 60 % (West Africa) and should not be recommendedany more if a more effective alternative drug like Atovaquone + Proguanil (Malarone®) is available. It can be used over long periods continuously (Up to 100 g of Chloroquine, corresponding to continuous intake over 5 years, is harmless. For continuous intake – which normally does not apply for flight crew – an ophthalmological control is recommended every 2 years. The combination of Chloroquine and Proguanil used to be the only anti-malarial approved for pilots before Atovaquone + Proguanil (Malarone®) was approved. Severe adverse **side effects** do not exist, for Chloroquine, short term stomach discomfort, flickering of eyesight, light dizziness, sleep disturbance occur rarely. For Proguanil reversible loss of hair, ulceration of the mouth and stomach discomfort may occur rarely**.** For Proguanil reversible loss of hair, ulceration of the mouth and stomach dicomfort may occur rarely. The medication should always be taken with food and with plenty of fluid. **Contraindications** for Chloroquine are psoriasis, retino-pathology, visual field defects, myasthenia gravis, glucose-6-phosphate dehydrogenase deficiency, hepatic porphyria, severe liver disorders, renal insufficiency and intolerance of 4-Aminochinolins. Contraindications for Proguanil are, severe renal insufficiency (reduction of dose necessary). A **rapid saturation** for chloroquine can be achieved by the intake of a weekly dose (2 Tablets) on 2 subsequent days. Subsequently, the chemo-prophylaxis has to be continued in a regular way. It has to be continued for 4 weeks after leaving the risk area.

Chloroquin + Proguanil (e.g. Resochin® + e.g. Paludrine®)

Generics:	- 150 mg Chloroquine-Base resp. 100 mg Proguanil
Intake:	- 2 Tbl. Resochin / w (with body weight > 80 kg: 3 Tbl), starting 1 week before mission, continuing for 4 weeks after leaving risk area
	- 2 x 1 Tbl. Paludrine / d, starting 1 day before mission, continuing for 4 weeks after leaving risk area
N.B.:	- for better compatibility intake with lots of fluid at meal times.
	- With continuous intake > 2 a ophthalmological control every 2 years
	- In New Guinea there is resistance against Proguanil
	- Chemo-prophylaxis is possible for children and in pregnancy
	- Rapid saturation with Chloroquine using: 2 Tbl/d for 2 d

b) Mefloquine (Lariam® or Mephaquine®)

Mefloquine is not approved for pilots! If a pilot should take it by mistake, then that pilot must remain unfit for flying duties for four weeks, and then be observed to see if any neuro- psychiatric side effects have occurred. Mefloquine in special circumstances can be used for flight attendants. The discussion about mefloquine for flight crew has not yet come to any fixed conclusions. Therefore until some conclusions have been reached, there is no reason why flight attendants should have to take the risk of using a less effective type of prevention, when this very effective anti-malarial for chemo- prophylaxis is available. Effectiveness is about 90 % in West Africa. Long-term intake is possible for up to 2 years. The **Side Effects** can include neuro psychiatric symptoms (0,1 to 1 %)[There are some reports of a higher percentage]. Visual blurring can occur. Epileptic seizures have been reported as well as psychotic symptoms. These effects can be dose related and occur more frequently with rapid saturation, or therapeutic intake, or in women (higher blood levels). Side effects are more likely to occur after a second intake. When the chemo-prophylaxis is taken for the first time, it should be started 3 weeks before onset of any exposure, therefore,in order to change the prophylaxis regime in case of side effects. **If side effects occur**, **Mefloquine should never be used again**. Vice versa, if side effects are absent, Mefloquine should be tolerated well in the future, although there is no guarantee or clinical evidence to prove this. The **Contraindications** include the first trimester of pregnancy when genetic abnormalities have been recorded. Three months after taking mefloquine, effective contraception is recommended. It should not be taken during the lactation period. It should not be given to children < 5 kg of body weight and / or < 3 yrs of age. It can cause cardiac conduction disturbances. It must not be taken with quinidine, or given to people with severe liver disorders, or with neuro psychiatric disorders, and of course, it must never be given to people with epilepsy. Interference with frequently used medicines such as beta-blockers, calcium antagonists and other anti arrhythmics should be considered. Even with diarrhoea Mefloquine can be sufficiently effective. A **rapid saturation** for mefloquine can be achieved by the intake of a weekly dose (1 Tablet) on 3 subsequent days. The prophylaxis with mefloquine should be started 1 week before the onset of a mission and continued for 4 weeks after leaving the risk area.

****Mefloquine should only be considered, where the risk of infection outweighs the probability of severe side effects. Because of the risk of both short term and long-term neurological side effects, mefloquine is forbidden for use in pilots****

Mefloquine (Lariam®)

Generic: - 250 mg Mefloquine
Intake: - 1 Tablet. /w, starting 1 week before exposure, continuing for 4 weeks after leaving risk area
N.B.: - Intake with plenty of fluid
- For women 3 months of effective contraception is recommended after intake
- Rapid saturation 1 x 1 Tbl for 3 d
- Rapid resistance to mefloquine has occurred in SE Asia. Resistant cases have now been reported in Africa.

c) Atovaquone + Proguanil (Malarone®

According to preliminary results of scientific studies about the interference of Atovaquone/ Proguanil with flight duties it seems likely, that there will not be any problems for aircrew. The combination of Atovaquone and Proguanil (Malarone®) is used by several airlines as Lufthansa and is approved for Pilots by the FAA. The effectiveness is about 90 %, like that of mefloquine. It can be used for adults and for stays up to 28 days (soon to be prolonged up to 56 days and probably longer) and for persons with body weight of more than 40 kg (These restricitons do not apply for the USA.). As with mefloquine, it is recommended for chemo-prophylaxis in areas, where there is chloroquine resistance and for treatment of uncomplicated malaria. This combination is much better tolerated than mefloquine. The combination is not associated with neuropsychiatric adverse effects, impairment of psychomotor performance, mood changes, sleepiness and fatigue, especially under hypobaric conditions. **Side effects** are minimal and do not last very long, they may include: cough, gastrointestinal disturbance (nausea, vomiting, abdominal discomfort and pain, diarrhoea) and headache. **Contraindications** are severe liver disorders and severe renal insufficiency (Creatinine-Clearance < 30 ml/min). **Due to the short**

time of administering (1 day before up to 7 days after staying in a malaria risk area) the combination is particularly suitable for flight crews. Acceptability of the drug by the compliance of patients proved to be very high.

Atovaquone + Proguanil (Malarone®)

Contents:	**-** Atovaquone (250 mg) + Proguanil (100 mg)
Intake:	**-** 1 Tablet. / d, starting 1 to 2 days before mission, continuing for 7 days after leaving risk area
	- Maximum stay in risk area 28 d (Longer term intake is under consideration.)
N.B.:	**-** effectiveness as mefloquine (90 %), tolerability better

d) Doxycycline

The antibiotic doxycycline is not officially approved for pilots yet, but it is being used in military pilots in high- risk areas, because of the lack of an effective alternative. It is not licensed for chemo-prophylaxis of malaria in some European Countries, but is used in the UK and the U.S. It is used for prophylaxis in areas with multi-resistant plasmodia (resistance against chloroquine, and proguanil, and mefloquine). This applies to the border areas between Thailand and Myanmar and Thailand and Cambodia. For the time being Doxycycline is regarded as effective as Atovaquone + Proguanil (Malarone®) or Mefloquine (Lariam®) for chemo-prophylaxis by some Societies for Tropical and Travel Medicine in Europe. It can be used instead of them, where these are recommended.

Side effects can include gastrointestinal disturbances (nausea, vomiting, diarrhoea), photo-dermatitis (care must be taken with solar radiation in tropical areas), very rarely it can cause increased intra-cranial pressure. **Contraindications** are children < 8yrs, severe liver disorders.

Doxycycline (several brand names)

Content:	- 100 mg Doxycycline
Intake:	**-** 1Tbl. **/** d, starting 1 to 2 days before mission, continuing for 4 weeks after leaving risk area
N.B.:	- Must be taken with plenty of fluid
	- Contraindicated in children < 8 yrs and pregnant women
	- Beware of photo-dermatitis (solar radiation!)

e) Other antimalarials

Halofantrin (Halfan®), Fansidar® (Sulfadoxin + Pyrimethamin) and derivatives of Artemisin are **not** suitable for prophylaxis.

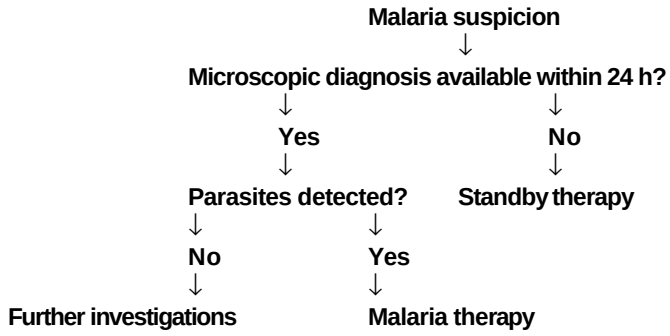
5.1.3 Standby Emergency Treatment

In Standby Emergency Treatment patients take an anti-malarial with them. This should be used if symptoms suspicious of malaria (e.g. fever > 38,5 °C, pain in the head and limbs, nausea and malaise) should occur, at least one week after having entered a risk area. Standby Emergency treatment can be recommended in areas with low transmission risk, short stays, intolerance of anti-malarials or where side-effects of chemo-prophylaxis outweigh the malaria-risk. European recommendations, (e.g. Swiss and German Societies of Tropical Medicine, 2001) advise standby precautions. Furthermore, Standby Emergency Treatment should be recommended if chemo-prophylaxis with chloroquine / proguanil is used, particularly if a more effective prophylaxis cannot be used in pilots or where there is intolerance. It can be considered especially in case of frequent short stops in endemic areas over a prolonged period of time. However, it does not replace exposure prophylaxis, which should be carried out meticulously.

If fever or other symptoms suspicious of malaria occur and no doctor is available, the standby drug should be taken by way of self- medication. As soon as possible a physician trained in tropical medicine should be consulted. **After having taken the standby drug as therapy, flight crew are not fit for flying duties for four weeks.**

Procedure if malaria is suspected

Requirements: symptoms suspicious of malaria
Stay in risk area for at least 7 d
No doctor available for next 24 h



*If applicable microscopic investigations have to be repeated every 6 h or in fever attacks

Depending on the destination, different drugs have been recommended for standby prophylaxis. Halofantrin (Halfan®) and the combination of Pyrimethamin und Sulfadoxin (Fansidar®) are not now recommended by most European Societies of Tropical Medicine. This is due to a variety of serious side effects including cardiac arrythmias.

In remote areas Standby Emergency Treatment can be appropriate, if malaria symptoms occur even though chemoprophylaxis has been taken and medical assistance is not available within the next 24 hours. The choice of drugs depends on the type of chemoprophylaxis taken before. Furthermore, a drug with no resistance in the respective area should be used. Because of lack of data no recommendation for Standby Emergency Treatment after chemoprophylaxis with Atovaquone/Proguanil can be given.

Choice of drugs for Standby Emergency Treatment according to previous chemoprophylactic regimen (International Travel and Health (2004), WHO, Geneva)

Prophylactic regimen	Standby Emergency Treatment
None	Chloroquine, for P. vivax areas only Mefloquine Quinine Artemether/Lumefantrine[a] Atovaquone/Proguanil[a]
Chloroquine alone / with Proguanil	Mefloquine Quinine
Mefloquine	Quinine[b] Quinine + Doxycycline/Tetracycline for 7 d[b]
Doxycycline	Mefloquine Quinine + Tetracycline for 7 d

a Limited experience of drug interactions with other antimalarial drugs, therefore these drugs not recommended if taking already other antimalarial

b Mefloquine to be resumed 7 days after last dose of Quinine

Dosages in Standby Emergency Treatment

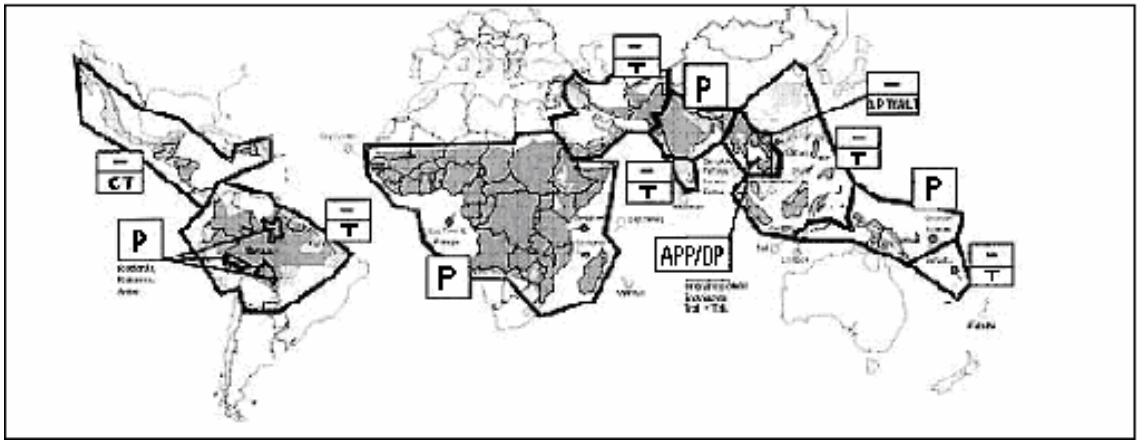
	Mefloquin (Lariam®) (Tbl. à 250 mg)	**Atovaquon/Proguanil (Malarone®) (Tbl. à 250 mg/100 mg)**	**Artemether/Lumefantrin (Riamet®) (Tbl. à 20 mg/120 mg)**	**Chloroquine (Resochin®) (Tbl. à 150 mg)**
d_1	Initially 3 Tbl. After 6 – 8 h 2 Tbl. After 6 – 8 h 1 Tbl.	Initially 4 Tbl.	Initially 4 Tbl. After 8 h 4 Tbl.	Initially 4 Tbl. After 6 h 2 Tbl.
d_2	-	4 Tbl.	2 x 4 Tbl.	2 Tbl.
d_3	-	4 Tbl.	2 x 4 Tbl.	2 Tbl.
Area	All malaria areas	All malaria areas	All malaria areas	Only in areas without chloroquine resistance

Guidelines for Standby Emergency Treatment (International Travel and Health (2004), WHO, Geneva)

- Consult a physician immediately if fever occurs 1 week or more after entering an area with malaria risk.
- If it is impossible to consult a physician and/or establish a diagnosis within 24 hours of the onset of fever, start the stand-by emergency treatment and seek medical care as soon as possible for complete evaluation and to exclude other serious causes of fever.
- Complete the stand-by treatment course and resume antimalarial prophylaxis 1 week after the first treatment dose. Mefloquine prophylaxis, however, should be resumed 1 week after the last treatment dose of quinine.
- Vomiting of antimalarial drugs is less likely if fever is first lowered with antipyretics. A second full dose should be taken if vomiting occurs within 30 minutes of taking the drug. If vomiting occurs 30–60 minutes after a dose, an additional half-dose should be taken. Vomiting with diarrhoea may lead to treatment failure because of poor drug absorption.
- Do not treat suspected malaria with the same drugs used for prophylaxis, because of the increased risk of toxicity and resistance.

5.1.4 Special recommendations

An example for special recommendations are those of the Swiss/ German Societies of Tropical Medicine and various other Organisations, which differentiate their recommendations by countries, and even travelling areas within countries, seasons and duration of stay.



(after WHO International Travel and Health 2003, and SAR and DTG)

areas without risk of malaria
areas with limited risk
malaria risk areas

P	Mefloquine (Lariam®), or Atovaquone / Proguanil (Malarone®), or Doxycyclin for Chemoprohylaxis
APP/DP	Atovaquone / Proguanil (Malarone®), or Doxycyclin for Chemo-prophylaxis
APT/ALT	no Chemo-prophylaxis but Atovaquone / Proguanil (Malarone®) or Artemether/Lumefantrin (Riamet®) for Standby-Therapy
T	no Chemo-prophylaxis but Mefloquine (Lariam®) or Artemether/Lumefantrin (Riamet®) for Standby-Therapy
CT	no Chemo-prophylaxis but Chloroquine (Resochin®) for Standby-Therapy

Recommendations for malaria prophylaxis (after DTG, 2003)

Geographic Region	Prophylaxis
Tropical Africa, Eastern Indonesia, Papua-New Guinea, Salomon Islands, Amazonian-Provinces	P
Indian Subcontinent north of line, Goa-Madras	P
Thailand (Provinces Trat and Tak)	APP / DP
Thailand (other provinces)	APT / ALT
Central America	CT
Other risk areas	T
In all malaria areas	Exposure prophylaxis

5.1.5 Frequent missions or long-term stay

Prior to long-term stays (stationing of flight crews and their families) meticulous medical advice must be given. The recommendations have to consider the individual situation. In principle, the use of chemo-

prophylaxis is recommended. WHO recommends chemo-prophylaxis at least for the first 1 to 3 months of a long-term stay. Further medical advice, should be given by a local specialist. This specialist should be experienced in malaria prophylaxis of non-immune patients. Chemo-prophylaxis is particularly important where the risk is higher (e.g. rainy season, insufficient exposure prophylaxis). Even more so with tourists, a thorough risk-benefit-calculation is necessary. For long-term stays and where chloroquine is taken, the WHO recommends an ophthalmological review of the retina every six months to see if there have been any changes, beginning five years after the onset of uninterrupted prophylaxis (with intake of 100 mg/week), and after three years (with intake of 100 mg/day).

For frequent missions, which apply particularly for flight crews – The European Authorities recommend some form of chemo-prophylaxis, whereas the WHO favours a standby prophylaxis. For pilots, only chemo-prophylaxis with chloroquine / proguanil is approved.

Checklist for malaria advice (after DTG, June 2001)

1. **Information about malaria risk.**
2. **Pregnant women and children under 5 years should abstain from stays in risk areas.**
3. **Information about local area prophylaxis (avoiding insect bites and stings).**
4. **Information that malaria may occur even with thorough prophylaxis.**
5. **Information about symptoms of malaria and necessity to consult a doctor.**

   Information about the potential lethal course in case of delayed diagnosis and therapy.
6. **Consider previous diseases, intake of medicine, allergies, existing or intended pregnancy, tolerance of previous chemo-prophylaxis.**
7. **Consider intended activities during stay (diving, mountain climbing).**
8. **Information about necessity of regular intake of chemo-prophylactic drugs before, during and after staying in risk area. If applicable information about mode of intake of standby therapy.**
9. **Information about side effects of anti-malarial medication.**
10. **Written information should be given as a handout.**
11. **If medicine is purchased abroad, only those approved in Europe should be bought.**

5.2 Diagnosis and Therapy

Early diagnosis and immediate treatment of malaria is essential. The most insidious form of malaria, Falciparum Malaria, caused by Pl. falciparum can be lethal within a couple of days, because the complications can occur so rapidly. Often, a delay in the diagnosis and therapy by the patient and / or the doctor may result in a fatal outcome. A mistaken diagnosis for example, can include an illness like influenza, which can be fatal. Flight crews have to be informed about incubation periods, symptoms, diagnostic and therapeutic possibilities, both at the tropical destination and at home.

Every febrile disease, from 7 days after up to several months, (cases even after one year are known) **after staying in risk areas, malaria should be suspected until the opposite has been proved.** Even without a typical course of fever, malaria has to be suspected. In cases of malaria breaking through despite proper prophylaxis, the symptoms may be atypical. The course of the disease can be protracted. Malaria (especially insidious Falciparum Malaria) can be ruled out if the thick film is negative. This is furthermore confirmed by negative fluorescence-micro-haematocrit enrichment (quantitative buffy coat or QBC) absence of anaemia and haptoglobin reduction, thrombocytopenia and splenomegaly.

The diagnosis is established by thick and thin film. This has to be repeated every 6 hours for 24 hours. The thick film is a method of enrichment. If the type of plasmodia has not been determined by thick film, the thin film reveals this information. Immuno-chromatographic **quick tests** are only supplementing these tests. They are not feasible as “Do it yourself”-tests for flight crews.

After a diagnosis of malaria has been made, therapy has to begin immediately. In case of doubt it is better to start therapy , rather than to wait for time consuming additional tests. In Europe even uncomplicated cases of malaria should be treated in hospital. **If a member of a flight crew contracts malaria he / she is unfit for flying duties until 4 weeks after successful treatment.**

6 Intestinal or food-borne infections

6.1 Traveller's diarrhoea

Traveller's diarrhoea is the most frequent disorder encountered in tropical and sub-tropical regions (at least 30 to 50 % of travellers). Risk and incidence increase with poor hygienic conditions. Eating with local people and food purchased from street vendors pose a special risk. Ice produced from unknown water sources is a common cause of travel diarrhoea.

The infection is acquired by faecal-oral transmission and is caused by contaminated food, beverages or smear/saliva infection. Causative agents are bacteria (e.g. enteric salmonella, pathogenic Escherichia coli, especially ETEC, Shigella, Yersinia and Campylobacter), their toxins (which can cause the food poisoning), several viruses (e.g. Rota and Norwalk virus) and protozoa. The most common are Amoeba and Giardia, and with increasing frequency Cryptosporidia. In acute diarrhoea, bacteria is the most common cause. In chronic diarrhoea, parasites are the most common cause.

Risk factors for traveller's diarrhoea

Destination
Season (in subtropical destinations)
Duration of stay
Style of stay (Hotel during Layover < circular tour < adventure trip)
Lodging, low standard of hygiene
Neglect of food and beverage hygiene
Reduced gastric acid (H_2-Blockers, Proton Pump Blockers, previous gastric resection)
Reduced immune response
Previous stay in third-world country (> 6 m before)

6.1.2 Clinical features and diagnosis

Normally traveller's diarrhoea starts on the third day of stay. **The Incubation period** can be only some hours, or up to several days. Bacterial and viral infections are usually of 6 to 12 hours. A shorter incubation (frequently only 30 minutes) is normally caused by food poisoning. Typical symptoms are, more than three liquid stools. Every type of diarrhoea can cause dehydration and a reduction of the electrolytes, potassium and bicarbonate. **The mean duration** is 3 to 4 days, 10 % may take more than one week, and only 1 % may result in a chronic form of diarrhoea (duration > 3 weeks).

Uncomplicated diarrhoea is common, presenting as gastroenteritis or entero-colitis with watery diarrhoea, rarely covered by mucus, diffuse abdominal pain, vomiting and temperatures of maximum 38,5°C. Typical for dysentery (up to 10 % of travel diarrhoea) are stools mixed with blood or pus (resulting from invasion of the colonic mucosa), intestinal cramps and fever up to > 40°C.

Most patients suffer a self-limiting disorder, and often by the time a visit is made to the physician, the symptoms have subsided. Therefore, a **diagnosis is not necessary** in most cases. If further diagnostic is intended, Salmonella, Shigella, Yersinia and Campylobacter should be checked for. Negative results do not rule out an infectious cause, because travel diarrhoea is almost always of an infectious origin. Many leukocytes detected by stool examination may indicate dysentery or invasive enteritis. However, in case of a fever > 38,5 °C and / or blood or pus, further diagnostic tests are mandatory.

6.1.3 Therapy

Symptomatic treatment – mostly as self-therapy (This information has to be given to flight crew) - and is usually sufficient. Fever > 38,5 °C and / or blood or pus, makes it necessary for a consultation with a doctor and the fever will require specific therapy.

a) Symptomatic Therapy

Fluid loss resulting from diarrhoea requires urgent fluid replacement. Motility inhibitors may be used as a supplementary measure:

Rehydratation
- Mild cases: fruit juice, tea with sugar, broth, juice of coconut, in children, cola and salt sticks.
- More severe cases: solution recommended by WHO (sodium chloride 3.5 g, sodium bicarbonate 2.5 g, potassium chloride 1.5 g, glucose or sugar 40.0 g, water ad 1000 ml, available also as ready mix e.g. Elotrans®, Oralpädon®, Rehdrat, Dioralyte, etc or a do it yourself solution with a 10ml spoonful of glucose or sugar, a 5ml teaspoon of salt or half salt/ half baking powder plus one litre of fluid.
- Fluid loss of > 10 % body weight: infusion therapy.

Motility Inhibitors
- Loperamid (Imodium®): initially 2 cps (4 mg), then 1 cps (2 mg) after every subsequent loose bowel movement
- Max. 12 mg/24 h, not to be used for more than 48 hr, not to be used for children < 2 a or dysentery (fever or bloody diarrhoea).

b) Specific Therapy

In case of cholera or infection with Shigella, parasites, typhoid fever or para-typhus a specific treatment by specific antibiotics is required. Otherwise a calculated antibiotic treatment can be prescribed for 3 to 5 days. Antibiotics do not replace fluid replacement! **Whilst taking antibiotic therapy, flight crew are unfit for flying duties, until they are fully recovered and the antibiotic therapy has been stopped.**

Antibiotic therapy for traveller's diarrhoea

Disease	Therapeutic Options
Diarrhoea without knowledge of the causative agent (calculated antibiosis)	Ciprofloxazin 2 x 500 mg/24 h for 3 – 5 days Norfloxazin 2 x 400 mg/24 h for 3 – 5 days Ofloxazin 2 x 200 mg/24 h for 3 – 5 days
Cholera	Tetracycline 2 x 500 mg/24 h for 5 days
Shigella	Ampicillin 2 - 4 x 500 mg/24 h for 5 days Trimethoprim/Sulfamethoxazol 160 mg/800 mg 2 x 1/24 h for 5 days
	Ciprofloxazin 2 x 500 mg/24 h for 3 – 5 days Norfloxazin 2 x 400 mg/24 h for 3 – 5 days Ofloxazin 2 x 200 mg/24 h for 3 – 5 days
Campylobacter	Azithromycin 1 x 500 mg for 3 days Erythromycin 4 x 500 mg/24 h for 7 days
Giardia	Tinidazole/Metronidazole 2 g as a single dose

6.1.4 Prophylaxis

Food and beverage hygiene act as a exposure prophylaxis against traveller's diarrhoea and other intestinal infections

Only use fresh boiled (tea, coffee) or originally bottled and sealed beverages
In the field, use water filters, iodine etc. for water treatment
No ice into drinks, no ice cream
No raw milk or dairy products

Only well-done or well-boiled meat or fish
Avoid raw fish and raw seafood
No raw salad only fruits, that can be peeled by oneself or under ones own supervision
No dishes with cold dressings (e.g. ketchup), mayonnaise or products of raw eggs
No sandwiches with salad or mayonnaise
Avoid dishes that have been kept warm for long periods of time. The fresh and thorough preparation of food is essential.
Thorough hand and body hygiene
Use mineral water for brushing teeth
Avoid tableware and cutlery that may have cleaned in dirty water (if applicable drinking from bottle or can)

Peel it, boil it or forget it!

Medical prophylaxis is only indicated in very rare cases (e.g. high-ranking business travellers, sportsmen prior to competition, patients with chronic inflammation bowel disease or gastric resection. Ciprofloxacin-1x 250/500 mg/daily).
This is not approved for flight crews.

6.2 Amoebiasis

Amoebiasis occurs in tropical and subtropical areas. Most cases seen in temperate zones are imported. Amoebae are rarely a cause for travel diarrhoea. The causative agent in Amoebic dysentery is a pathogenic protozoa called Entamoeba Histolytica, which is potentially invasive. About 10 % of the world population is infested with Entamoeba Histolytica. Nevertheless, most of those infested with Entamoeba exhibit the apathonogenic type called Entamoeba dispar, which appears and behaves like E. histolytica. The two can be differentiated by molecular genetic and protein chemical measurements. Both species infest the lumen of the colon, but only E. histolytica can invade the bowel wall. Only the pathogenic E. histolytica results in the formation of antibodies. Proteins, which have a particular pattern of iso-enzymes, the (so-called zymodemes), are responsible for the pathogenic effects of E.histolytica.

The infection is acquired by faecal-oral transmission. Cysts are ingested in contaminated water and food. The risk of infection depends on the hygienic standards of the person excreting the cysts and the potential recipient. Cysts are resistant against gastric acid and go through a development to trophozoites, so-called minuta forms in the small intestine. These multiply and colonize the upper colon. In the lower colon cysts are developed and excreted. Only in the case of accelerated intestinal passage (diarrhoea) are the minuta forms are excreted. Magna forms develop from minuta forms and are characterized by phagocytized RBC, which may invade the wall of the colon. **Amoebic cysts are frequently found in flight crew**.

6.2.1 Clinical features

The **asymptomatic luminal infection** shows excretion of cysts without clinical symptoms. **Invasive amoebic disease** starts with invasion of the bowel wall. It shows different clinical features: In **amoebic dysentery** abdominal pain, tenesmus, diarrhoea with blood and mucus (raspberry jelly stool) develop within 2 to 3 weeks. The clinical course may vary between common diarrhoea with only occult blood, to more than 20 bloody bowel movements a day. Complications such as perforation, peritonitis, and toxic mega-colon may occur. An **Amoebic liver abscess** develops after the invasion of the blood vessels and is the most frequent extra-intestinal complication. Severe pain in the right upper abdomen, fever and severe malaise are typical. Complications are hepatic failure, perforation into abdominal cavity or thorax, causing diaphragmatic pain and severe shortness of breath. The most severe complication can be a brain abscess. Rigors are common and may be mistaken initially for malaria

6.2.2 Diagnosis

Luminal infection is diagnosed by laboratory's specialising in tropical diseases. This requires studying fresh stools or by using enrichment methods. Using **zymodeme** (isoenzyme analysis), E. histolytica and E. dispar can be differentiated as well as by **Stool culture** and **PCR**. **PCR** or **Stool Antigen ELISA** can

detect E. histolytica directly. Invasive amoebiasis, is proved by **specific antibodies** (mostly by the beginning of clinical symptoms or at least 1 week after).

Procedure if amoebic cysts have been detected

- Asymptomatic excretion of cysts ? serology (test for specific antibodies)
- Negative serology ? asymptomatic luminal infection, probably E. dispar
- Positive serology ? PCR / Zymodeme to differentiate E. dispar / E. histolytica
- Symptomatic excretion of cysts ? serology and PCR / Zymodeme to differentiate E. dispar / E. histolytica

Amoebic liver abscess is diagnosed by ultrasound (CT or NMR), supplemented by serology.

6.2.3 Therapy

Therapy of amoebiasis (Lunzen, Tannich, Burchard, Dt. Ärzteblatt 93, 51 - 52)

Diagnosis	Drug	Dosage	Time of treatment
Luminal infection	Paromomycin Diloxanidfuroat	25 - 35 mg / kg / d, tid 3 x 500 mg p.o.	7 days 10 days
Amoebic dysentery	Metronidazole Tinidazole	3 x 10 mg/kg KG p.o. or i.v 2 g / d p.o.	10 days 5 days
Amoebic liver abscess	Metronidazole Severe cases additionally Chloroquine	3 x 10 mg/kg KG i.v. Initially 600 mg p.o. Then 300 mg p.o.	10 days 2 days 2 - 3 weeks

In invasive amoebiasis, a luminal infection is present as well and should be treated with diloxanidfuroat (available in the U.K.). Success of intestinal eradication should be checked after about 6 weeks by microscopic stool diagnosis. **During medication with either drug, members of flight crew are not fit to fly.** The **side effects** of the medication can include extra-pyramidal tremors and **a severe reaction with any form of alcohol. In asymptomatic luminal infection, fitness for flying is not restricted. Flight crew are not fit for flying duties with amoebic dysentery or with liver abscess or other manifestations. 2 weeks after successful treatment (proved by ultrasound, CCT, NMR, EEG depending on clinical manifestation), flight crew may return to duty.**

6.3 Giardiasis

Giardiasis (Lambliasis) occurs worldwide. In temperate areas up to 10 % of diarrhoea, and in the third world up to 20 % is caused by Giardia. The causative agent is the protozoa Giardia lamblia. Humans are a source of infection, particularly children, who can excrete very many cysts. Transmission is via the oral faecal route, or by smear infection or from contaminated food and water.

The **course of disease** varies between the asymptomatic excretion of cysts, to heavy diarrhoea and malabsorption. Early symptoms include diarrhoea, nausea, vomiting, intestinal hurry and abdominal pain. This can continue for about 1 to 2 weeks. Chronic Giardiasis may develop, even without the previous acute phase. Symptoms appear continuously or intermittently with intestinal hurry, diminished consistence of stool, sometimes diarrhoea, and a loss of weight. Severe cases show malabsorption, reduced growth rates in children, dehydration, and very rarely, a fatal outcome.

Cysts and trophozoites can be detected in fresh stool analysis by naked eye microscopic **diagnosis** or in conserved stool by enrichment methods in specialized laboratories. Antigenic stool tests are a new development. Sometimes diagnosis has to be more invasive by taking biopsy specimens from the jejunum.

Tinidazole (Simplotan®) 2 g as single dose is used for **therapy**. If necessary, this treatment can be repeated after 7 days. Alternatively, Metronidazole (Clont®, 2 g/d for 3 d or 3 x 400 mg for 5 – 7 d) can be used. During pregnancy Paromomycin should be used. During medication with either of the drugs

members of flight crew are not fit for flying duties. Success of intestinal eradication should be checked after about 6 weeks by microscopic stool diagnosis.

6.4 Cryptosporidia

Intestinal infections by cryptosporidia are occuring with increasing frequency. Cryptosporidia are now resistant against chlorides. Therefore the usual chloride treatment of drinking water cannot now prevent this type of infection.

Transmission is via the oral-faecal route. In immuno-competent persons a self- limiting course of 1 to 4 weeks can be found with diarrhoea, fever and febrile symptoms. A specific therapy is not necessary. Severe disease occurs in immuno-deficient patients. In these cases Paromomycin (Humatin®, 4 x 500 mg/d p.o. for 14 – 28 d, then 2 x 500 mg/d p.o. as suppression therapy for long-time) is used for treatment. **Whilst taking such medication, flight crew are not fit for flying duties**. Exposure prophylaxis should ensure that all drinking water should be filtered.

7 Patients with symptoms after visits to tropical areas

A host of other tropical diseases occur outside of Europe, most are of little significance for flight crews. Nevertheless, they may be of significance in the differential diagnosis of patients who complain of symptoms such as fever, diarrhoea, exanthema, and jaundice, after visits to the tropics. In patients presenting with fever or even unspecific symptoms, malaria should be suspected after staying in endemic areas. Diarrhoea with fever and / or bloody stools, or chronic diarrhoea should be should also be diagnosed meticulously. Diagnosis should be performed in hospitals and treatment given by physicians, who specialise in tropical medicine.

Differential Diagnosis for Fever after staying in tropical areas

Malaria
Infections of upper respiratory tract
Acute Hepatitis
Typhus / Para-typhus
Amoebiasis, Liver abscess
Acute phase of helminthic infections e.g. Katayama Fever
Dengue Fever and other Arbo-virus Infections
Campylobacter Enteritis
Borreliosis
Rickettsiosis
Visceral Leishmaniasis

Differential Diagnosis of Diarrhoea

Amoebiasis
Giardiasis
Shigellosis
Enteric Salmonellosis
Campylobacter Enteritis

Differential Diagnosis of Exanthema and other disorders of skin

Pyodermia
Dermatomycosis
Ektoparasites
Larva migrans
Cutaneous leishmaniasis
Filariasis
Myiasis

Dengue Fever is a common diagnosis for febrile patients who have stayed in endemic zones. Where flight crews are concerned this disease represents an important differential diagnosis with malaria. Infections occur worldwide in the tropics and subtropics and have spread in the past years, especially

into conurbations. The disease is caused by a flavivirus (4 Serotypes) and transmitted by Aedes mosquitoes (active day and night). After an incubation period of 2 – 7 days patients complain of a biphasic fever up to 40 °C, severe muscle and limb pain (break bone fever), headache, malaise, and generalized exanthema. After malaria has been ruled out, the diagnosis is established clinically and can be verified by an increase of antibodies. The only treatment required is symptomatic.
The administration of antipyretics and analgesics such as Paracetamol can be used. Acetylsalicylic Acid should however be avoided. The complications of **Dengue Haemorrhagic Fever** and **Dengue Shock Syndrome** are very rare in travellers. Treatment requires intensive care medicine.

Apart from Hepatitis A and B, Hepatitis C, D, E, can be encountered in tropical areas as well as in Europe. This depends on the local epidemiology. Clinical diagnosis and treatment do not differ either. Exposure prophylaxis include, avoiding contact with blood and body fluids (Hepatitis C and D) and the practice of good food hygiene (Hepatitis E) is recommended.

Bacterial diseases like Borreliosis (Relapsing Fever), Rickettsiosis (different febrile diseases presenting as atypical pneumonia or cyclic general infections are often accompanied by exanthema). Protozoal diseases like visceral leishmaniasis or trypanosomiasis, are fairly rare in travellers and in flight crews.

Haemorrhagic Fevers such as Lassa, Marburg and Ebola Fever are very rare and of little significance for flight crews. When patients suffering from these particular fevers or any other type of infectious disease have been transported by air, the flight surgeon has the responsibility to inform any member of the crew that flew that particular aircraft. The Flight Surgeon should offer the crew an examination or a transfer to a specialized institution. The Flight Surgeon is also obliged to report the matter to the health authorities according to the local health regulations.

8 Other Tropical diseases and Infections

There are some tropical diseases that are rarely encountered by flight crews. In this context it should be mentioned, that a lot of diseases occurring in tropical and subtropical areas are not typical tropical diseases. This applies to diseases that may occur even in temperate zones, but having a much higher prevalence in the tropics than in Europe where they may have been eradicated.

Helminthic diseases can be avoided by good food hygiene or by exposure prophylaxis. Rare infections and complications such as Hydatid disease caused by Echinococcus granulosus or Cysticercosis caused by Taenia solium with intracerebral symptoms renders flight crews unfit for flying duties.

The infection **Schistosomiasis** (Bilharziosis) is marked by an initial period of fever (Katayama Fever) and then an infection of wall of bladder and the colon. This causes haematuria and bloody stools. One of the complications can be portal hypertension. The infection can be avoided in tropical areas by not swimming or walking in lakes and rivers. Helminthic infections that are transmitted by insect vector's are not of any real significance for flight crews.

A further disease transmitted by ticks is Borreliosis, which is caused by different species of Borrelia. It appears in three stages with skin, joint, cardiac and neurological symptoms. There is no vaccination for the European form of the disease. Antibiotics are given as therapy. **Flight crew are unfit for flying duties until successful treatment has been documented.**

Sexual transmitted diseases as well as HIV infection can be avoided by sensible sexual hygiene and precautions. The flight surgeon should not hesitate to advise flight crew on this subject.

Flight crews may encounter many types of skin disease, when they are operating in tropical areas. **Larva migrans. (Creeping Eruption), is one type of this condition.** This can be diagnosed by seeing lines like threads appearing on the skin that are slightly raised above the skin level. The disease is caused by, the larva of ankylostoma. This is found in dogs. It is common after skin contact with sand on beaches that is contaminated by dog faeces. Walking on beaches with bare feet can also result in another disease

caused by the sand flea called **Tunga Penetrans**. This can present as a severe irritation, with secondary infection and ulceration in the inter-digital, sub-ungual and genito-anal areas. Tetanus and gangrene are occasional complications. The developing larvae of the dipterous flies cause **Myiasis**, after the eggs have been deposited under the skin. This is a relatively uncommon in humans. It often occurs by accident. Sweating and poor hygienic conditions encourage fungal infections. This is encountered more readily in the tropics. Good hygiene and cotton clothes can prevent these diseases. **Ectoparasitic infections** such as scabies, lice, fleas, and bed bugs are more likely to be encountered where there are poor living conditions and where there is poor personal hygiene amongst the flight crew. **Prickly heat** is a condition of the sweat glands caused by heavy sweating, more so in tropical areas. It can be avoided by using the correct clothing and by using the appropriate body hygiene.

Other food borne diseases like **Ciguatera, tetrodotoxin, and paralytic shellfish poisoning** present with light to severe neurological symptoms, nausea, vomiting and diarrhoea, and can be prevented by not eating certain fish. When flight crews are operating in areas where these diseases occur, and they present with typical symptoms, they can be treated by symptomatic therapy. The symptoms normally subside after a couple of weeks.

Haemoglobinopathies such as sickle cell anaemia (drepanocytosis) or thalassaemia are common in people originating from tropical areas. These conditions have to be taken into account by flight surgeons examining applicants from tropical areas or of African origin. These genetic abnormalities are of significance because the homocygotic form will make someone unfit for the flying environment and for flying duties. Fitness with the heterocygotic form depends on the actual haematological variables. **The Haematocrit values should be > 32 % for flight crews on duty.**

Venomous fish. There are over 100 fish species that have proved dangerous to man. Most are found in tropical areas. Great care must be taken when handling any fish dead or alive. Unnecessary contact with fish should be avoided in the vicinity of Coral Reefs. This is important for scuba divers and those who snorkel.

9 Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment)

Disease	**Condition**	**Period of Unfitness**	**Notes**
African Tick Typhus			See Rickettsial Diseases
African Trypanosomiasis			See Trypanosomiasis
AIDS			See HIV
American Trypanosomiasis			See Chagas Disease
Amoebiasis	Asymptomatic Luminal Infection	No restriction	
	Amoebic Dysentery	Unfit until therapy and full recovery	
	Liver Abscess	2 w after therapy and full recovery	No residual mass in ultrasound
	Other manifestation	2 w after therapy and full recovery	In case of brain abscess or meningoencephalitis if no residual mass in CCT or NMR and normal EEG
Anaemia	HK < 32 %	unfit	
Ancylostoma duodenale			See Helminthic Diseases
Angiostrongyliasis			See Helminthic Diseases

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Anthrax	All forms of disease	2 w after therapy and full recovery	No spores or vegetative forms of B. anthracis in bacteriologic studies
Antibiotics		Until cessation of therapy	
Arboviral Encephalitis		4 w after therapy and full recovery	In case of normal EEG and absence of convulsive periods. In case of symptomatic epilepsy on discretion of AMS
Arbovirus Fever	Chicungunya (CHIK)	4 w after therapy and full recovery	No restriction of joint mobility
	O´Nyong Nyong (ONN)	4 w after therapy and full recovery	No restriction of joint mobility
	Oropouche Fever	2 w after therapy and full recovery	
	Ross River Fever (RR), Epidemic Polyarthritis	4 w after therapy and full recovery	No restriction of joint mobility
	Sandfly (SF) Fever, Pappataci Fever Phlebotomus Fever	2 w after therapy and full recovery	
Argentinian Hemorrhagic Fever			See Haemorrhagic Fever
Ascariasis			See Helminthic Diseases
Aspergillosis			See Fungal Pulmonary Infections
Bacillus anthracis			See Anthrax
Bacterial Meningitis			See Meningitis
Balantidium coli	Asymptomatic Infection	No restriction	
	Symptomatic infection	After therapy and full recovery	
Bartonella henselae **Bartonella bacilliformis**	 Oroya Fever		See Cat Scratch Disease See Bartonellosis
	Verruga peruana		See Bartonellosis
Bartonellosis	Cat Scratch Disease	2 w after therapy and full recovery	Normal liver function tests and normal neurological examination
	Oroya Fever	2 w after therapy and full recovery	
	Verruga peruana	No restriction	
Beta Thalassaemia			See Thalassaemia
Blastocystis hominis	Asymptomatic Infection	No restriction	
	Symptomatic infection	Until therapy and full recovery	
Blastomycosis			See Fungal Pulmonary Infections
Bolivian Hemorrhagic Fever			See Hemorrhagic Fever

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Borreliosis	**Lyme Disease**, skin, joint and peripheral enurologic manifestation	Until therapy and full recovery	Individual assessment by serodiagnostic
	Lyme Disease, cardiac manifestation	Until therapy and full recovery	Echocardiogram must demonstrate normal contraction and ejection and 24 h ECG must demonstrate absence of significant arrythmias
	Lyme Disease, encephalitis and meningitis	Until therapy and full recovery	Neurological examination and EEG must be normal
	Relapsing Fever	4 w after therapy and full recovery	Normal ECG, 24 h ECG, Echocardiogram, liver function tests and normal neurological examination
Burkholderia			See Melioidosis
Buruli Ulcer		No restriction	Normal function of limbs, sufficient local therapy and sufficient hygienic conditions
Campylobacter			See Travel Diarrhoea
Carrión Disease	Oroya Fever		See Bartonellosis
	Verruga peruana		See Bartonellosis
Cat scratch Disease			See Bartonellosis
Chagas Disease	American Trypanosomiasis	Unfit	Unless assessed fit by AMS in absence of cardiac and gastrointestinal complications after meticulous tests (e.g. normal ECG, 24 h ECG, Echocardiogram, gastrointestinal studies)
Chicungunya (CHIK)			See Arbovirus Fever
CHIK Virus	Chicungunya (CHIK)		See Arbovirus Fever
Cholera		2 w after therapy and full recovery	
Ciguatera			See Seafood Toxins
Clonorchis sinensis **Closridium perfringens**			See Helminthic Diseases See Travel Diarrhoea See Gas Gangrene
Closridium tetani			See Tetanus
Coccidioides immitis			See Fungal Pulmonary Infections
Coxiella burneti			See Rickettsial Diseases
Creeping eruption		No restriction	
Crimean Congo Haemorrhagic Fever			See Haemorrhagic Fever
Cryptococcus		Unfit	Infection is sign for impaired immunity in HIV Infection

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Cryptosporidium parvum	Unspecific Diarrhoea		See Travel Diarrhoea
	In HIV Patients	Unfit	Infection is sign for impaired immunity in HIV Infection
Cutaneous Leishmaniasis			In case of absence of functional sequelae (i.e. no restriction of joint movement by scar formation etc.)
Cyclosporidia			See Travel Diarrhoea
Cysticercosis			See Helminthic Diseases
Cytomegalia (CMV-Infection)	Mostly asymptomatic in immuno-competent hosts	No restriction	
	In HIV Patients	Unfit	Infection is sign for impaired immunity in HIV Infection
Dengue Virus	Dengue Fever	2 w after full recovery	Rule out Malaria!
	Dengue Shock Syndrome	4 w after therapy and full recovery	
	Dengue hemorrhagic Fever	4 w after therapy and full recovery	
Dracunculus medinensis			See Helminthic Diseases
East American Equine Encephalitis (EEE)			See Arboviral Encephalitis
Ebola Virus.			See Hemorrhagic Fever
Ebstein Barr Virus (EBV)			See Mononucleosis
Echinococcus			See Helminthic Diseases
EEE Virus	East American Equine Encephalitis (EEE)		See Arboviral Encephalitis
Ehrlichiosis			See Rickettsial Diseases
Encephalitis		4 w after therapy and full recovery	In case of normal EEG and absence of convulsive periods. In case of symptomatic epilepsy on discretion of AMS
Endemic Syphilis	Early Lesions	2 w after therapy and full recovery	
	Late Lesions	Unfit	Unless rendered fit by AMS
Entamoeba histolytica			See Amoebiasis
Enterobius vermiculars			See Helminthic Diseases
Epidemic Polyarthritis			See Arbovirus Fever
Epizoonosis		Unfit until infestation has been eradicated	
Escherichia coli			See Travel Diarrhoea
Falciparum Malaria			See Malaria

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Fasciola			See Helminthic Diseases
Fasciolopsis buski			See Helminthic Diseases
Fièvre Boutonneuse			See Rickettsial Diseases
Filariasis			See Helminthic Diseases
Fleas			See Epizoonosis
Framboesia			See Yaws
Fungal Skin Infections		No restriction	
Fungal Pulmonary Infections, Systemic Fungal Infections	Fungal Pulmonary Infections	2 w after therapy and full recovery	Successful treatment must be demonstrated by Chest X-ray
	Other systemic manifestations	2 w after therapy and full recovery	Successful treatment must be demonstrated by ultrasound (liver), EEG (meningitis)
Gas Gangrene	Clostridial Myositis	4 w after therapy and full recovery	
Giardiasis	Asymptomatic Disease	No restriction	
	Symptomatic Disease	Until therapy and full recovery	
Glucose-6-phosphate dehydrogenase deficiency		No restriction	If oxidative stress due to antimalarials, antibiotics, analgesics, antihelminthic drugs and certain type of food (Fava Beans) are avoided. These Persons should obtain **no missions to the tropics**
Gonorrhea		Until therapy and full recovery	
Granuloma inguinale		Until therapy and full recovery	
Guanarito Virus **Haemorrhagic Fever**	Venezuelan Haemorrhagic Fever	 4 w after therapy and full recovery	See Haemorrhagic Fever Successful recovery has to be proved by meticulous clinical and laboratory examination, 24h ECG and echocardiography
Hantavirus Haemorrhagic Fever			See Haemorrhagic Fever
Helminthic infections	Asymptomatic or unspecific Disease	No restriction	
	Anaemia	Unfit	HK < 32 %
	Portal Hypertension	Unfit	Unless rendered fit by AMS

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
	Cysticercosis	4 w after therapy and full recovery	No residual mass in CCT or NMR and normal EEG, normal extended ophthalmologic examination (no mass)
	Filariasis (Lymphatic)	Unfit	In case of Elephantiasis. See also Onchocerciasis
	Cystic Hydatid Disease	2 w after therapy and full recovery	Successful treatment must be demonstrated by ultrasound (liver), CT (lungs, peritoneal cavity)
	Alveolar Hydatid Disease	Unfit	Unless definite healing is demonstrated
Hemoglobin, abnormal, Hemoglobin Disorder	Homocygotic	Unfit	
	Heterocygotic	No restriction	HK < 32 %
Hepatitis	Hepatitis A	After therapy and full recovery	
	Hepatitis B acute	After therapy and full recovery	
	Hepatitis B chronic	Unfit	Unless Chronic Persisting Hepatits, no impairment of mental abilities, in regular testing AFP normal or after successful therapy (sero conversion, normal liver function tests)
	Hepatitis C acute	After therapy and full recovery	
	Hepatitis C chronic	Unfit	Unless Chronic Persisting Hepatitis, no impairment of mental abilities, in regular testing AFP normal or after successful therapy (sero-conversion, normal liver function tests)
	Hepatitis D acute	After therapy and full recovery	
	Hepatitis D chronic	Unfit	Unless Chronic Persisting Hepatitis, no impairment of mental abilities, in regular testing AFP normal or after successful therapy (sero-conversion, normal liver function tests)
	Hepatitis E	After therapy and full recovery	
	Hepatitis F	After therapy and full recovery	No clinical significance
	Hepatitis G	After therapy and full recovery	No clinical significance

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Histoplasma capsulatum			See Fungal Pulmonary Infections
HIV		Unfit	Unless assessed fit by AMS
Hookworm			See Helminthic Diseases
Hydatid Disease			See Helminthic Diseases
Hymenolepis nana			See Helminthic Diseases
Immunization			See Vaccination
Influenza		Unfit until full recovery	
Intestinal Flukes			See Helminthic Diseases
Invasive Salmonellosis			See Typhoid Fever
Ippy Virus			See Haemorrhagic Fever
Isospora belli			See Travel Diarrhea
Japanese Encephalitis		4 w after therapy and full recovery	
Junin Virus	Argentine Haemorrhagic Fever		See Haemorrhagic Fever
Kala Azar	Visceral Leishmaniasis	4 w after therapy and full recovery	
Kaposi Sarcoma		No restriction	In case of absence of systemic manifestations
Katayama Fever **Kyasanur Forest Fever**		Unfit in acute stage	See Trypanosomiasis See Haemorrhagic Fever
Larva currens	Strongyloides Infection		See Helminthic Diseases
Larva migrans		No restriction	Infection by ancylostoma pathogenic for dogs
Lassa Fever			See Haemorrhagic Fever
Legionella pneumophilia	Legionnaire´s Disease	2 w after therapy and full recovery	
Leishmania aethiopica			
Leishmania braziliensis			
Leishmania chagasi			See Kala azar
Leishmania donovani			See Kala azar
Leishmania guyanensis			
Leishmania infantum			See Kala azar

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Leprosy	Lepromatous Leprosy	4 weeks after therapy and full recovery	Normal opthalmological findings, normal audiogram and, in case of meningitis, normal EEG and absence of convulsive periods and normal neurological evaluation
	Tuberculoid Leprosy	Unfit	Unless neurological, renal, ophthalmologic complications have been ruled out and in case of normal opthalmological findings, normal audiogram and, in case of meningitis, normal EEG and absence of convulsive periods and normal neurological evaluation
Leptospira	Leptospirosis		See Leptospirosis
Leptospirosis	Weil´s disease	2 w / 4 w after therapy and full recovery	Depending on severity of clinical course
Lice			See Epizoonosis
Loa Loa			See Helminthic Diseases
Loiasis			See Helminthic Diseases
Louse Borne Relapsing Fever			See Borreliosis
Louse Borne Typhus			See Rickettsial Diseases
Lung Flukes			See Helminthic Diseases
Lymphatic Filariasis			See Helminthic Diseases
Machupo Virus	Bolivian Haemorrhagic Fever		See Haemorrhagic Fever
Malaria	Malaria suspected or proved	Unfit	
	after therapy and recovery	4 w	
	After chemoprophylaxis with Resochin/Paludrin	No restriction	
	After Chemoprophylaxis with Mefloquine or Atovaquon/Proguanil After Standby Therapy with Chloroquine, Mefloquine, Atovaquon/Proguanil or Artemether/Lumefantrin	4 w 4 w	
Marburg Fever			See Haemorrhagic Fever
Marburg Virus			See Haemorrhagic Fever
Measles		Until full recovery	Infectious until 2 d after onset of exanthema
Melioidosis		Until full recovery	

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Meningitis		4 w after therapy and full recovery	Normal EEG and absence of convulsive periods and normal neurological evaluation. In case of symptomatic epilepsy on discretion of AMS
Meningococci			See Meningitis
Microsporidia	Unspecific Diarrhea		See Travel Diarrhoea
	In HIV Patients	Unfit	Infection is sign for impaired immunity in HIV Infection
Mites			See Epizoonosis
Mite Typhus			See Rickettsial Diseases
Monkey Pox		4 w after therapy and full recovery	Extended opthalmological examination must be normal
Mononucleosis		2 w after therapy and full recovery	Normal size of spleen (Ultrasound)
Mopeia Virus			See Haemorrhagic Fever
Mucocutaneous Leishmaniasis		No restriction	In case of absence of functional sequelae
Mucosal Leishmaniasis			See Mucocutaneous Leishmaniasis
Murray Valley Encephalitis (MVE)			See Arboviral Encephalitis
Murine Typhus			See Rickettsial Diseases
MVE Virus	Murray Valley Encephalitis (MVE)		See Arboviral Encephalitis
Mycobacterium leprae			See Leprosy
Mycobacterium tuberculosis **Mycobacterium bovis**			See Tuberculosis See Tuberculosis
Mycobacterium ulcerans			See Buruli Ulcer
Myiasis	Facial Manifestations		Normal extended ophthalmological and ORL examination
Necator americanus			See Helminthic Diseases
Neisseria gonorrhoeae			See Gonorrhoea
Neisseria meningitidis			See Meningitis
Neurosyphilis			See Syphilis
Non-Veneral Treponematosis	Endemic Syphilis		See Endemic Syphilis
	Pinta	2 w after therapy and full recovery	
	Yaws		See Yaws
Norwalk Virus			See Travel Diarrhoea
Ocular Toxocariasis		Unfit	Unless rendered fit by AMS
Old World Tick Typhus			See Rickettsial Diseases

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Onchocerca volvulus			See Onchocerciasis
Onchocerciasis	Cutaneous and subcutaneous manifestations	Until full recovery	
	Ocular manifestation	Unfit	Unless assessed fit by AMS
ONN Virus	O´Nyong Nyong (ONN)		See Arbovirus Fever
O´Nyong Nyong (ONN)			See Arbovirus Fever
Opisthorchiasis			See Helminthic Diseases
Opisthorchis			See Helminthic Diseases
Opisthorchis felineus			See Helminthic Diseases
Opisthorchis guayaquilensis			See Helminthic Diseases
Opisthorchis sinensis			See Helminthic Diseases
Opisthorchis viverrini			See Helminthic Diseases
Oropouche Fever			See Arbovirus Fever
Oropouche (ORO) Virus	Oropouche Fever		See Arbovirus Fever
Oroya Fever			See Bartonellosis
Pappataci Fever	Sandfly (SF) Fever, Phlebotomus Fever		See Arbovirus Fever
Paracoccidioides brasiliensis Paracoccidioidomycosis			See Fungal Pulmonary Infections See Fungal Pulmonary Infections
Paralytic Shellfish Poisoning			See Seafood Toxins
Pediculosis pubis			See Epizoonosis
Pediculosis capitis			See Epizoonosis
Phthirius pubis			See Epizoonosis
Pinta			See Non-Veneral Treponematosis
Pinworm			See Helminthic Diseases
Phlebotomus Fever	Sandfly (SF) Fever, Pappataci Fever		See Arbovirus Fever
Plague	Bubonic Plague	2 w after therapy and full recovery	
	Pulmonary Plague	4 w after therapy and full recovery	
Plasmodium falciparum			See Malaria
Plasmodium malariae			See Malaria
Plasmodium ovale			See Malaria
Plasmodium vivax			See Malaria
Pneumocystis carinii		Unfit	Opportunistic Infection in HIV Infection
Pneumonia **Pneumonic Plague**		2 w after therapy and recovery	 See Plague
Poliomyelitis		4 w after therapy and full recovery	
Pork Tape Worm			See Helminthic Diseases
Postvaccinal Encephalitis			See Encephalitis
Pubic Lice			See Epizoonosis
Pyomyositis			See Tropical Pyomyositis

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Q-Fever			See Rickettsial Diseases
Rabies		Unfit	
Relapsing Fever			See Borreliosis
Rhabdomyolysis		Unfit	Until renal function has been normalized
Rhodesian Sleeping Sickness			See Trypanosomiasis
Rickettsia			See Rickettsial Diseases
Rickettsial Diseases	Epidemic Typhus (Louse Borne Typhus)	4 w after therapy and full recovery	
	Endemic Typhus (Murine Typhus)	4 w after therapy and full recovery	
	Tick Typhus (Spotted Fever) AmericanTick Typhus Old World Tick Typhus Rickettsial Pox	2 w after therapy and full recovery	
	Mite Typhus (Scrub Typhus)	4 w after therapy and full recovery	
Rickettsialpox			See Rickettsial Diseases
Rift Valley Fever			See Haemorrhagic Fever
Ross River Fever (RR)	Epidemic Polyarthritis		See Arbovirus Fever
Rota Virus			See Travel Diarrhoea
RR Virus	Ross River Fever (RR), Epidemic Polyarthritis		See Arbovirus Fever
Rubella **Salmonella**		Until full recovery	Infectious until 2 w after onset of exanthema See Travel Diarrhoea
Salmonella enteritidis			See Travel Diarrhoea
Salmonella Enterocolitis			See Travel Diarrhoea
Salmonella paratyphi			See Typhoid Fever
Salmonella typhi			See Typhoid Fever
Salmonella typhimurium			See Travel Diarrhoea
Sarcoptes scabiei			See Epizoonosis
Scabies			See Epizoonosis
Schistosoma			See Schistosomiasis
Schistosoma haematobium			See Schistosomiasis
Schistosoma intercalatum			See Schistosomiasis
Schistosoma japonicum			See Schistosomiasis
Schistosoma mansoni			See Schistosomiasis
Schistosoma mekongi			See Schistosomiasis
Schistosomiasis	CNS Schistosomiasis	Unfit	Unless rendered fit by AMS
	Hepatolienal Schistosomiasis	Unfit	Unless rendered fit by AMS

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
	Intestinal Schistosomiasis	After therapy and full recovery	In case of absence of complications like rectal prolapsed or intersusseption
	Pulmonary Schistosomiasis	Unfit	Unless rendered fit by AMS
	Urinary Schistosomiasis	After therapy and full recovery	In case of absence of urinary retention, stasis, renal failure or stone formation
Scrub Typhus			See Rickettsial Diseases
Seafood Toxins		2 w after therapy and full recovery	Absence of neurologic sequelae
Shigella			See Travel Diarrhoea
Shingles			See Varizella Zoster Virus
SLE Virus	St. Louis Encephalitis (SLE)		See Arboviral Encephalitis
Sleeping Sickness			See Trypanosomiasis
Snake Bite		Unfit	Unless any neurological, cardiac and haematological complication has been ruled out
Splenomegaly		Unfit	Unless only slightly enlarged with no danger of rupture
Spotted Fever			See Rickettsial Diseases
St. Louis Encephalitis (SLE)			See Arboviral Encephalitis
Strongyloides stercoralis			See Helminthic diseases
Syphilis		Unfit	Unless rendered fit by AMS in stage I or II
Systemic Fungal Infections			See Fungal Pulmonary Infections
Taenia saginata			See Helminthic diseases
Taenia solium			See Helminthic diseases
Tana Pox		2 w after therapy and full recovery	
Tapeworms			See Helminthic diseases
Tetrodotoxin Poisoning			See Seafood Toxins
Thalassaemia	Beta-Thalassaemia maior	Unfit	
	Beta-Thalassaemia minor	No restriction	HKT > 32 %
	Alfa-Thalassaemia maior	Unfit	
	Alfa-Thalassaemia minor	No restriction	HKT > 32 %
Threadworm			See Helminthic diseases
Tick Borne relapsing Fever			See Relapsing Fever
Tick Typhus			Seen Ricketttsial Diseases
Toxocara cani			See Heminthic Diseases
Toxocara cati			See Heminthic Diseases

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Toxocariasis			See Heminthic Diseases
Toxoplasma gondii			See Toxoplasmosis
Toxoplasmosis	Asymptomatic or only generalized Lymphadenopathia	No restriction	
	Myocarditis, Hepatitis	Until therapy and full recovery	Complications ruled out by normal ECG, 24 h ECG, Electrocardiogram and normal liver function tests
	Cerebral Toxoplasmosis	Unfit	Infection is sign for impaired immunity in HIV Infection
Travel Diarrhea		Until full recovery	
Traveller´s Diarrhea			See Travel Diarrhoea
Trench Fever			See Rickettsial Diseases
Treponema pallidum	Syphilis		See Syphilis
Treponema pallidum subspecies endemicum	Endemic Syphilis		See Endemic Syphilis
Treponema pallidum subspecies pertenue	Yaws		See Yaws
Treponema pallidum subspecies carateum	Pinta		See Non-Venereal Treponematosis
Trichuris trichiura			See Helminthic Diseases
Trichuris trichuria			See Helminthic Diseases
Tropical Pyomyositis		4 w after therapy and full recovery	In case of absence of functional sequelae (i.e. no restriction of joint movement by scar formation etc.)
Tropical Splenomegaly Syndrome **Tropical Sprue**		After successful therapy, substitution and full recovery	See Splenomegaly
Tropical Ulcer		No restriction	If local therapy can be performed and hygienic conditions are sufficient
Trypanosoma brucei			See Trypanosomiasis
Trypanosoma brucei gambiense			See Trypanosomiasis
Trypanosoma brucei rhodesiense			See Trypanosomiasis
Trypanosoma cruzi			See Chagas Disease
Trypanosomiasis	Sleeping Disease	Unfit	Unless rendered fit by AMS after meticulous tests (ECG, 24h ECG, Echocardiogram, EEG, neurological evaluation)

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
Tuberculosis		4 w after therapy and full recovery	In case of normal opthalmological findings, normal audiogram and, in case of meningitis, normal EEG and absence of convulsive periods and normal neurological evaluation
Tunga penetrans			See tungiasis
Tungiasis		No restriction	
Typhoid Fever		4 w after therapy and full recovery	
Typhus Fevers			See Rickettsial Diseases
Upper Respiratory Tract (URT) Infections		Until full recovery	If pressure of middle ear and sinuses can be equalized and the voice is clear enough for radio communications.
Urinary Schistosomiasis			See Schistosomiasis
Vaccination		24 hours	Parenteral immunization, provided that adverse side effects (anaphylactic reaction etc.) are absent, that may impair the ability to perform the duties
Varizella			See Varizella Zoster Virus
Varizella Zoster Virus		Unfit until full recovery	If blisters have disappeared
VEE Virus	Venezuelan Equine Encephalitis (VEE)		See Arboviral Encephalitis
Venezuelan Equine Encephalitis (VEE)			See Arboviral Encephalitis
Venezuelan Haemorrhagic Fever			See Haemorrhagic Fever
Verruga peruana			See Bartonellosis
Vibrio cholerae			See Cholera
Viral Haemorrhagic Fever **Viral Hepatitis**			See Haemorrhagic Fever See Hepatitis
Visceral leishmaniasis			See Kala Azar
Viral Encephalitis			See Encephalitis
Viral Meningitis			See Meningitis
Weil´s disease			See Leptospirosis
WEE Virus	West American Equine Encephalitis (WEE)		See Arboviral Encephalitis
West American Equine Encephalitis (WEE)			See Arboviral Encephalitis
West Nile (WN) Fever	Fever, myalgia, exanthema	After full recovery	

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)

Disease	Condition	Period of Unfitness	Notes
	Meningitis or Meningoencephalitis	4 w after therapy and full recovery	Normal EEG and the absence of convulsive periods and normal neurological evaluation. In case of symptomatic epilepsy at the discretion of AMS
West Nile (WN)Virus			See West Nile (WN) Fever
Whipworm			See Helminthic Diseases
Wuchereria bancrofti	Lymphatic Filariasis		See Helminthic Diseases
Yaws	Early Lesions	2 w after therapy and full recovery	
	Late Lesions	Unfit	Unless rendered fit by AMS
Yellow Fever		4 w after therapy and full recovery	
Yersinia			See Travel Diarrhoea
Zoster			See Varicella Zoster Virus

Medical Fitness for Air Crews after Infectious Diseases (Guidelines for Medical Assessment (cont'd)