

FSG 1900-01 MEDICATIONS AND AIRCREW

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References:

- A. [B-GA-100-001/AA-000 National Defence Flying Orders](#)
- B. [CF Drug Benefit List](#)
- C. [FSG 1400-01 Use of SSRI/SNRI Medications in Aircrew](#)
- D. [FSG 300-01 Temporary Flying Restrictions](#)
- E. [FSG 1400-03 Fatigue Management in Aircrew](#)
- F. [FSG 900-01 Metabolic Syndrome and Diabetes in Aircrew](#)
- G. [USAF Waiver Guide](#)

Record of Amendments approved by AUMB

Date (DD/MM/YY)	Change/Reason
05Dec16	Page 5/Para 12/Antibiotics Grounding period for antibiotics standardized at 4 days. Harmonized for short or long-term use.
05Dec16	Page 6/Para 22/NSAIDs Celecoxib approved for aircrew for short or long-term use. Previous concerns about adverse cardiovascular effects recently clarified.
05Dec16	Page 8/Paras 33-36/Sedatives/Hypnotics Guidelines for operational use clarified and harmonized with FSG 1400-03. Grounding period for zopiclone increased to 12 hrs
05 Dec16	Page 8/Para 38/Hypertension Recommendation for thiazide diuretics changed to long-acting preparations such as chlorthalidone. Recent data shows limited efficacy for short-acting preparations such as hydrochlorthiazide.

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GENERAL INFORMATION

1. These Guidelines have been developed to assist Flight Surgeons and Basic Aviation Medicine Providers (BAvMed) in determining the aeromedically acceptable use of medications for RCAF aircrew. Each prescribing situation is unique in terms of the illness, the individual, and the drug, and it is difficult to legislate the sensible use of medications in aircrew. Determining whether a medication may be used in aircrew on flying duties and what restrictions may be appropriate should be based on a sound knowledge of the drug actions and pharmacokinetics, adverse effects, and the operational environment including possible contingency situations. Aircrew are prohibited from self-medication under ref A Vol 1, Chap 9, pp 2-4.
2. These Guidelines are revised periodically and are reviewed and approved by the Aerospace and Undersea Medical Board (AUMB). The Guidelines are interfaced with the CF P&T Committee through the RCAF Surgeon/AMA. Aircrew should be prescribed medications available within the CAF Formulary (ref B) whenever possible. These guidelines do not constitute a drug benefit list.
3. When determining appropriate flying restrictions, the Flight Surgeon/BAvMed Provider should consider whether he/she would be comfortable flying on the various missions that the aircrew member will be serving on while taking the prescribed medication, and that all possible risk mitigation actions to minimize the risk have been initiated.
4. If in doubt about prescribing any medication for aircrew, Flight Surgeons and BAvMed Providers should obtain advice by email or by telephone from:
 - a. 1 Canadian Air Division Surgeon (1 CAD Surg) at CSN 257-5488 or Aeromedical Standards and Clinical Services (ASCS) Flight Surgeon at CSN 257-5875, or emergency;
 - b. CFEME Medical Consult Services (Med Consult Svcs) (CSN 634-4011 or commercial (416) 635-2000): Dr Gary Gray – 2015; Dr. Bill Bateman - 2159, or via Orderly Room: ext 2017/2082.
5. One of the functions of the Flight Surgeon is to brief their squadron aircrew and ground crew on the appropriate use and precautions in the use of drugs, including over-the-counter (OTC) medications and herbal preparations, which aircrew may not consider as "drugs". These guidelines may be helpful in the preparation of such briefings. A review article on "Herbal Preparations: A Primer for the Aeromedical Physician" was published in Aviation, Space and Environmental Medicine 2000;71: pp 45-60.
6. Aircrew may also be prescribed medications from sources other than their Flight Surgeon (e.g. by Dental Officers or Consultants) and aircrew should be briefed on the requirement to consult their Flight Surgeon/BAvMed Provider prior to returning to flying duties while taking medication prescribed from any source.

DRUGS, DISEASES AND FLIGHT SAFETY

7. In prescribing any medication for aircrew, the Flight Surgeon/BAvMed Provider should consider both the nature of the disease process and the medication. Sometimes, the disease or medical problem itself will preclude flying rather than the potential side-effects of the medication. A simple example is the use of topical nasal steroids in allergic rhinitis. It's not the medication, but rather the degree of upper respiratory congestion and systemic atopic symptoms that are the determining factors. For example, inability to clear the ears on descent can cause considerable pain during a very critical portion of the flight and be a greater concern than the side-effects of a topical nasal steroid.
8. Any medication may have effects of concern in the aviation environment. The possibility of an idiosyncratic reaction must be kept in mind when introducing any medication for aircrew. Adverse effects that may be merely annoying on the ground can produce serious aeromedical consequences in air operations.
9. When prescribing a medication for aircrew, physicians should be familiar with the product monograph including pharmacokinetics and published adverse effects. For drugs with CNS or other side-effects of aeromedical concern, aircrew should not return to flight duties until at least five-half lives have passed after stopping the medication. With respect to adverse effects, the following possibilities should be considered:
 - a. **Acute incapacitation** – Is there any possibility that this drug, in this situation, might cause incapacitation; anaphylaxis, acute vertigo, hypotension, arrhythmias, diplopia, etc.; and,
 - b. **Performance decrements** – Performance decrements may occur through a direct effect on the CNS or through a non-CNS adverse effect (e.g. GI upset, which can be distracting enough to cause a critical lapse of attention). Drugs with obvious CNS side-effects (e.g. minor tranquilizers) are obvious exclusions for aircrew duty, but subtle side-effects from other medications may also cause serious flight safety problems. For example, gastrointestinal upset from erythromycin which caused mild nausea and resulted in anxiety, hyperventilation and an air emergency for a student pilot at 2 CFFTS in Moose Jaw.
10. When considering the potential safety implications of both drugs and illness, there are three major areas of concern:
 - a. **Flight Safety** – Does the medication or the illness have the potential to compromise flight safety? If so, the aircrew must be grounded.
 - b. **Mission** – In military air operations, successful completion of the mission may be of utmost importance, whether it is a tactical fighter sortie during hostilities or a helicopter search and rescue mission to a sinking freighter in peacetime. Flight mission completion is a top operational priority that must be considered when prescribing medications to aircrew.
 - c. **Individual Health Compromise** – The third major concern is the potential effects of continuing flight duties while taking the medication on the health

and well-being of the individual aircrew member. For example, a pilot with early ankylosing spondylitis would be better to be restricted from rotary wing operations where back discomfort due to posture and vibration is a very common problem, than to continue flying in the environment with a medication even though aeromedically acceptable. Special consideration must also be taken with pregnant or nursing female aircrew members.

DRUG GROUPS – CONSIDERATIONS AND RECOMMENDATIONS

11. The following sections provide general guidelines for specific drug groups. It is impossible to cover every drug available. If you have any doubts or concerns regarding a particular prescribing situation be sure to discuss the problem with one of the physicians on staff at 1 CAD in Winnipeg or CFEME/Med Consult Svcs in Toronto. It is imperative that medication not previously cleared for use in RCAF aircrew not be used prior to obtaining clearance from CFEME/Med Consult Svcs or the Div Surgeon office.

ANTIBIOTICS

12. Most serious adverse events occur in the first 48 hours. A minimum grounding period of 4 days is recommended prior to returning to aircrew duties. Aircrew must be grounded on initiation of antibiotic treatment and must be seen by a Flight Surgeon or B Av Med Provider to be ungrounded. FS/BAvMed Providers should clarify that the acute infectious illness has resolved and there are no drug side-effects. Be aware of possible hypersensitivity reactions, or GI disturbances effects which may not be disabling, but may be significantly distracting. Minocycline is particularly to be avoided because of its high incidence of vestibular side-effects, but other antibiotics such as TMP-SMX can also cause vestibular side-effects, and aircrew should be carefully questioned about any sensations of unsteadiness before returning to flight duties.

13. Topical antibiotics do not normally require a grounding period.

14. Routine antibiotic prophylaxis for travelers' diarrhea in aircrew is not recommended (ref D) but broad spectrum treatment (e.g. with ciprofloxacin or azithromycin) may be useful to hasten recovery and return to flying duties.

15. Malaria chemoprophylaxis: Flight Surgeons/BAvMed Providers responsible for aircrew being deployed to or through malarial areas should consult with the Directorate of Force Health Protection (DFHP) for the most current recommendations. Messages from DFHP regarding malaria chemoprophylaxis for new deployments should normally include a separate paragraph regarding aircrew. Aircrew should be grounded for 24 hours after the first dose of chloroquine or doxycycline before deployment, but grounding is not required for further preventive doses. Malarone is preferred for chloroquine resistant areas. Doxycycline is also acceptable but mefloquine is not recommended for prophylaxis in aircrew because of the potential neurocognitive effects. Malarone and primaquine have both been demonstrated to be free of performance side-effects, and may be used in aircrew. All CAF members require normal G6PD tests prior to use of primaquine. 24 hour grounding following the first dose of any of these anti-malarials is recommended.

ANTIHISTAMINES

16. The anticholinergic and sedative effects of the older generation anti-histamines (eg chlorpheniramine) make them unsuitable for use in aircrew. The sedative interactive effects with alcohol are potentiating and potentially dangerous.

17. Loratadine (Claritin), desloratadine (Aerius) and fexofenadine (Allegra) are H1 antihistamines which have not been demonstrated to have anticholinergic or CNS effects. Clemastine (Tavist) and cetirizine (Reactine) may produce drowsiness and CNS side-effects and are not recommended as first line antihistamines for aircrew, but may be considered after a failed trial of loratadine, desloratadine, or fexofenadine.

18. Loratadine (Claritin), desloratadine (Aerius) and fexofenadine (Allegra) may be prescribed for CF aircrew with allergic rhinitis or other situations requiring an antihistamine (e.g. chronic urticaria). The drug should first be used for a non-flying trial period of at least 3 days, and the minimal dosage, which effectively controls symptoms determined. Aircrew must be seen again before returning to flying duties, and the presence of any side-effects as well as the extent of symptomatic control determined. Once trialed in aircrew, grounding is not required for recurrent, intermittent use. Alcohol must not be taken within a 24 hour period prior to flying while taking an antihistamine.

19. Topical antihistamines for allergic rhinitis or allergic conjunctivitis do not require a flying restriction.

NSAIDs AND ANALGESICS

20. For simple analgesia (e.g. relief of musculoskeletal aches, headache, etc), acetaminophen is preferable to ASA or NSAIDs for use by aircrew.

21. ASA and other non-steroidal anti-inflammatory drugs (NSAIDs), which inhibit prostaglandin synthesis, all have potentially serious side-effects on both the GI tract and the CNS. CNS effects include sedation, headaches, and decreased vigilance. Indomethacin generally produces the most pronounced CNS effects. Hypersensitivity reactions (e.g. acute bronchospasm) may occur with any of the NSAIDs in "sensitive" persons. Increases in hepatic transaminases progressing to frank hepatitis may also occur.

22. GI effects are common and vary from non-specific, distracting GI upset to gastritis progressing to ulceration. For aircrew requiring other than brief NSAID treatment (up to 1 week), concurrent GI protection with a proton-pump inhibitor or use of the COX-2 NSAID celecoxib is recommended.

23. Aircrew should be briefed on the potential GI side-effects of ASA and NSAIDs and be cautioned on self-medicating with OTC ASA/NSAIDs.

24. If required for brief periods (e.g. up to a week for musculoskeletal injuries), NSAIDs may be used in aircrew preferably as an HS medication while on flying duties without a flying restriction. Muscle relaxants (e.g. Norflex) and drug combinations (e.g. with codeine or meprobamate) must not be used by any aircrew on flying duties. The use of any drug containing a narcotic requires grounding. Muscle relaxants may have long half-lives, and aircrew may require continued grounding for several days (i.e. at least five half-lives) after being prescribed such medication.

25. If aircrew require NSAIDs for prolonged periods (longer than two weeks), NSAIDs should be prescribed with appropriate GI protection with a proton pump inhibitor such as pantoprazole or with misoprostol. Oxicams and celecoxib are acceptable alternatives. If long-term NSAIDs are taken with appropriate GI protection, aircrews (including pilots) do not require an operational flying restriction (unless required by their underlying medical condition).

DECONGESTANTS

26. Aircrew with upper respiratory infections or allergy-related congestion should be grounded until normal Eustachian tube function has returned, confirmed by examination.

27. Topical and systemic decongestants are adrenergic agonists. Cold preparations often additionally contain older generation antihistamines. Topical decongestants are generally safer than systemic preparations, although even the topical sympathomimetic sprays are absorbed to a certain extent and can produce adrenergic effects including arrhythmias. The rebound effect of topical sympathomimetic sprays (e.g. Dristan) can start after as short a time as 48 hours of repetitive use. These medications also reduce ciliary activity and so reduce mucus clearance. In aircrew recovering from upper respiratory congestion, a topical decongestant may be used as a "get me down" aid. The use of systemic decongestants (eg pseudoephedrine) is not recommended in aircrew.

28. Since many compounds of this type are available over-the-counter, Flight Surgeons and BAvMed Providers should regularly brief aircrew on the potential hazards of these compounds, including the potential arrhythmogenic potential of pseudoephedrine.

29. Topical corticosteroids and sodium cromoglycate for allergic rhinitis produce no significant systemic effects and can be used for aircrew without restrictions. Saline rinses do not require a flying restriction.

ACID SUPPRESSION THERAPY – PUD, GERD AND DYSPEPSIA

30. Active GI ulcer disease requires grounding. Aircrew suspected of having active ulcers should undergo endoscopy to include biopsy for H. pylori. Active ulcers should be treated with a proton-pump inhibitor such as pantoprazole which produces the most rapid healing and, where H. pylori has been demonstrated, eradication should be undertaken with appropriate combined therapy. If due to H. pylori, successful eradication should be confirmed with urea breath testing or H. pylori stool antigen before returning aircrew to flight duties.

31. For dyspeptic symptoms without a demonstrable ulcer, for reflux symptoms, and for "maintenance" therapy after ulcer healing, high potency antacids (e.g. Maalox TC; Mylanta II), sulcrafate, ranitidine in an HS dosage regimen or a proton pump inhibitor may be used by aircrew.

32. For gastro-esophageal reflux disease (GERD), PPIs such as pantoprazole are most efficacious and may be used for aircrew including pilots.

SEDATIVES/HYPNOTICS (See also Ref E)

33. In general, this class of drug is not compatible with flying duties. Specific guidelines for the use of sedatives/hypnotics to facilitate off-nominal sleep during phase-

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shifted flight operations or during circadian transitions are outlined in FSG 1400-03 Fatigue Management in Aircrew.

34. Zopiclone (Imovane), temazepam (Restoril), zolpidem (Sublinox), and melatonin SR are approved for Flight-Surgeon-supervised use in aircrew to facilitate sleep in operational settings requiring off-nominal sleep or during circadian shifting. The half-life, dosages and required grounding periods are shown in para 35.

35. Table of sleep medications approved for aircrew

Medication	Trade Name	Half-life (hr)	Dosage	Grounding Required (hrs)
temazepam	Restoril	8-9	7.5/15	12
zopiclone	Imovane	5	3.75/5/7.5	12
zolpidem	Sublinox	2-3	5	6
Melatonin SR			1 to 3mg SR	Not required

36. As per FSG 1400-03, before prescribing for operational use, the medication must be ground tested by the individual, with completion of FSG 1400-03 Annex F. Ground testing should begin with the smallest dosage, with titration upwards (and repeat ground testing) only if required to achieve adequate sleep. The smallest effective dose to achieve adequate sleep should be prescribed, maximum quantity 7.

37. Other drugs such as antihistamines or other benzodiazepines must not be used to facilitate sleep. Triazolam (Halcion) must not be used in aircrew because of the reports of hallucinations after use.

HYPERTENSION

38. The Canadian Hypertension Society (CHS) website(<http://www.hypertension.ca>) provides current Canadian guidelines for the investigation and treatment of hypertension.

- a. **Assessment** - For mildly elevated office readings, before a diagnosis of hypertension is made and treatment initiated additional blood pressure data should be obtained from serial clinic readings, home blood pressure measurements, and ambulatory 24 hour blood pressure monitoring. Basic CHS-recommended investigations include urinalysis, and biochemical screen of renal and hepatic function, electrolytes, lipid profile, blood sugar/A1C and an ECG. An echocardiogram may demonstrate early cardiac target organ effects of hypertension such as diastolic dysfunction and increased left ventricular mass but is not a routine requirement. Investigation for Obstructive Sleep Apnea (OSA) should be considered for patients with suggestive symptoms. For renovascular or endocrine-related hypertension, additional specific investigations are indicated (see CHS guidelines).
- b. **Life-style modifications** – Life-style modification is considered the cornerstone of therapy. Efforts should initially be directed towards control of

blood pressure by non-pharmacological means including weight reduction, nutritional approaches such as the DASH (Dietary Approaches to Stop Hypertension) diet and salt restriction, exercise, and alcohol avoidance. Should adequate application of non-pharmacologic methods fail to control the blood pressure, drug therapy may be required.

- c. **Antihypertensive Medications** - The initiation of pharmacologic therapy for hypertension requires that aircrew be grounded until the blood pressure is reasonably controlled and the adverse effects of treatment assessed. This will generally require a grounding of 2-4 weeks. Addition of new medications will require additional grounding. For aircrew, introduction of antihypertensive medications is recommended as follows.
- (1) **Thiazides** – Thiazide diuretics have the longest track-record as antihypertensive medications in aircrew and are recommended as initial treatment of hypertension in most aircrew. Once treatment is established, an operational flying restriction is not required. Based on recent data, which show limited efficacy of short acting thiazides such as hydrochlorothiazide, a long-acting thiazide such as chlorthalidone is recommended. Thiazides may induce undesirable metabolic adverse effects including hypokalemia, hyperuricemia, hyperlipidemia, and glucose intolerance. These potential adverse effects must be closely monitored. Extending thiazide dosage beyond 25 mg daily of chlorthalidone or equivalent is not recommended because it does not increase therapeutic efficacy, and may increase adverse effects.
 - (2) **ACE inhibitors/Angiotensin receptor blockers** – Angiotensin-converting enzyme inhibitors or angiotensin receptor blockers may be used as initial monotherapy for hypertension. With a vasodilator action, ACEi/ARBs may reduce G-tolerance, so if ACEi/ARBs are used in tactical fighter pilots (Hawk, F-18), they should be referred to CFEME/DRDC Toronto for G-tolerance assessment before returning to flying duties. With this caveat, ACEi/ARBs may be used in RCAF aircrew for the treatment of hypertension without requiring an operational flying restriction. Dual therapy with ACEi or ARB plus thiazide is also permitted without requiring a flying restriction.
 - (3) **Calcium channel blockers** – The Canadian Hypertension Society considers long-acting CCBs as a first line option in the treatment of hypertension. For aircrew, long acting dihydropyridine calcium channel blockers (e.g. amlodipine, felodipine, nifedipine) may be used alone or in combination therapy with a thiazide or ACE inhibitor without requiring an operational flying restriction. CCBs have not been evaluated for effects on G-tolerance, and because of their vasodilatory effect, they should not be used as first line agents in Harvard II, Hawk and CF18 pilots. Harvard II, Hawk or CF18 pilots treated with a CCB will require centrifuge evaluation at CFEME before returning to operational flying.

- (4) **Beta-blockers** – Beta-blockers may be indicated if clinical assessment suggests a significant adrenergic input to the hypertension. Because of their central beta- blocking effect and potential effect on performance, a beta-1 selective agent such as atenolol or acebutalol is preferred. Pilots treated with beta-blockers must be assigned an A3, restricted from solo tactical fighter and tactical helicopter operations

ANTI-MOTION SICKNESS DRUGS

39. Airsickness is common during training, but remits in most trainees as they become familiar with the flight environment. In some, symptoms persist and additional desensitization is required, through a formal airsickness rehabilitation program, which may include the use of antimotion sickness medications and temporary medical category. For aircrew in training including student pilots, Flight Surgeons may include short term use of anti-motion sickness medications (e.g. promethazine-dextroamphetamine) as part of the desensitization program.

40. Currently, no anti-motion sickness medications are considered safe enough for ongoing routine use by flight deck aircrew during flight duties. Some operational flying environments are particularly provocative (eg tactical Aurora back-end positions), and motion sickness may be a chronic problem requiring medication for non-flight deck aircrew.

41. Antihistamines such as dimenhydrinate (Gravol) have mild to moderate efficacy against motion sickness. They cause sedation and a performance decrement lasting several hours.

42. Transdermal scopolamine may produce significant side-effects including drowsiness and other CNS symptoms, and may cause visual problems with impairment of accommodation. Absorption of transdermal scopolamine is variable from person to person, and even in the same person under different conditions, so side-effects may be variable and unpredictable. It is not recommended for use in aircrew.

43. Promethazine is more efficacious than dimenhydrinate, but causes more significant and prolonged drowsiness and performance decrements. This can be prevented by the concurrent administration of dextroamphetamine 10mg (Special Authorization). Dextroamphetamine also has anti-motion sickness properties, so for most aircrew, the combination of promethazine 25mg orally plus dexamphetamine 10mg taken two hours before flight is efficacious without producing sedation during the flight.

44. For deployed Sea-King aircrew in whom sea-sickness is a problem, the use of dimenhydrinate or promethazine 25mg with or without amphetamine 10mg may also be used with an 8hour window to flight duty.

45. Non -flight deck aircrew other than SAR techs may use anti-motion sickness medications under the direct supervision of their Flight Surgeon after discussion with ASCS at 1 CAD Winnipeg.

ASTHMA

46. Asthma in general is not compatible with aircrew duties, and is generally disqualifying for aircrew selection per AMA 100-01.

47. Trained aircrew who develop asthmatic symptoms should have a thorough pulmonary review with a detailed history to assess causes of adult onset asthma including occupational factors, and pulmonary function tests before and after bronchodilator, airway challenge testing, and an exercise test if indicated. If it is determined that the degree of airway reactivity is mild, and can be well controlled with inhaled corticosteroids with minimal requirement for inhaled rescue beta-agonists, non-pilot aircrew may be retained on unrestricted flying status. Leukotriene inhibitors (eg Singulair) are also acceptable. Oral bronchodilators including theophyllines and beta-adrenergics are not permitted. Long-acting beta-agonist/inhaled steroid combination may be used in non-pilot aircrew.

48. Pilots with mild, well controlled asthma may continue to fly with an A3 restriction from tactical fighter operations (Hawk, CF18). Other aircrew with asthma well controlled with ICS or ICS/LABA combinations ± Singulair may be considered for unrestricted aircrew duties.

49. More severe asthma will generally requires grounding and accompanying significant MELs.

MEDICATIONS FOR FEMALE

50. **Aircrew Contraceptives** - In reviewing and selecting birth control options for female aircrew, in addition to the normal medical history and risk factors, Flight Surgeons and BAvMed Providers should additionally consider aircrew operational factors (e.g. the type of aircraft and operational mission). Do operations commonly cross many time zones making coordination of OCP dosing challenging? How significant is it if they become accidentally pregnant (e.g. are they preparing for a deployment or in the midst of a training program?), i.e. do they require a highly reliable birth control method? The contraceptive options for female aircrew are:

- a. **Oral contraceptives** – Female aircrew may use oral contraceptives without requiring an operational restriction. Aircrew should be grounded for seven days on initiation of medication, and for three days on a change of dosage or product. Note: Diane 35 should not be used for birth control. It is prescribed for severe acne and hirsutism, and has an increased risk for thrombosis;
- b. **Depo-Provera** – Although this product has a very important use and is highly effective, it is not considered a first line choice for female aircrew. Concerns include decreases in bone density with increased fracture risk, the product is very long lasting with a significant side effect profile including irregular heavy bleeding particularly in the first year, and there is a long time for reversibility making Planned Parenthood more difficult. It is not recommended for CF aircrew. Individual cases should be discussed with 1 CAD or CFEME prior to commencing;

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- c. **Evra** (contraceptive skin patch) – Because of concerns with respect to variable estrogen delivery, issues with falling off with sweating, swimming, friction from straps, this product is not considered a first line medication choice for female aircrew. It may be authorized with one week grounding on initiation if recommended by the medical provider and the member considers this their preferred option;
- d. **NuvaRing** – This vaginal estrogen-progesterone contraceptive ring is inserted once monthly and thus avoids the requirement for a daily pill. Side-effect profiles is similar aircrew especially those in positions that involve time zone or circadian shift changes, do not like to take/forget to take daily pills, and are comfortable with the physical insertion/removal of this type of product;
- e. **Intrauterine systems (IUS)/Mirena** – Unlike previous generation IUDs, Mirena is an IUS designed to have a slow release of levonorgestrel (progesterone analogue).It provides highly effective contraception for up to five years. Menstrual cramping and flow is decreased, with amenorrhea in most women after the first year. It is fully reversible with removal. This product is provided through the Drug Benefit list, and may be an excellent option for female aircrew. One week grounding is required after insertion, which should be carried out by a physician well experienced in IUD insertion; and,
- f. **Plan B** – If used within 72 hours after high-risk intercourse, there is a 75% success rate in preventing pregnancy. Prescription of Plan B should include a review of risk factors that led up to high-risk activity with appropriate counseling and risk mitigation. Prescription requires a 24 hour period of grounding.

51. **Hormone Replacement Therapy** - When clinically recommended or prescribed by an endocrinologist or OB/GYN, hormone replacement therapy is acceptable for female aircrew with seven day grounding on initiation of therapy.

52. **Uncomplicated Vaginal Candidiasis** - Oral fluconazole (Diflucan) as a single oral dose provides an effective treatment for vaginal candidiasis. A 24 hour period of non-aircrew duties is required

53. **Dysmenorrhea** - NSAIDs are authorized at normal therapeutic doses up to twice a day for up to 5 days for normal menstrual cramps without a requirement for grounding. Severe or escalating dysmenorrheal symptoms may impact on operational effectiveness and potentially on flight safety. Female aircrew with severe dysmenorrhea should be reviewed to ensure there is no underlying pathology, and to review other therapeutic options including OCPs or IUS such as Mirena.

TREATMENT OF DYSLIPIDEMIA IN AIRCREW

54. Updated guidelines for cardiovascular risk screening are promulgated as Flight Surgeon Guideline 600-01 Aircrew Cardiovascular Risk Screening and 900-01 Metabolic Syndrome and Diabetes in Aircrew and should be followed for aircrew.

55. Pharmacologic treatment should be initiated after a reasonable trial of diet and life-style modification. Health Canada guidelines for initiation of drug therapy should be followed for aircrew as for other CF personnel. The following approach is recommended for trained aircrew found to be dyslipidemic based on two or more lipid determinations:

- a. **Lifestyle Modification** - Diet remains the cornerstone of any treatment regimen. Referral (with the spouse if applicable) to a dietician is recommended. Dietary modifications should be reinforced by the Flight Surgeon over the first six months and lipid measurements repeated at two to three monthly intervals to determine the effect of the diet. Aircrew should be encouraged towards a regular exercise program – known to have a positive effect on lipid metabolism; and
- b. **Drug Treatment** - If medication is required for aircrew as per Health Canada guidelines, treatment with an HMG CoA reductase inhibitor (statin) is recommended. In situations where hypertriglyceridemia is the prevalent problem, a fibrate such as fenofibrate may be indicated and may be used in aircrew.

56. Aircrew should be grounded for the first week during the initiation of drug therapy for dyslipidemia. An Air Factor restriction is not required for statins, fenofibrates or ezetimibe.

- a. Ezetimibe (Ezetrol) inhibits cholesterol absorption and works synergistically with statins to reduce LDL cholesterol. Ezetimibe is generally well tolerated, with GI symptoms such as flatulence being the most common side-effect. Occasionally severe diarrhea, pancreatitis, myalgias may occur. A one week grounding is required on initiation.
- b. Niacin: A recent large trial failed to confirm efficacy in reducing cardiovascular events, and because of this, along with troublesome adverse effects, niacin is not recommended for dyslipidemia treatment in aircrew.

ANTI-DEPRESSANTS (see also Ref C)

57. Aircrew who present with symptoms of depression should receive appropriate clinical treatment. Psychiatric referral is indicated particularly if treatment with anti-depressants may be indicated.

58. Please note the current policy for SSRIs applies to treatment of depression only. The use of SSRIs for other indications such as severe PMS, anxiety or PTSD must be discussed on a case-by-case basis with the Med Consult Svcs at CFEME and/or the 1 Cdn Air Div Surg.

59. Based on side-effect profiles, clinical experience, and studies at DRDC Toronto, the approved medications for RCAF aircrew include bupropion, sertraline, citalopram and escitalopram. If required on clinical grounds, other SSRI/SNRI medications may be considered on a case-by-case basis.

60. The SSRI guideline (ref C) allows for aircrew other than pilots and AECs to return to unrestricted flying duties (but with geographic limitations) while taking certain specific SSRIs/SNRIs as early as six months after clinical resolution of depressive symptoms. Prior to return to flying duties, a detailed Aeromedical Summary must be submitted to the 1 Cdn Air Div Surg.

61. Pilots and AECs treated with SSRIs/SNRIs are assessed on a case-by-case basis for return flight duties. Prior to return to flying duties, pilots/AECs require referral to the CFEME Medical Consult Services at CFEME in Toronto to include neurocognitive testing, and review by the consultant aeromedical psychiatrist. Each case will be reviewed by the Aerospace and Undersea Medical Board, with recommendations provided to the Aerospace Medical Authority. Considerations include the specific type of operational duties, review and recommendations by the aeromedical psychiatrist and by the Aerospace and Undersea Medical Group at CFEME, and operational standards evaluations.

62. For aircrew being returned to flight duties while taking antidepressants, concurrent temporary geographic restriction limiting deployability (G4T6) is required – Requires specialist care at minimum of three monthly intervals; Unfit deployments exceeding 8 weeks. Flight Surgeons and BAvMed Providers managing aircrew with depressive illnesses should contact CFEME Med Consult Svcs early in the course of management to discuss potential return-to-flying strategy.

63. Aircrew with extended or recurrent depression may be clinically treated with long-term antidepressants. Such individuals require case-by-case consideration, but may be eligible for continuing aircrew duties if clinically stable, with a permanent MEL geographic restriction G3 – Requires specialist follow-up not more often than six monthly; requires enhanced predeployment screening.

THYROID

64. **Hyperthyroid** - Patients with hyperthyroidism must be grounded on diagnosis of hyperthyroidism. If thyroid suppression treatment with propylthiouracil or methimazole is undertaken, aircrew must remain grounded until a euthyroid state has been re-established. Aircrew other than pilot may be returned to flying duties under the close supervision of the Flight Surgeon, but require a geographic limitation from deployments greater than 8 weeks to allow appropriate follow-up. Pilots of tactical fighter and tactical helicopter aircraft must remain grounded during the full course of anti-thyroid suppression. I131 therapy may be preferred therapy. Aircrew must remain grounded during therapy and until clinically and biochemically euthyroid following treatment.

65. **Hypothyroid** - Patients may be returned to flying duties while using thyroid replacement hormones once a state of clinical and biochemical euthyroidism has been established (i.e. TSH normal, no signs or symptoms)

DIABETES

66. Detailed directions about the investigation and management of diabetes in aircrew are provided in Ref F. Life-style modification with weight reduction and exercise remain the cornerstone for the treatment of most diabetics. The 2014 CDA Guidelines highlight the importance of an individualized approach for control of diabetes. For most RCAF aircrew diabetics, the target A1C should be under 7.0%. Although regular periodic

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screening is a key element of the protocol for diabetes in aircrew, most aircrew who develop diabetes will not have evidence of target organ damage but their diabetes is a major risk factor for developing macro and microvascular disease. In treating aircrew with diabetes, hypoglycemia is a major therapeutic concern, and the pharmaceutical approach to the treatment of DM2 in aircrew is somewhat different than in non-aircrew.

67. The following table lists the medications for type II DM in RCAF aircrew with some specific caveats listed below. The medications are listed with increasing risk for hypoglycemia.

DRUG/ CLASS	Mechanism of Action	Risk for Hypoglycemia	Weight	Efficacy	Initial Grounding
Biguanides Metformin	Suppress gluconeogenesis	very low	neutral	++	14 days
TZDs Pioglitazone (Actos)	Increase insulin sensitivity	low	neutral	++	30 days
Incretins	Glucose- dependent increase in insulin release. Inhibit glucagon release	low			
Oral Incretins (sitagliptin-Januvia)	DPP-4 inhibitor	low	neutral	++	30 days
Injectable Incretins (liraglutide-Victoza)	GLP-1 receptor agonists	low	decrease	+++	45 days
Basal Insulins Detimir (Levemir) Glargine (Lantus)	Deliver long-acting basal insulin	moderately low	increase	+++	60 days
Sulfonylureas Glyburide (Diabeta) Gliclazide(Diamicron) Glimepiride(Amaryl)	Stimulate insulin release	moderate	increase	+++	90 days
Meglitinides Repaglinide	Stimulate insulin release	moderate	increase	+++	90 days

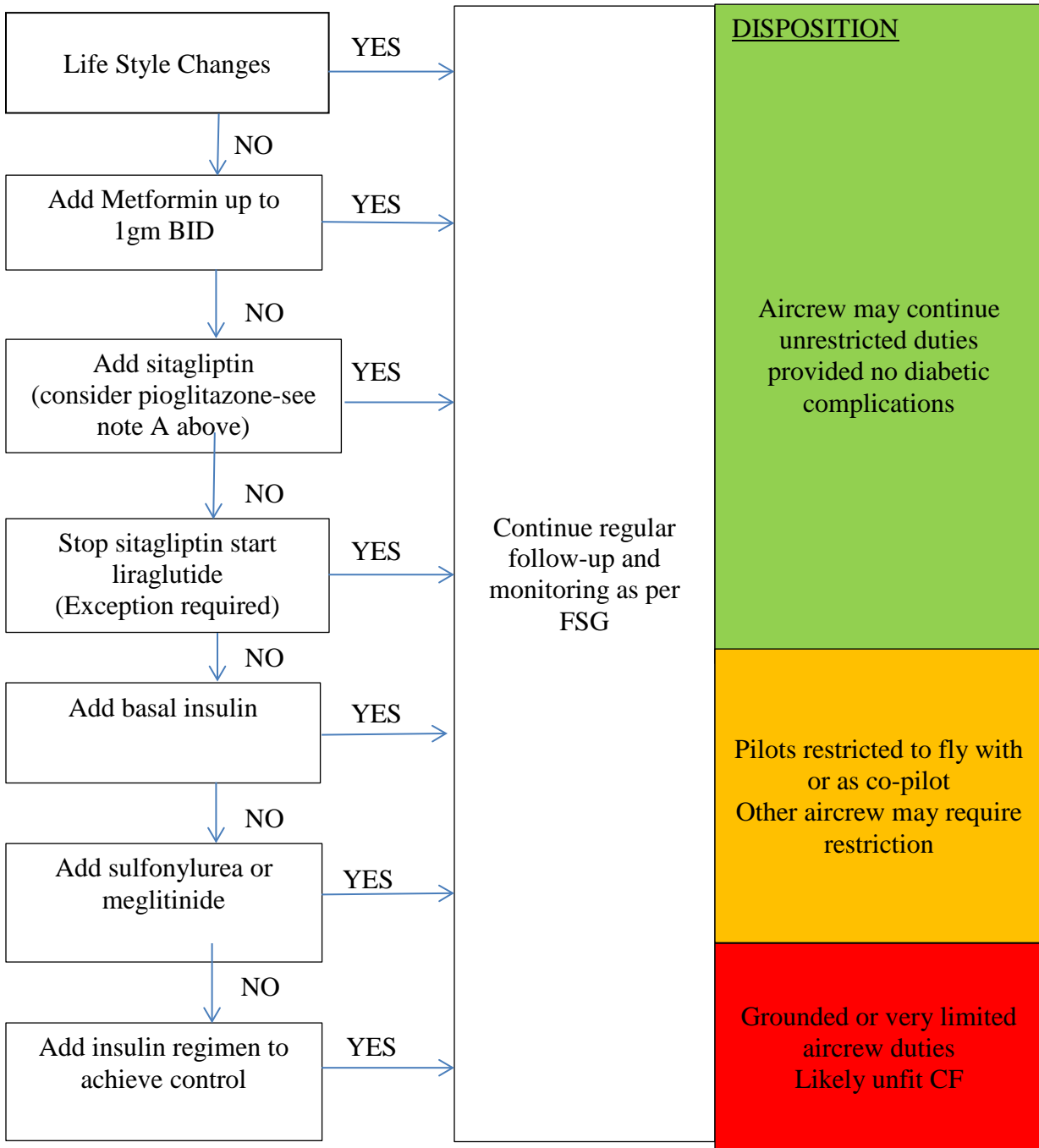
Notes:

- a. TZDs (pioglitazone) have concerning adverse effects including cardiac effects and bladder tumours, which have led to withdrawal of pioglitazone in France and specific FDA warnings. It is not recommended for RCAF aircrew as a first-line DM2 treatment.
- b. Incretins; Oral DPP4 inhibitors are less effective than GLP-1 agonists. Liraglutide is not on the CF Formulary, but can be requested through the Drug Exception Centre for individual aircrew (see protocol below).

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68. With these considerations in mind, the following protocol for DM2 medications for aircrew is recommended:

Target Hemoglobin A1C <7 % Achieved



MISCELLANEOUS

Hair Growth Stimulants

69. Products include:

- a. **Topical Minoxidil (Rogaine)** – Rogaine (minoxidil) is not supplied by the CF. Aircrew other than pilots may use Rogaine after a 7 day grounding period to ascertain any potential side-effects without a flying restriction. Pilots who obtain topical minoxidil require a 7 day grounding period with Flight Surgeon/BAvMed Provider review before returning to flight duties. Harvard II, Hawk and CF18 pilots require an operational flying evaluation with a standards officer to assess G- tolerance within the aircraft operational envelope; and,
- b. **Finasteride (Propecia)** – Finasteride is being promoted as another agent to regenerate hair growth and aircrew may approach the Flight Surgeon about its use. It is not supplied by the CF. Aircrew using this medication should initially be grounded for 7 days for observation. An Air Factor restriction is not required.

Steroids

70. In general, systemic corticosteroids are not compatible with flight duties for any aircrew. Inhaled and topical intranasal corticosteroids are acceptable without requiring an operational flying restriction.

71. Anabolic steroids (eg testosterone) prescribed for deficiency syndromes are acceptable for unrestricted flying duties. Anabolic steroid use for other than deficiency syndromes (e.g. body building) is not permitted in aircrew.

Accutane

72. Aircrew other than pilot may use isotretinoin without restriction after a 7 day initial period of grounding. During the period of treatment, pilots using isotretinoin must be given a temporary A3 category, restricted to fly with or as copilot. All aircrew using isotretinoin must remain under the close supervision of the Flight Surgeon in consultation with a dermatologist (temporary G4 required). Caution should be used in prescribing isotretinoin therapy for aircrew that use facemasks routinely while flying.

Imodium

73. Imodium may be used for mild diarrheal symptoms in transport aircrew. It should be used only when the symptoms are mild, and there is no fever or bloody stools.

Smoking Cessation Aids

74. Smoking cessation medications may be used by RCAF aircrew, within the guidelines of CF H Svcs Instruction 4200-55 Provision of Smoking Cessation Medications to Eligible CAF Personnel and DSG 03/10- Use of Zyban and Champix During Deployment

- a. **Nicotine replacement therapy**– Aircrew including pilots may use nicotine gum or transdermal nicotine patches as an aid to smoking cessation without requiring an operational flying restriction. Patches must be used under the guidance of a Flight Surgeon or BAvMed Provider. Aircrew should not fly for the first 2 days of initiating treatment and must be reviewed before returning to flying duties and at regular intervals to confirm that the individual has stopped smoking, and that there are no significant side-effects.
- b. **Zyban (bupropion)** – Zyban may be used as a smoking cessation aid by RCAF aircrew consistent with CF policy. Aircrew will be grounded for a minimum two week period during initiation of therapy. Because of potential neurocognitive side-effects and remote risk for a seizure, bupropion must be used with extreme caution and under close supervision in aircrew.

Non-pilot aircrew may be returned to flying duties after a two-week period of grounding, after being cleared by the Flight Surgeon (only). Pilots are restricted to fly with or as copilot during treatment.

For all aircrew taking Zyban weekly visits with the Flight Surgeon are required throughout treatment to monitor for side-effects and reinforce the smoking cessation objective. Medication should be supplied in weekly aliquots, and weekly visits documented in the CFHIS.

- c. **Champix (varenicline)** – In placebo controlled trials, varenicline has superior efficacy in promoting smoking cessation compared with placebo, nicotine replacement, and bupropion. The most common adverse effects are gastrointestinal, and sleep disturbance. Serious neuropsychiatric adverse effects have been reported in post-marketing surveillance including depression, suicide and personality changes, but it is not clear to what extent these reflect the effects of nicotine withdrawal per se. Serious AEs appear to be more common in individuals with previous psychiatric conditions.

Champix may be prescribed for aircrew with similar limitations as Zyban, criteria include:

- (1) Use under the supervision of a Flight Surgeon (only);
- (2) initial two week period of grounding;
- (3) re-assessment by the Flight Surgeon before return to flying;
- (4) weekly visits with the Flight Surgeon during treatment for review re AEs and prescription refill for another week; and
- (5) pilots are restricted to fly with or as co-pilot.

Glaucoma

75. Topical adrenergic agents, topical beta-blockers, and prostaglandin analogues (Xalatan) may be used without an Air Factor restriction after a 7 day grounding period.

Antifungal Drugs

76. Terbinafine (Lamasil), fluconazole (Diflucan), and itraconazole (Sporonox) may be used to treat fungal infections of the nails in aircrew. Pulsed dosage is the preferred regimen. GI upset is the most common side-effect. Aircrew should be grounded for 48 hours on the initiation of treatment (and each pulse)

Erectile Dysfunction

77. Pilots and other active duty aircrew using the PDE5 inhibitors sildenafil (Viagra) or vardenafil (Levitra) should be grounded for 48 hours after each use (partly because of concerns over effects on colour vision). The use of tadalafil (Cialis) with its longer-half-life (18 hrs) is not recommended in aircrew actively flying.

Gout Prophylaxis

78. Allopurinol is currently approved for prophylaxis of gout without requirement for an operational restriction. Allopurinol is indicated for prophylaxis after recurrent episodes of gout. Because of the risk of precipitating an episode of gout during initiation of allopurinol therapy (which should generally be done with colchicine coverage), aircrew must be grounded for the first 14 days of allopurinol therapy.

HSV Treatment and Suppression

79. For aircrew with frequently recurring herpes infections, long-term suppression or treatment of an acute outbreak by the administration of an oral cyclovir such as famciclovir or valacyclovir are acceptable for continuing aircrew duties.

Herbal Agents

80. Little is known about most complementary supplements and herbal preparations in terms of potential side-effects of aeromedical concern. The purity and potency of preparations varies widely. Flight Surgeons and BAvMed Providers should routinely inquire about herbal and supplement use during periodic aircrew medicals, and discuss the concerns about possible aeromedical side-effects. Flight Surgeons and BAvMed Providers may have to research information from Internet sources to provide feedback to aircrew about these concerns. A helpful review article on a range of herbal preparations is "Herbal Preparations: A Primer for the Aeromedical Physician", published in Aviation, Space and Environmental Medicine, 71 (1); pp. 45-60, January 2000.

81. COLD-FX™ is a patented extract from North American ginseng (panax quinquefolium) marketed by CV Technologies Inc. in Edmonton. In animal studies, it has been shown to modulate the immune response. Placebo-controlled clinical trials have shown a slight decrease in the number of colds contracted over periods up to four months (decrease of 0.25 cold/person), fewer cold symptoms, but no difference in duration. Ginseng may cause mild side effects including insomnia and GI upset. More serious side-effects that have been reported with ginseng (but not specifically COLD-FX™) include

Steven's-Johnson syndrome, mania, cerebral arteritis, and hypertension. COLD-FX™ is expensive, and is not included in the CF Drug Benefit List. If CF aircrew who choose to use COLD-FX™, a 7 day grounding period is recommended on initiation of self-administered treatment.

82. The following supplements/herbal preparations should NOT be used in aircrew on active flying duties:

- a. St-John's Wort;
- b. Ephedrine-containing compounds;
- c. Valerian; and/or
- d. Kava.

Benign Prostatic Hypertrophy

83. Medications may be recommended by urological consultants for aircrew who develop obstructive symptoms associated with benign prostatic hypertrophy.

- a. **5 alpha reductase inhibitors** – finasteride (Proscar) or dutasteride (Avodart). These block conversion of testosterone to dihydrotestosterone which is required for development and maintenance of BPH. As for Propecia, after an initial period of 7 days grounding during initiation of therapy, aircrew including pilots may be returned to unrestricted flying duties.

Alpha blockers –alfuzosin, doxazocin, tamulosin, and terazocin cause relaxation of smooth muscle tone in the bladder neck, capsule and prostate. Adverse effects may include dizziness, orthostatic hypertension and rarely, syncope. Aircrew must be grounded during the first two weeks of treatment with alpha blockers. If there are no adverse effects, non-pilot aircrew may be returned to usual duties. Pilots require a restriction to fly with or as copilot, unfit fast jets, while taking alpha blockers for BPH.

Operational Medications

84. The following medications may be required during hostile operations involving chemical warfare exposure. Aeromedical guidelines for their use are as follows:

- a. **Pyridostigmine** – may be used in time of a chemical warfare threat as a routine prophylactic countermeasure after tolerance pre-testing under the supervision of a Flight Surgeon, without an operational flying restriction;
- b. **Atropine (HI-6 injection)** – may be carried by aircrew for use only in the event of a suspected direct chemical warfare attack and only if actual symptoms are experienced in flight;
- c. **Diazepam, edrophonium and pralidoxime** will not be used in flight, and

- d. **Alertness Medications** - The RCAF Surgeon has approved the use of oral caffeine tablets (50mg Chewpods) for limited use in an operational trial (Op Impact) as an alertness medication for aircrew. Based on the results of the operational trial, oral caffeine tablets may be made available to RCAF aircrew, but at present use is limited to the operational trial. The use of modafanil and dextroamphetamine is not approved for CAF aircrew.

Disease Modifying Antirheumatic Drugs (DMARDs)

85. DMARDs include antimalarials (chloroquine), sulfasalazine, methotrexate and TNF alpha blockers. Increasingly, DMARDs are being clinically recommended for early disease suppression in rheumatoid arthritis, with a parallel application for plaque psoriasis.

86. These diseases are disqualifying for aircrew selection but sometimes manifest in trained aircrew. TNF alpha blockers including etanercept (Enbrel), adalimumab (Humira), infliximab (Remicade), and others, are available in the CAF Formulary as Exceptions. These potent medications are recombinant DNA-derived protein composed of TNF receptor linked to human IgG. They bind TNF and block the interaction with cell surface receptors. TNF alpha plays an important role in the inflammatory process associated with rheumatoid arthritis and plaque psoriasis.

87. TNF alpha drugs, while potent clinical tools for RA and plaque psoriasis, have a range of potential serious adverse effects including increased susceptibility to serious infections such as TB, bacterial sepsis, and invasive fungal infections; increased risk of malignancy including lymphomas and leukemia; systemic adverse effects including GI [diarrhea, nausea, elevated liver enzymes (10-20%)], respiratory [bronchitis, cough (10-15%)] CNS [headaches, dizziness (5-10%)], CV [hypertension (10%)]. Because of these significant adverse effects, patients on TNF alpha DMARDs require regular physician and specialist follow-up more often than six monthly (G4 or G5).

88. These drugs may be considered on a case-by-case basis for CAF aircrew after consultation with 1 CAD Surg/ASCS in Winnipeg and/or Medical Consult Services/CFEME in Toronto. Pilots will be restricted to fly with or as copilot. Other aircrew may be returned to flying/controlling duties. All will require the appropriate Geographic and Occupational MELs (G4 or G5).

DRUGS CURRENTLY APPROVED FOR USE WITHOUT REQUIRING AN OPERATIONAL FLYING RESTRICTION

89. There will be a requirement to ground aircrew for specified periods during the initial period of treatment for most of these medications. After return to flying duties, aircrew will require regular follow-up while taking these medications. If there are no problems in the follow-up period aircrew on these medications may fly unrestricted.

- a. INH for TB converters (grounding for 1 week on initiation of therapy, Flight Surgeon review before return to flying, G4 (T6) – Medication requiring regular laboratory and physician services no less often than 4-weekly;

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- b. Chlorthalidone for hypertension;
- c. ACE inhibitors/ARBs; (NOTE: Tactical fighter pilots require AUMS review);
- d. Allopurinol for hyperuricemia;
- e. Contraceptives; OCPs, IUS (Mirena), contraceptive patches;
- f. Tetracyclines/other antibiotics at low dosage for acne (NOT Minocycline);
- g. Sodium cromoglycate preparations – inhaled, or topical nasal or ophthalmic;
- h. Topical or inhaled steroid preparations;
- i. Antacids/sucralfate/Proton pump inhibitors;
- j. Topical drops for glaucoma;
- k. Hormone replacement therapy – thyroxine; testosterone;
- l. Antimalarial prophylaxis (ref E) (e.g. chloroquine; doxycycline, Malarone);
- m. Loratidine, fexofenadine, desloratidine;
- n. Nicotine replacement therapy for smoking cessation;
- o. Imodium;
- p. Lipid-lowering agents cholestyramine; ezetimibe; fluvastatin; pravastatin, simvastatin, atorvastatin, rosuvastatin, and fenofibrate (Lipidil Supra);
- q. acyclovir/famcyclovir/valacyclovir for recurrent HSV; and
- r. glucosamine.