

3.2 Medical Requirements Overview**TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW**

MRID# and Title:	MR009S Pre- and Postflight Physical Exam for Short Duration Crews
Sponsor:	Medical Operations
IPT:	N/A
Category:	Medical Requirements (MR)
References:	Medical Operations Requirements Document (MORD) for Space Shuttle, JSC 13956 Rev G Section 2.1.2, Preflight Medical Evaluation Section 2.1.3, Postflight Medical Evaluation Astronaut Medical Evaluation Requirements Document (AMERD), JSC 23834 Section II, Paragraph 2.7.2: Space Flight Medical Certification Appendix A, Section III: Medical Standards/Procedures, Paragraph 3.14, Full Flight Surgeon Physical Examination Appendix B, Section IV: Pre- and Postflight Medical Evaluation Requirements for Short Duration Flights (less than 30 days) Appendix B, Table B2: Pre- and Postflight Medical Evaluation Requirements for Short Duration Flight
Purpose/Objectives:	To assess the pre- and postflight medical status of short duration crewmembers
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 CMIS
Flight Duration:	< 30 days
Number of Flights:	All Shuttle Flights
Number and Type of Crew Members Required:	All prime Shuttle crewmembers
Other Flight Characteristics:	N/A

3.3 Preflight Training – No Preflight Training

3.4 Preflight Activities

TABLE 3.4: PREFLIGHT ACTIVITIES

Preflight Activity	Description:	A full (L-10 days) and brief (L-2 days) physical exam will be performed by the Flight Surgeon on the Shuttle crew. See Flight Surgeon Physical Exam Description on page 3.		
	Schedule:	Duration:	Schedule:	Flexibility:
		Full: 60 minutes Brief: 30 minutes	L-10 days L-2 days	N/A N/A
Ground Support Requirements Hardware/Software	Preflight Hardware:	Preflight Software:	Test Location:	
	Physical exam hardware and consumables	N/A	U.S.	
Testing Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:	Temperature Requirements:	Special Lighting:
	Standard physical exam room, approx. 8' X 10'	1 required (4 desired) 110V	Normal range	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:	If more than 20 days have elapsed between L-10 and L-2 tests, a portion of the L-10 exam may be repeated			
Launch Delay Requirements:	The exam may be repeated, at the Crew Surgeon's discretion, if the 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 CMIS.		

Flight Surgeon Physical Exam Description:

Full Exam (L-10 days, R+3*, and R+7* days):

- 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
- Chest and lungs: cardiovascular exam, including cardiac auscultation, carotid and venous upstrokes, and peripheral pulses
- Abdomen: auscultation, palpitation of major organs and herniations
- 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 and gait exam (see appended test)

* If mission duration ≤ 20 days, then perform R+0 (brief) and R+3 (full). If duration is 21-30 days, then perform R+0 (brief), R+3 (brief), and R+7 (Full).

Brief Exam:

Preflight (L-2 days):

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

Postflight (R+0, R+3*):

- Vital signs
- Chest and Lungs
- Neurologic

3.5 In-Flight Activities – No In-Flight Activities

3.6 Postflight Activities

TABLE 3.6: POSTFLIGHT ACTIVITIES

Postflight Activity	Description:	2 to 3 physical exams will be performed postflight (R+0, R+3, and R+7 if necessary). See Constraints this page.			
	Schedule:	Brief exams for postflight focus primarily on Chest & Lung and Neurologic. See Descriptions on p. 3.			
		Duration:	Schedule:	Flexibility:	Personnel Required:
	Flight duration ≤ 20 days: Brief: 30 min. / Full: 60 min.	R+0d (brief), R+3d (full)	N/A	Flight Surgeon and Crewmember	
	Flight duration is 21 -30 days: Brief: 30 min. / Full: 60 min.	R+0d (brief), R+3d (brief), R+7d (full)	N/A	Flight Surgeon and Crewmember	
Ground Support Requirements Hardware/Software	Postflight Hardware:	Postflight Software:		Test Location:	
	General physical exam hardware and consumables	N/A		U.S./NASA Clinic	
Testing Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:	Temperature Requirements:	Special Lighting:	
	Standard physical exam room, approx. 8' X 10'	4	Normal	Ambient	
	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:	If flight duration ≤ 20 days, then physical exam on R+0 (brief) and R+3 (full). If flight duration is 21- 30 days, then physical exam on R+0 (brief), R+3 (brief), and R+7 (full).				
Early Destow / Early Return:	N/A				
Notes:	N/A				
Data Delivery	Data/Report to Designated Recipients (Nominal/Contingency):				
	A postflight physical exam report will be included in the crewmember's medical record and later archived into CMIS.				

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	Full exam: 60 min. Brief exam: 30 min	L-10d L-2d	N/A N/A	N/A N/A	Flight Surgeon and crewmember Flight Surgeon and crewmember	None
In-Flight – N/A						
Postflight						
Physical Exam	Flight duration ≤ 20 days: Brief: 30 min. / Full: 60 min.	R+0d (brief), R+3d (full)	N/A	N/A	Flight Surgeon and crewmember	See Duration description, this page.
	Flight duration is 21 -30 days: Brief: 30 min. / Full: 60 min.	R+0d (brief), R+3d (brief), R+7d (full)	N/A	N/A	Flight Surgeon and crewmember	
Postflight Debrief-N/A						

MR009S Pre- and Postflight Physical Exam for Short Duration Crews

MR009S
MSD-MO-045

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NEUROLOGICAL FUNCTION RATING SCALE

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

I. Neurological Signs and Symptoms (circle all appropriate).

- | | | |
|---|---|--|
| <p>1. Headache</p> <p>1 = None
2 = Resolved
3 = Intermittent
4 = Persistent</p> | <p>2. Dizziness/Faintness</p> <p>1 = None
2 = Mild; Occasional (does not interfere with activity)
3 = Moderate; Frequent (interferes with some activity)
4 = Severe; Persistent (interferes with most activity)</p> | <p>3. Vertigo/Spinning</p> <p>1 = None
2 = Mild; Occasional (does not interfere with activity)
3 = Moderate; Frequent (interferes with some activity)
4 = Severe; Persistent (interferes with most activity)</p> |
|---|---|--|

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 (C5, 6)		
Knee (L3, 4)		
Heel (S1)		

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/Romberg (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 close
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 = Slips/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

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

Total _____

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

Signature _____