

3.2 Medical Requirements Overview

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MRID# and Title:	Pre- and Postflight Physical Exams for Long Duration Crews
Sponsor:	Medical Operations
IPT:	N/A
Category:	Medical Requirements (MR)
References:	ISS Medical Operations Requirements Document (MORD), SSP 50260 Rev C: <ul style="list-style-type: none"> ▪ Section 5.0: Crewmember Medical Evaluation, Certification and Monitoring Medical Evaluation Documents (MED) Volume B Section 1: Clinical Assessment and Monitoring
Purpose/Objectives:	To assess the medical status and flight readiness of crewmembers for long-duration missions before flight and medical status after landing.
Measurement Parameters:	Vital signs, head/face, mouth, throat, ears, nose, eyes, chest, cardiovascular, abdomen, musculoskeletal, skin, and neurologic
Deliverables:	A preflight and postflight physical examination report will be included in the crewmember’s medical record and eventually to be archived in MMR
Flight Duration:	≥ 30 days
Number of Flights:	All long duration missions
Number and Type of Crew Members Required:	All ISS crewmembers (except spaceflight participants). Back-up crew will only complete preflight MATs greater than L-45 days unless specifically waived by crew surgeon. If crew swap does occur, back-up crew will complete all preflight MATs.
Other Flight Characteristics:	N/A

3.3 Preflight Training – N/A

3.4 Preflight Activities

TABLE 3.4: PREFLIGHT ACTIVITIES

Preflight Activity	Description:	A full (Annual Medical Exam (AME) L-6/9 m) and brief (L-7/10 & L-1/2 days) physical exam will be performed by the Flight Surgeon on the ISS crew. See Flight Surgeon Physical Exam Description on page 3.		
	Schedule:	Duration:	Schedule:	Flexibility:
		Full Exam: 60 minutes Brief Exam: 30 minutes	AME L-9/6 m L-7/10, L-1/2 days	N/A N/A
Ground Support Requirements	Hardware/Software	Preflight Hardware:	Preflight Software:	Test Location:
		General physical exam hardware and consumables	N/A	Agency specific or Kazakhstan
Testing Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:	Temperature Requirements:	Special Lighting:
	Standard physical exam room, 8' X 10'	1 required (4 desired) 110V for U.S. 220V for Russia	Normal	N/A
	Hot or Cold Running Water:	Privacy Requirements:	Vibration/Acoustic Isolation:	Other:
	Both are required	Private room and hallway (Neurologic), free from distraction	N/A	N/A
Constraints/Special Requirements:	N/A			
Launch Delay Requirements:	The Physical Exam will be repeated at the Crew Surgeon's discretion if launch is delayed.			
Notes:	N/A			
Data Delivery	Data/Report to Designated Recipients (Nominal/Contingency):			
		A preflight physical examination report will be included in the crewmember's medical record and eventually will be archived in MMR.		

Flight Surgeon Physical Exam Description:

Full (AME L-6/9 m, R+0, R+7/14, R+45/60 day (return to duty), also as clinically indicated):

- Vital signs: pulse and blood pressure recumbent, sitting, standing, body temperature, respiratory rate, height, and weight
- Head and face: nares/nasal mucosa, sinuses, maxillary and frontal
- Mouth and throat
- Ears: external meatus, tympanic membrane, and response to Valsalva
- Eyes: general appearance, extra-ocular movements, pupil reactivity, and ophthalmoscopic exam
- Neck: thyroid, vascular exam, motion
- Pulmonary/Chest and lungs: cardiovascular exam, including cardiac auscultation, carotid and venous upstrokes, and peripheral pulses
- Abdomen: auscultation, palpitation of major organs and herniations
- Rectum/anus: to include prostate exam for males, rectal vault and occult blood testing
- Genitourinary exam: appearance, general exam, and herniations
- Breast exam
- Pelvic exam/Pap smear: for female crewmember (may be performed by a gynecologist)
- Extremities: to include range-of-motion and general strength assessments on a 1-5 scale
- Spine: general appearance and mobility
- Skin: to include lymphatics and identifying body marks
- Neurologic: to include standard functional exam and gait exam (see appended test)

Brief, excludes rectal, genitourinary, breast, and pelvic. (L-7/10, L-1/2):

- Vital signs: pulse and blood pressure, body temperature, respiratory rate, height, and weight
- Ear, Nose, and Throat
- Chest and Lungs
- Abdominal
- Extremities/Spine
- Neurologic

3.5 In-Flight Activities – NO IN-FLIGHT ACTIVITIES

3.6 Postflight Activities

TABLE 3.6: POSTFLIGHT ACTIVITIES

Postflight Activity	Description:	A clinically directed physical exam R+0, R+3, R+7/14, R+45/60 day (return to duty), will be performed by the Flight Surgeon on the ISS crew. Also may be performed as clinically indicated. See Flight Surgeon Physical Exam Description on page 3.			
	Schedule:	Duration:	Schedule:	Flexibility:	Personnel Required:
		60 minutes (Full)	R+0, R+3, R+7/14, R+45/60 day (return to duty), also as clinically indicated.	N/A N/A	Flight Surgeon & crew Flight Surgeon & crew
Ground Support Requirements Hardware/Software	Postflight Hardware:	Postflight Software:		Test Location:	
	General physical exam hardware and consumables	N/A		Agency Specific	
Testing Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:	Temperature Requirements:	Special Lighting:	
	Standard physical exam room, 8' X 10'	4 110V for U.S. 220V for Russia	Normal room temperature	N/A	
	Hot or Cold Running Water:	Privacy Requirements:	Vibration/Acoustic Isolation:	Other:	
	Both are required	Private room, free from distraction	N/A	N/A	
Constraints/Special Requirements:	N/A				
Early Destow / Early Return:	N/A				
Notes:					
Data Delivery	Data/Report to Designated Recipients (Nominal/Contingency):				
	A postflight physical examination report will be included in the crewmember's medical record and eventually will be archived in MMR.				

3.7 Summary Schedule

TABLE 3.7: SUMMARY SCHEDULE

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	BLOOD VOLUME	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training – N/A						
Preflight						
Physical Exam	60 minutes (Full) 30 minutes (Brief)	AME L-6/9 m L-7/10, L-1/2 days	N/A N/A	N/A N/A	Attending FS and crewmember	N/A N/A
In-Flight – N/A						
Wheels-Stop – N/A						
Postflight						
Physical Exam	60 minutes (Full)	R+0, R+3, R+7/14, R+45/60 day (return to duty), also as clinically indicated.	N/A N/A	N/A N/A	Attending FS and crewmember	N/A
Postflight Debrief						
N/A						

MR009L Pre- and Postflight Physical Exam for Long Duration Crews

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NEUROLOGICAL FUNCTION RATING SCALE

NAME _____ DATE _____
LAUNCH REFERENCE (DAY/MISSION) _____ TIME _____

- I. Neurological Signs and Symptoms (circle all appropriate).
- 1. Headache
 - 1 = None
 - 2 = Mild
 - 3 = Moderate
 - 4 = Persistent
 - 2. Dizziness/Vauntiness
 - 1 = None
 - 2 = Mild, Occasional (does not interfere with activity)
 - 3 = Moderate, Frequent (interferes with some activity)
 - 4 = Severe, Persistent (interferes with most activity)

- 3. Vertigo/Spinning
 - 1 = None
 - 2 = Mild, Occasional (does not interfere with activity)
 - 3 = Moderate, Frequent (interferes with some activity)
 - 4 = Severe, Persistent (interferes with most activity)

- II. Motor Performance
- 4. Gaze/Ocular Movements
 - 1 = Normal
 - 2 = Mild Nystagmus: Quickly remits in one direction
 - 3 = Moderate Nystagmus: Quickly remits in more than one direction
 - 4 = Severe Nystagmus: Sustained in any one direction
 - 5. Finger to nose (close eyes, touch nose, open eyes, touch finger)
 - 1 = Normal
 - 2 = Touches nose 1st attempt, misses finger 1st attempt
 - 3 = Misses nose, touches finger 1st attempt
 - 4 = Misses nose, misses finger 1st attempt
 - 6. Drift (close eyes, extend arms, palms up)
 - 1 = Normal
 - 2 = Mild: One arm slight drift
 - 3 = Moderate: Two arms slight drift
 - 4 = Severe: Large drift of either arm

DTR	Right	Left
Biceps (C5)		
Triceps (C7, 8)		
Knee (L4, 5)		
Heel (S1)		

- 0 = Absent
- 1 = Diminished
- 2 = Normal, Brisk
- 3 = Hyperactive, Exaggerated
- 4 = Clonus

- III. Gait and Station
- 7. Rising from chair / without use of arms
 - 1 = Normal
 - 2 = Slow
 - 3 = Tends to fall back, uses arms
 - 4 = Uses arms to stand
 - 8. Standing/Rosenberg (feet together, arms extended, close eyes) 30 seconds
 - 1 = Normal
 - 2 = Sway noted
 - 3 = Catches self with leg extension
 - 4 = Unable to perform with eyes closed
 - 9. Leg lift - Hop (close eyes, lift leg, hop 3 times, alternate)
 - 1 = Normal
 - 2 = Hops with eyes open
 - 3 = Cannot stand on one foot with eyes closed
 - 4 = Cannot perform
 - 10. Tandem/Heel to toe walk (5 meters)
 - 1 = Normal
 - 2 = Performs with arms extended (sense of falling)
 - 3 = Stops/leans to one side but recovers
 - 4 = Cannot perform
 - 11. Dynamic equilibrium (close eyes walk 9m turn 180 and return)
 - 1 = Normal
 - 2 = Walks straight, performs turn with difficulty
 - 3 = Walks straight, cannot perform turn
 - 4 = Cannot walk straight

Total _____
 11 - 13 Normal
 14 - 15 Suspect
 > 15 Consider referral to neurovestibular lab for posturography, gaze, and locomotion tests.

Signature _____