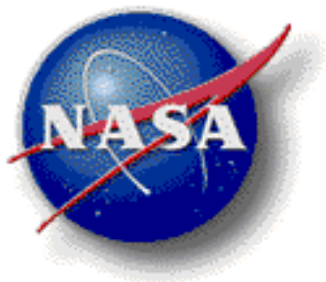


# Flight Crew Health Stabilization Program

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Revision E  
March 2017

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National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas

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**FLIGHT CREW HEALTH STABILIZATION PROGRAM**

March 2017


Approved by:



7/20/17

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Date



20 July 2017

Terrance Taddeo, M.D.  
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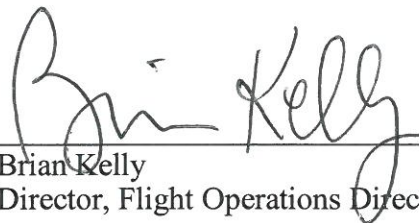
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## FLIGHT CREW HEALTH STABILIZATION PROGRAM

March 2017

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## REVIEW AND CHANGE PROCESS

The Flight Operations Directorate (FOD) Vehicle Integration & Test Office (VITO) coordinates reviews of this document every 2 years or as needed, in accordance with JSC quality management system practices. The next planned review is following the completion of commercial crewed test flights.

### Document Change Record

Revision	Date	Originator / Phone	Description
JSC 11852	Feb 1987	Richard Jennings	Shuttle Health Stabilization Program for the Orbital Flight Test
JSC 22538	Mar 1988	Karen Mathis	Health Stabilization Program for the Space Transportation System
Rev. B	Feb 1993	Karen Mathis	Health Stabilization Program for the Space Shuttle Program
Rev. C	Mar 2005	Christina Stevens/46142	Flight Crew Health Stabilization Program
Rev. D	Feb 2010	Christina Stevens/46142	Flight Crew Health Stabilization Program Rev. D includes additional sections on Influenza, Occurrence and Variances, Roles and Responsibilities, Temporary PC clearance, Aircraft flight crew clearance and educational briefing content.
Rev. E	Nov 2016	James Pattarini/46843	Flight Crew Health Stabilization Program Rev. E reflects updates to site responsibility descriptive language for return to U.S. Crewed Vehicle support at KSC with CCP integration, and updates stabilization plan contact group designations and quarantine guidelines to align with MMOP approved SSP 50480-ANX1

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## 1.0 PURPOSE

This document establishes requirements for the United States (U.S.) Human Space Flight Program relating to the Health Stabilization Program (HSP) for all NASA crewed space flight vehicle launches from the U.S. The HSP constitutes the U.S. implementation of internationally approved health stabilization guidelines for the prevention of infectious disease specified in SSP 50480-ANX1.

## 2.0 SCOPE

This document establishes the policy and procedures for the NASA HSP and is authorized through the Director, Johnson Space Center (JSC). This document delineates the medical operations requirements for the HSP. The HSP goals are accomplished through an awareness campaign and procedures such as limiting access to prime and backup crews, medical screening and vaccinations, and controlling prime and backup crewmember activities.

The medical operations requirements baselined in this document are applicable to all NASA crewed space flight vehicles launched in the U.S. for NASA missions or involving NASA resources, encompassing all International Space Station (ISS) Crewmembers, ISS visitors, and personnel whose activities involve direct interaction with the launching of Crewmembers or ISS visitors.

## 3.0 AUTHORITY DOCUMENTS

NASA Policy Directive (NPD) 8900.1, Medical Operations Responsibilities in Support of Human Space Flight Programs; NPD 8900.3, Astronaut Medical and Dental Observation Study and Care Program; and NASA Procedural Requirement (NPR) 1800.1, NASA Occupational Health Program Procedure, authorize the specific provision of medical service.

## 4.0 APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. These documents are applicable to the extent specified within this document.

- a. JSC <TBD 4-1>, Commercial Crew Pre-Launch and Post-Landing Food Service Operational Procedures
- b. SSP 50480-ANX1, Guidelines and Procedures for the Prevention of Infectious Disease Transmission to ISS Crewmembers
- c. <TBD 4-2> Facility Cleanliness Requirements
- d. <TBD 4-3> Quarantine Facility Cleanliness Requirements

## 5.0 REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document. These reference documents may or may not be specifically cited within this document.

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- a. JSC 65994 Commercial Medical Operations Requirements Document (CMORD)
- b. NPD 8900.1 Medical Operations Responsibilities in Support of Human Space Flight Programs
- c. NPD 8900.3 Astronaut Medical and Dental Observation Study and Care Program
- d. NPR 1800.1 NASA Occupational Health Program Procedures
- e. SSP 50260, International Space Station Medical Operations Requirements Document
- f. SSP 50667 Medical Evaluation Documents (MED) Volumes A and B
- g. SN-C-0005 Contamination Control Requirements (Space Shuttle)

## 5.1 RUSSIAN REFERENCE DOCUMENTS

- a. Regulations on Space Mission Pre-Launch and Post-Flight Sanitary, Hygienic and Anti-epidemic Support, 2001
- b. Guide for Medical Support of Manned Space Flights
- c. Cosmonaut Healthcare Methodologic Instruction
- d. Regulations for Cosmonaut Training Center's Operational Group at the Cosmodrome

## 6.0 HSP IMPLEMENTATION FOR U.S. LAUNCHES

NASA's Human Space Flight Program uses strategic risk mitigation to achieve mission success while protecting crew health and safety. Infectious diseases can compromise crew health and mission success, especially in the immediate preflight period. The primary purpose of the Flight Crew HSP is to mitigate the risk of occurrence of infectious disease among astronaut prime and backup crews in the immediate preflight period (14 days prior to launch). Infectious diseases are contracted through direct person-to-person contact, and through contact with infectious material in the environment. The HSP establishes several controls to minimize crew exposure to infectious agents and maintain immune status. The HSP provides a quarantine environment for the crew that minimizes contact with potentially infectious material. The HSP also limits the number of individuals who come in close contact with the crew. The transmission of some infectious diseases can be greatly curtailed by vaccinations. Members of the Operational Group (OG) who will have close contact with crew are required to maintain updated vaccinations. The infection-carrying potential of these primary contacts (PC) is further minimized by educating them in ways to avoid infections and avoiding contact with the crew if they are or may be sick, supplemented by medical screening and personal protective equipment (PPE) when indicated.

- A. The medical operations requirements baselined in this document are applicable to crewed space flight vehicles launched in the U.S. for NASA missions and/or involving ISS or other NASA-crewed orbital resources.
- B. Biomedical data on crewmembers becomes a protected part of their individual medical record. Provisions of the Privacy Act of 1974 as amended regarding control of records, information exchange, and release of prime and backup crewmembers' health information to the public are strictly followed.



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- C. Success of the HSP relies on the commitment and engagement of every team member. Deviations from these requirements, process escapes, and incidents of infectious disease symptoms among the OG during the quarantine period all contribute to increased risk to crew health and safety, and to mission success. Waivers may be granted for acceptable levels of risk, and will be processed by FOD, Human Health and Performance (HH&P), and affected NASA Program management per procedures outlined in 6.4.9 Reporting of Occurrences and Variances.

The HSP minimizes crew contact with infectious agents in the Launch minus (L-) 14 days period by:

1. Defining quarantine environments where the presence of airborne, surface, water and food infectious contaminants are minimized through careful environmental and quality assurance controls.
2. Minimizing the number of individuals allowed close contact with crewmembers during the immediate preflight period.
3. Defining requirements and responsibilities for individuals allowed close contact with crewmembers during the immediate preflight period.
4. Providing mechanisms to prohibit individuals suspected of having an infectious condition from close contact with crewmembers.

## 6.1 HSP DORMANCY AND REACTIVATION

The HSP is nominally in continuous effect while U.S. launches are occurring on a regular basis. The HSP will enter dormancy after a successful launch if no U.S. launches are planned within 12 months. The HSP will be reactivated from dormancy no later than 6 months prior to the first scheduled launch.

## 6.2 PRIMARY CONTACT GROUP DEFINITIONS

Any individual who requires access to dedicated quarantine facilities during the crew quarantine period (L-14 days) is identified as a PC. The objective is to limit the number of individuals permitted close contact with the crew, while ensuring that crewmembers' training and personal needs are met. FOD authorizes PC status based on the prime crew's need for direct contact with the personnel in question. Individuals without PC status are not permitted in quarantine facilities during the quarantine period. FOD and the mission-assigned physicians have the authority to revoke PC status at any time to protect the health of the crewmembers. Any PC who becomes ill shall refrain from contact with quarantined crewmembers, shall refrain from entering the crew vehicle or crew quarters, and inform their designated representative, detailed below. All PCs shall be readily visually identifiable, either by badging or similar means within L-14 days. All PCs shall be educated about their role and responsibilities with the HSP. The type and duration of contact dictates what is required of PCs. The following are specific requirements for each category of

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PC.

A. OPERATIONAL GROUP (OG)

The OG is comprised of all individuals required to have direct access to the Crew in support of launch activities within L-14 days (examples include agency-approved personal contacts, technical and medical support personnel, and management necessary for this purpose). All members of the OG shall be identified by the sponsoring parties and the list of primary and alternate members made available to NASA for review by L-45 days. All OG personnel are required to comply with the following procedures:

OG personnel are limited in their choice of work and leisure locations and activities, and do not engage in public tourist activities until released from PC status (see 6.6.4 OG Prevention Measures for details). The OG shall be comprised of the smallest number of individuals required to safely complete training and direct crew support activities prior to launch (within L-14 days).

The OG may include members of the contact groups below.

B. CREW FAMILY/PERSONAL CONTACTS

May include significant others, children, parents, or siblings. Immediate family (spouse or significant others, children 12 years and older) may be included as part of OG if they satisfy criteria outlined further in this document. Children under 12 years of age must meet additional requirements outlined in this document (Refer to 6.6.3 Family/Personal Contacts Prevention Measures and 6.7 Travel Timeline for PCs). Personal contacts are present within L-14 days for Behavioral Health and Performance (BHP) support and are approved by the sponsoring agency.

C. SPECIAL GUESTS/VIPS

Include extended family members and friends attending the launch that are not included in Personal Contacts above and are not members of the OG. Special Guests and Very Important Person (VIP)s are not restricted in terms of accommodation or mobility, and must meet strict criteria for interaction with Crewmembers as a result (Refer to 6.6.5 Special Guests and VIP Prevention Measures).

D. FLIGHT CREW/ FLIGHT SUPPORT PERSONNEL

Astronauts and their families may come into contact with aircrew from the Aircraft Operations Division of JSC or with contractor aircrew who transport them to John F. Kennedy Space Center (KSC). Aircrew contact with prime and backup crewmembers is limited to sharing the aircraft cabin during the journey, which creates a low risk for transmission of infectious diseases. Aircrew must be free of physical signs/symptoms of infectious diseases. NASA

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reserves the right to forbid any aircrew from transporting quarantined prime or backup crewmembers or their families if there is any indication that the individual may harbor an infectious disease.

Aircrew must attest to their state of health, and acknowledge responsibilities for preventing the transmission of infectious diseases while the crewmembers or their families are on board the aircraft. (Refer to Appendix A-1 Verification of Flight Crew Compliance with HSP Requirements).

Flight support personnel, such as ramp workers, maintenance personnel, flight schedulers, etc., shall stay a minimum of 1.5 meters from quarantined prime and backup crewmembers and their families at all time. These individuals do not require PC authorization. Refer to 6.6 Group Specific Measures for Prevention of Infectious Disease (ID).

#### E. STAFF WITH ACCESS TO CREW QUARTERS OR CREW VEHICLE, WITHOUT CREW CONTACT

Staff who require access to crew quarters, crew vehicle, or areas to be occupied by quarantined crew shall take steps to minimize the risk of disease transmission (Refer to 6.6.6 Prevention Measures among Staff with Access to Crew Quarters or Crew Vehicle, Without Crew Contact). These actions are required despite not being designated PCs due to the risk of indirect contact transmission.

### 6.3 INFECTIOUS DISEASE CONTROL TEAM

It is recognized that there will be an evolution of launch facilities over the lifetime of the ISS and other future programs, which may include commercial facilities in the U.S. or elsewhere in addition to KSC launch facility. To maintain a degree of uniformity of infectious disease containment protocol across launch sites, oversight of infectious disease control at each site will be implemented through the Infectious Disease Control Team (IDCT) in accordance with this document, which aligns with guidelines established for ISS operations and captured within SSP 50480-ANX1.

The IDCT shall be comprised of the following representatives:

- A. IDCT Designated Lead (DL-IDCT)
- B. Crew Surgeon, Deputy Crew Surgeon, International Partner (IP) Crew Surgeon (as applicable), Commercial Provider Crew Surgeon (as applicable)
- C. Launch Facility Medical Representative
- D. BHP Representative
- E. Infectious Disease (ID) subject matter expert(s) (SME)/consultant(s)
- F. Launch Facility Representative

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- G. Quarantine Facility Representative (If not DL-IDCT)
- H. Operational Group Lead
- I. Commercial Provider OG Representative (as applicable)
- J. International Partner OG Representative (as applicable)

For NASA crewed launches from the U.S., the Designated Lead (DL) of the IDCT will be a NASA designated physician or similar with experience in epidemiology, preventive medicine, or infectious disease control. The DL-IDCT shall be designated by NASA prior to L-90 days.

The DL-IDCT shall be assisted by a team comprised of those listed above, with duties and roles as outlined below.

## **6.4 ROLES AND RESPONSIBILITIES**

### **6.4.1 IDCT DUTIES, ROLES AND RESPONSIBILITIES IN INFECTIOUS DISEASE PREVENTION**

Duties specific to the prevention of infectious disease for members of the IDCT are itemized below.

#### **A. DESIGNATED LEAD OF ID CONTROL TEAM (DL-IDCT)**

The DL-IDCT has the responsibility for facilitating the awareness and educational components of the program. Responsibilities include:

1. Oversight of and responsibility for implementation of these requirements in the pre-launch phase.
2. Receive names of personnel requiring PC status from FOD, IPs, Commercial Providers, OG Lead, and Facility Managers.
3. Create a PC Master List of individuals requiring PC status.
4. Annually review the PC Master List with the Astronaut Office.
5. Review the list of mission-specific PC names with the Astronaut Office prior to each mission.

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6. Provide annual and mission-specific PC HSP training briefings, and record attendance.
7. Record PCs completion of training, and provide this information to FOD
8. Coordinate availability of seasonal influenza vaccine for PCs with the JSC Clinical Services Branch and KSC Occupational Medicine Clinic.
9. Record verification of seasonal influenza vaccination of PCs and communicate this information to FOD.
10. At L-90 days, the DL-IDCT will begin working with the crew training manager and the Vehicle Integration Test Team lead to determine which groups and facilities the crew will work in the weeks leading up to launch. Education and awareness efforts will be targeted towards these groups and facilities.
11. Serve as an interface for program efforts and as the initial contact point for questions and concerns.
12. Provide support for educational briefings provided by the Crew Surgeon to the crew, their families, and necessary employee groups.
13. Coordinate and/or provide annual training as described in this document.
14. Attend the Initial and Final Medical Operations Readiness Reviews prior to each launch to report on HSP activities.
15. Prepare and submit a post-mission HSP report, including:
  - a. Occurrences of illness and illness exposures among PCs during quarantine.
  - b. Influenza vaccination among PCs for missions launching during influenza season.
16. Interface with BHP advisors regarding behavioral health aspects of ID control activities for launching Crewmembers.
17. Arranging for and implementation of medical screening of contacts and issuing clearances for Crewmember contact with Launch Facility Medical Providers. DL-IDCT will consult with the Team regarding visitation approval in off-nominal situations on a case-by-case basis.
18. Control over medical safety of organized food and water supply, conditions of accommodations, environmental services, work and rest for Crewmembers and OG members residing at Astronaut Quarantine Facility (AQF).
19. DL-IDCT is an ad-hoc member of the Integrated Medical Group (IMG) and is accountable to the Multilateral Medical Operations Panel (MMOP) through IMG for implementation of these requirements for ISS missions.

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20. Generate a report to the Space Medicine Operations Team (SMOT) and MMOP (for ISS missions), summarizing the results of any investigative effort(s) to identify the human, system, and environmental factors that led to the infection.
21. Review and recommend updates to this document.

**B. CREW SURGEON, DEPUTY CREW SURGEON, AND INTERNATIONAL PARTNER/COMMERCIAL PROVIDER CREW SURGEONS**

The Surgeons assigned to Crew support have the following responsibilities:

1. Support the DL-IDCT as required.
2. Responsible to the DL-IDCT for ID matters regarding their Crewmember(s)' interface with agency approved contacts.
3. Interface with DL-IDCT to manage ID control for their Crewmember(s).
4. Oversee ID control issues with respect to personnel visiting their Crewmember(s); in off-nominal circumstances, the Crew Surgeon may be required to provide a written medical conclusion to support the final judgment of the IDCT for issuance of clearance for visitors from the Agency represented by that Crew Surgeon, including children.
5. All medical providers have the authority to revoke PC status based on exam or history findings and clinical judgment. Any changes in PC status shall be communicated to the DL-IDCT, Launch Facility Medical Representative, OG Lead, and all mission-assigned Crew Surgeons.
6. Assist the DL-IDCT and the Crew Family Support personnel in communicating PC responsibilities to the families of the Prime Crew. This should occur no later than the L-45 days Spouse (or Significant Other) Briefing.
7. Maintain self-isolation and quarantine by adherence to OG guidelines contained within this document; Prime Crew Surgeons are expected to perform their crew support duties within quarantine. Deputy Crew Surgeons are expected to maintain isolation so as to be able to enter quarantine if the need arises
8. Review of effectiveness of infection control procedures and consistency of implementation related to crew interactions. For ISS missions, this shall be included in each Increment Crew Surgeon Report to the MMOP.

**C. LAUNCH FACILITY MEDICAL REPRESENTATIVE**

1. Interface with DL-IDCT and other IDCT members for OG status updates
2. Participate in OG screening exams (in coordination with other Launch Facility Medical Providers)

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3. Track OG members cleared via post-72 hour observation OR using PPE only; clearance approval shall be communicated to the DL-IDCT, OG Lead, and mission-assigned Crew Surgeons.
4. Report departures from OG isolation criteria to the DL-IDCT and mission-assigned Crew Surgeons.
5. All medical providers shall have the power to revoke PC status based on history or exam findings.
6. If OG member PC status is changed, status updates shall be communicated to the DL-IDCT, OG Lead, and mission-assigned Crew Surgeons.

#### D. BEHAVIORAL HEALTH AND PERFORMANCE ADVISOR

1. Provide input to the IDCT as needed regarding the behavioral health aspects of implementation of these Guidelines within L-14 days.
2. Advise Crew Surgeon(s), Deputy Crew Surgeon(s), IP Flight Surgeons, and Commercial Provider Surgeon(s) regarding BHP issues related to ID control.

#### E. LAUNCH FACILITY REPRESENTATIVE

1. Provide DL-IDCT with comprehensive PC personnel list plus alternates no later than L-45 days
2. Provide confirmation of HSP ID prevention strategy education to launch facility personnel requiring access to crew vehicle (not designated PCs)
3. Interface with and inform DL-IDCT and mission-assigned physicians re: self-reporting personnel with ID symptoms
4. Ensure PPE use is being observed within L-14 days for personnel contact with crew vehicle.

#### F. QUARANTINE FACILITY REPRESENTATIVE

The Quarantine Facility Representative may be fulfilled by the same individual as the Quarantine Facility Manager role, or it may be a separate individual. Both approaches are acceptable.

1. Provide DL-IDCT with comprehensive facility PC personnel list no later than L-45 days
2. Provide confirmation of NASA facility PC member HSP ID prevention strategy training completion (and alternates) by L-21 days.
3. Provide NASA facility PC member medical questionnaires and proof of vaccination status by L-21 days.
4. Advise IDCT with respect to operational implications of visitation with Crewmembers

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5. Provide oversight of facility management for crew visitation with personal contacts.
6. Interface with and inform DL-IDCT and mission-assigned physicians re: potential PC exposures or suspected breaks in isolation.
7. Ensure Astronaut Crew Quarters (ACQ) is appropriately cleaned prior to and during Crewmember occupation according to IDCT recommendations.
8. Provide and enforce PPE use for NASA OG members in accordance with OG requirements outlined in this document.

#### G. COMMERCIAL PROVIDER OG REPRESENTATIVE

1. Provide DL-IDCT with comprehensive PC personnel list (plus alternates) no later than L-45 days
2. Provide confirmation of commercial provider OG member HSP ID prevention strategy training completion (and alternates) by L-21 days.
3. Provide Commercial provider OG member (and alternates) medical questionnaires and proof of vaccination status by L-21 days.
4. Manage real-time changes to personnel list and inform OG Lead and DL-IDCT
5. Interface with DL-IDCT and launch facility physicians for scheduling of provider OG member screening exams
6. Interface with and inform OG Lead, DL-IDCT, and mission-assigned physicians of any potential PC exposures, suspected ID symptoms, or suspected breaks in isolation.
7. Provide and enforce PPE use for commercial provider OG members in accordance with OG requirements outlined in this document.

#### H. INTERNATIONAL PARTNER OG REPRESENTATIVE

1. Shall perform duties identical to Commercial Provider OG Representative for all IP members of the OG.

#### I. OPERATIONAL GROUP LEAD

The most vital role of the OG Lead is maintaining the real-time list of OG personnel medically cleared for direct contact with the Crewmembers, and ensuring this living list of cleared individuals is provided to the DL-IDCT, and mission-assigned Crew Surgeons. This is accomplished by regular communication of medical status updates from Launch Facility Medical Representative to the OG Lead. The OG Lead is historically selected from Astronaut Office Chief or designee. Responsibilities include:

1. Provide DL-IDCT with comprehensive list of NASA OG personnel no later than L-45 days.



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2. Provide confirmation of NASA OG member HSP ID prevention strategy training completion (and alternates) by L-21 days
3. Provide NASA OG member medical questionnaires and proof of vaccination status by L-21 days.
4. Manage real-time changes to NASA OG personnel list and inform DL-IDCT and mission-assigned physicians in coordination with Launch Facility Medical Representative.
5. Interface with DL-IDCT and launch facility physicians for scheduling of NASA OG member screening exams.
6. Interface with and inform OG Lead, DL-IDCT, and mission-assigned physicians of any potential OG member exposures, suspected ID symptoms, or suspected breaks in isolation.

#### **6.4.2 COMMERCIAL CREW LAUNCH PROVIDER RESPONSIBILITIES**

All entities providing essential personnel who will comprise the OG are required to provide a list of designated PCs plus alternates to the launch agency no later than 45 days in advance of designated launch date (L-45 days).

Commercial Providers shall:

- A. Prior to approval, ensure preliminary medical screening questionnaires on these individuals are completed, as well as confirmation of vaccination status, absence of active infectious disease or recent exposures.
- B. Identify a Commercial Provider OG Representative to the IDCT.
- C. Ensure that OG, flight support personnel, and other PCs they supply meet the travel and isolation guidelines outlined in this document.
- D. Provide IDCT certification that all PC vaccinations are current and complete.
- E. Arrange for HSP educational briefings and track training of Commercial Provider personnel.
- F. Affirm that all Provider PCs have completed medical assessments and 72-hour observation period prior to crew contact (via coordination with and approval from DL-IDCT, non-OG medical providers, and mission-assigned physicians).
- G. Report any Commercial Provider PC illness or suspected exposure to the IDCT.
- H. Provide and coordinate alternate PC designation for real-time personnel changes

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- I. Provide a location for medical screenings if not utilizing NASA medical facility, and ensure all designated PCs attend.
- J. Provide PPE in accordance with this document for Commercial Provider personnel at each facility.

### 6.4.3 QUARANTINE FACILITY MANAGER RESPONSIBILITIES

For missions utilizing NASA facilities, NASA designated Facility Managers in any facility used by the Crewmembers shall have the following responsibilities:

- A. Restrict access to quarantine facilities to PCs with mission-required purposes for entry.
- B. Review the quarantine facility Access list with the DL-IDCT prior to each quarantine period to ensure that everyone has current PC training.
- C. Provide the review access list to JSC and KSC Center Security to use as access control.
- D. Identify those PCs for missions during influenza season who have not received the seasonal influenza vaccination, to ensure that they wear PPE at all times while in public areas within crew quarantine facilities.
- E. Work with the Crewmembers to limit contact with PCs to mission-related-only purposes.
- F. Report any suspected medical symptoms or illnesses among quarantine facility personnel to the DL-IDCT and/or the Crew Surgeon.
- G. Direct individuals who require temporary/immediate access to crew quarantine facilities and/or contact with the designated physician for examination and clearance.
- H. Ensure that any maintenance that needs to be conducted while the crew is in the facility be coordinated in compliance with the requirements in this document.
- I. Ensure that the facility is clean, especially areas where crewmembers will be living, working and training.
- J. Ensure that hand washing facilities (both soap/water and alcohol-based hand sanitizing liquids (minimum alcohol content = 62 %) are available for use by quarantined crewmembers and PCs.

For NASA crewed missions utilizing Commercial Provider facilities, the above responsibilities shall be added to 6.4.2 Commercial Crew Launch Providers with the exception of C, which will require appropriate security authority designation.

### 6.4.4 RESTRICTED ACCESS FACILITY MANAGER RESPONSIBILITIES

Restricted Access Facility Managers have the following responsibilities:

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- A. Identify facility personnel whose duties may require PC with Prime Crews during quarantine, on an ongoing and/or mission-specific basis.
- B. Report facility personnel requiring PC access to the DL-IDCT.
- C. Communicate with the DL-IDCT when the Prime Crew will have training events during quarantine.
- D. Coordinate with the DL-IDCT, the Crew Training Manager, and FOD regarding which facility personnel require direct contact with Prime Crew during the training event within the facility.
- E. Educate facility personnel to avoid direct contact with Prime Crew during the quarantine period training event.
- F. Update entrance card reader access to reflect the PC access list. (where applicable)
- G. Ensure that alcohol-based hand sanitizing liquids (minimum alcohol content = 62 %) are available for use by the Prime Crew during the quarantine period training event.
- H. Ensure launch pad restroom facilities to be used by flight crews in quarantine have been cleaned and sanitized per <TBD 4-2> prior to crew arrival.
- I. Provide PPE in accordance with this document for Commercial Provider personnel at each facility.

#### **6.4.5 LAUNCH FACILITY MEDICAL PROVIDER(S) RESPONSIBILITIES**

Non mission-assigned (distinct from Crew Surgeons/Flight Surgeons outlined above) medical providers at the launch facility are critical for the successful execution of the HSP. Their responsibilities include:

- A. Performing screening exams within L-14 days for members of the OG.
- B. Tracking of OG members cleared via 72 hours of observation vs. those requiring PPE. As OG members are cleared, their change in status shall be communicated to the DL-IDCT, Launch Facility Medical Representative, OG Lead, and mission-assigned Crew Surgeons.
- C. Reporting of departures from OG isolation criteria to DL-IDCT, Launch Facility Medical Representative, OG Lead, and mission-assigned Crew Surgeons identified either via self-reporting or during screening exam encounters.
- D. Evaluate and disposition any medical symptoms/illnesses among PC personnel, with regard to their permission to enter quarantine facilities and/or come into contact with Crewmembers.

All medical providers have the authority to revoke PC status based on exam or history findings and clinical judgment. Any changes in PC status shall be communicated to the DL-IDCT, Launch Facility Medical Representative, OG Lead, and mission-assigned Crew Surgeons.

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#### **6.4.6 CREW FOOD SERVICES RESPONSIBILITY**

The Director of the Human Health and Performance Directorate has the responsibility to provide high-quality food to ensure the health, safety, and comfort of flight personnel during the HSP. All foods, including off-the-shelf processed ambient, refrigerated, fresh, fresh-frozen, and precooked frozen foods will be purchased, stored and prepared under controlled conditions as outlined in JSC <TBD 4-1>, Commercial Crew Pre-Launch and Post-Landing Food Service Operational Procedures. Individuals who prepare and serve the food will be trained; possess valid food-handling permits; and are designated as PCs. The JSC Human Systems Engineering and Development Division, within the Human Health and Performance Directorate, will manage food purchasing, transportation, storage, preparation, and service. KSC will provide facilities to support the HSP food service at KSC.

Food depot personnel will prepare the Crewmembers' food during quarantine. Specific steps must be taken to ensure the crew is not infected by a food-borne illness while in quarantine. Local and Federal health regulations specify the frequency and type of medical examinations required for food preparation personnel.

#### **6.4.7 SECURITY RESPONSIBILITIES**

Security personnel have the following responsibilities:

- A. JSC Security will control access to JSC AQF at all times. The Facility Manager will provide the Prime Crew schedule to security. Security will only grant access to those individuals on the approved access list, or as otherwise permitted by the Facility Manager.
- B. KSC Security will control access to KSC ACQ at all times while the Prime Crew is at KSC. Security will only grant access to those individuals on the approved access list,
- C. Additional security responsibilities may be assigned by the Facility Manager.

#### **6.4.8 IDCT PROCESS AND ACCOUNTABILITY**

DL-IDCT has a decision authority on matters within the scope of IDCT. Decisions on IDCT matters associated with crew training and OG specialist activities are coordinated with the OG Lead.

Decisions on matters related to the interests of particular crewmembers are coordinated with the corresponding designated Crew Surgeon. Decisions are generally made by consensus of parties involved. For resolution of issues and matters of disagreement, DL-IDCT calls a meeting of IDCT.

For ISS operations, if consensus is not attained, DL-IDCT or any IDCT member may initiate a discussion with the IMG and the MMOP membership at the nominal SMOT conference, or request a special SMOT conference. Significantly problematic issues or matters concerning medical policy may require resolution by the Multilateral

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Medical Policy Board (MMPB).

## 6.4.9 REPORTING OF OCCURRENCES AND VARIANCES

Deviations from the requirements established in this document, process escapes, and/or symptoms of infectious disease that occur among PCs during the quarantine period will be promptly reported to the mission-assigned physicians, OG Lead, and DL-IDCT for assessment of risk to the crew and mission. PCs may also knowingly or unknowingly violate the principles and regulations of the HSP. These occurrences and variances place the crew and the mission at risk of infectious disease.

### 6.4.9.1 PRE-FLIGHT: HSP WAIVER PROCESS

Upon identification of any deviation or escape from health stabilization requirements and/or symptoms of infectious disease among the OG during the quarantine period, the OG Lead and the Prime Crew Surgeon will assess the risk to the prime and backup (if applicable) astronaut crew on that flight, and (for flights to ISS) to the crew already onboard ISS.

- A. Risk assessment will account for crew health risks generally, and for risk to the success of mission objectives, including ISS mission objectives scheduled within 14 days of docking to ISS. The OG Lead will consult with the appropriate NASA Flight Directors to ensure that the correct mission objectives are accounted for in this assessment.
- B. If the risks are deemed to be acceptable, FOD and HH&P will brief, out-of-board, the NASA Mission Management Team (MMT) chair, and for flights to ISS, the NASA ISS Mission Management Team (IMMT) chair, and IP representatives for affected IP crewmembers. The NASA MMT and IMMT chairs will determine if their teams need a formal presentation for risk acceptance, or if their out-of-board concurrence is sufficient. Presentation materials will not include personally identifiable medical information, but will identify the organizations involved with any deviations, escapes, or symptoms.
- C. If the risks are deemed to be unacceptable, FOD and HH&P will contact the NASA MMT and IMMT chairs to determine flight / schedule / assignment impacts and forward planning. Formal presentations to the appropriate management teams will be planned. Presentation materials will not include personally identifiable medical information, but will identify the organizations involved with any deviations, escapes, or symptoms; those organizations should be prepared to respond to actions
- D. In either case, if crew quarantine will continue toward launch, the OG Lead and Prime Crew Surgeon may impose stricter mitigation requirements (such as, but not limited to: expanded PPE use, reduced contact with crew, more strictly limited OG membership, additional PC screening, etc.).

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#### **6.4.9.2 POST-FLIGHT: HSP OCCURRENCES & VARIANCES REPORTING**

Following the flight, the DL-IDCT will work with the appropriate Programs and organizations to ensure that all occurrences and variances are reported for record and rolled into mission-specific lessons learned.

- A. The DL-IDCT will record these occurrences and variances in a post-mission HSP report, for the purpose of identifying and addressing the situations that created the risk. The post-mission HSP report will be submitted to the Human Health and Performance Directorate and FOD for review.
- B. The report will attach no personally identifiable medical information contained in the report. However, the report will identify any crewmembers or crew dependents who failed to receive the proper vaccinations, e.g. the flu vaccine for missions occurring during influenza season. The report will also identify individuals involved in violations of HSP policies.
- C. HH&P and FOD will include appropriate information in post-flight lessons learned reports to the affected Program(s) per their established processes.
- D. For ISS missions, if infectious transmission occurs, the DL-IDCT shall generate a report to the SMOT and MMOP summarizing the results of any investigative efforts to identify the human, system, and environmental factors that led to the infection. This report will also be shared out-of-board with ISS Program Management.

### **6.5 GENERAL PREVENTION MEASURES FOR ALL PERSONNEL**

#### **6.5.1 STANDARDIZED EDUCATIONAL BRIEFING**

All individuals interacting with Prime Crew in the pre-launch period are required to participate in standardized training on infectious disease prevention measures coordinated by the HSP Program. Completion of a standardized educational briefing within the past year is required before any contact with the Crew. The educational briefing may be delivered by means of an audiovisual presentation. This educational training should include discussion, and where applicable, demonstration of specific preventive techniques. While the NASA HSP will provide training materials for all NASA personnel, NASA-affiliated organizations including Commercial Providers may provide their own educational briefings to satisfy this requirement. The recommended minimum contents are included in Appendix B, Contents of the Educational Briefing. For non-NASA provided educational materials, NASA will assess whether the education materials provided satisfy the HSP educational briefing requirement.

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## 6.5.2 IMMUNIZATION

Appropriate immunization provides a high degree of protection against specific pathogens. Review of the vaccination status of PCs shall be included in the initial medical screening process (Appendix A-2, Verification of PC Compliance with HSP Requirements). The following specific immunizations are required for all PCs: measles, mumps, rubella, diphtheria, pertussis, polio, varicella, hepatitis A and B, and current seasonal influenza. Additional vaccination may be required for geographically prevalent infectious disease (also see 6.5.5 Vector Control). Absence of vaccination against any of the above diseases in a given individual may not preclude his/her presence at the launch facility, however additional contact protocols (e.g. the donning of PPE) shall be required of these individuals, as directed by examining physician. These individuals may also be precluded from inclusion in the OG at the IDCT's discretion. The crewmembers are vaccinated according to Office of the Chief Health and Medical Officer (OCHMO) medical standards and SSP 50667 MED Volumes A and B.

### A. INFLUENZA AND VIRAL SYNDROMES

Influenza virus is the leading cause of lost workdays among healthy workers. Viral illness has caused the delay of previous missions in the past. Although influenza can occur sporadically throughout the year, the vast majority of influenza cases occur during "Flu Season".

### B. FLU SEASON

Flu season occurs during the winter and spring. For the purposes of the HSP, Flu Season begins on November 1st and ends on April 30th. Any mission with an expected or actual launch date that occurs within this specified time period is subject to additional measures to protect the Prime Crew and the mission from influenza virus exposure.

### C. FLU VACCINATIONS

Vaccination of PCs against influenza is a vital step in avoiding flu-related mission impacts. All crewmembers and all PCs are required to receive the influenza vaccine at the start of each flu season, or don PPE for all contact with quarantined Crewmembers.

In the event of vaccine shortages, Prime Crew and their dependents will be vaccinated first, followed by medical support staff and other PCs. This prioritization of vaccination reflects the realization that in vaccinating those in closest physical proximity to the Prime Crew offers protection against illness-related mission impact.

1. Influenza vaccination is required for all PCs. Individuals who require access to quarantined crewmembers during the flu season but are unable to receive the flu vaccination more than 14 days prior to that contact, will be

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required to wear a droplet respiratory facemask at all times while in contact with the crew and/or in crew quarantine facilities.

2. The DL-IDCT will provide a list of PCs who have received the influenza vaccination to the quarantine Facility Managers, the crewmembers, and the Crew Surgeons for missions launching during the flu season.
3. It is the responsibility of everyone to ensure all personnel adhere to the mask policy for unvaccinated PCs.
4. Individuals who do not receive the influenza vaccination and refuse to wear respiratory protection masks will not be allowed access to quarantined Crewmembers or crew quarantine facilities. Waivers to this requirement will not be considered.

### 6.5.3 MEDICAL SCREENING

Medical screening of PCs is an integral part of the prevention strategy to reduce the risk of transmission of infectious disease to Crewmembers. All PCs will undergo medical screening as detailed in 6.7 Travel Timeline For all Primary Contacts.

Screening exams shall be performed by non-mission assigned Launch Facility Medical Providers at a designated medical area physically distinct from the crew quarantine areas. These medical providers will have no direct contact with the Crewmembers. Crew Surgeons will not perform medical screening exams for OG, but may provide informal post-clearance surveillance once OG members enter quarantine.

Screening in the form of a questionnaire and targeted physical examination shall be conducted for both initial screening prior to Crewmember interaction, and recurrent health monitoring. The relevant, evidence-based information for the screening questionnaire is included in Appendix A-2, Verification of PC Compliance with HSP Requirements. The contents of the screening exam and monitoring for all OG members are detailed in 6.6.4-B OG Prevention Measures.

### 6.5.4 PRE-LAUNCH MEASURES

Review of the current medical literature indicates that with appropriate preventive (sanitary-hygiene) measures as described, the risk of infectious disease transmission can be effectively minimized without complete isolation of the Crew from contacts. With appropriate measures, Crew can safely interact with contacts as required for operational, management, and BHP support including interactions in private, indoors, or outdoors. All PCs are directed not to shake hands with crewmembers and to avoid any physical contact not explicitly required for mission support.

All individuals with direct contact with crewmembers are expected to wash their hands with soap and water as directed in the educational briefing, or if unable, to use an alcohol-based hand sanitizing liquid (minimum alcohol content = 62 %) prior to such contact. Any individual who requires direct access to Crewmembers but has not



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met the observational period or isolation requirements pertinent to their contact group outlined below, must wear PPE consisting of mask and gloves during time in close quarters with either Crewmembers, Crew Quarters, or Crew Vehicle beginning at L-14 days.

### **6.5.5 VECTOR CONTROL**

In addition to immunization and hygiene/PPE requirements outlined in this document, vector control measures may be required for emergent disease risks, and the IDCT will coordinate vector control response strategy with local public health department resources beginning at L-90 days, with specific measures communicated to all PC providers by L-45 days.

## **6.6 GROUP-SPECIFIC MEASURES FOR PREVENTION OF INFECTIOUS DISEASE**

### **6.6.1 CREW PREVENTION MEASURES**

Launching crewmembers are responsible for the state of their health and must adhere to the recommended measures for infectious disease prevention. Backup crewmembers as individuals with direct and ongoing contact with the crew, must also comply with these requirements.

Infectious disease control requirements for Crewmembers include:

- A. In the preparations period before departure to the launch site:
  1. Training (briefing) on ID prevention measures
  2. Information on the ID situation at the launch site and the geographic region of the site
  3. Respond to real-time public health alerts or infectious disease outbreaks as instructed by IDCT consensus.
- B. Compliance with the geographic and travel restriction advisories at the pre-launch training site (accommodation, living conditions and organized meals only in the quarantine zone) and launch site (limitation of interpersonal interactions to those necessary for performance of work, compliance with the hygiene norms at work place and in transit).
- C. Beginning at L-21 days, continuous compliance with recommended enhanced precautions.
  1. Limitation of interpersonal interactions to authorized contacts only
  2. Compliance with site-specific recommendations with respect to food and water intake

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3. Adherence to specific recommendations from the Crew Surgeon and DL-IDCT regarding infectious disease control, for example, special considerations related to local epidemiologic infectious disease concerns
4. Immediate reporting to the DL-IDCT of any symptoms or concerns related to infectious disease
5. Enhanced hand hygiene;
6. Distancing / spatial separation of a minimum of 1.5 meters is required in public areas whenever unscreened interactions/contact is possible (e.g. passing through public areas).

### 6.6.2 CREW QUARANTINE PERIOD

The quarantine period is defined as the time period prior to launch where contact with the crewmembers is limited. The quarantine period nominally begins on the afternoon fourteen days prior to launch (L-14 days), of which the first 7 days may be home-quarantine at the crewmember's residence provided:

1. In-home family members adhere to PC prevention measures.
2. Family members are assessed by the Crew Surgeon within 72 hours prior to start of quarantine (L-17/14 days).
3. An execution plan tailored to meet HSP requirements and the practical needs of the crewmember and their family will be reviewed and approved by DL-IDCT and the Crew Surgeon(s) no later than 72 hours prior to quarantine start

Quarantine facilities must be available at least fourteen days prior to launch (L-14 days), should illness develop among family members that necessitates placing crewmembers in quarantine prematurely, or if home quarantine conditions are broken (see 6.9 Quarantine Facilities). At the Crew Commanders' discretion, the quarantine period may commence prior to L-14 days, if necessary, to optimize shifting of the crew's circadian cycle. Non-NASA crew may practice home quarantine at an analogous site within the continental US, and will join NASA crewmembers at Astronaut Crew Quarters no later than L-7 days assuming no break in quarantine conditions with travel. Commercial air travel is considered a break in quarantine.

The quarantine period is nominally completed after a successful launch of the crew. However, if vehicle, weather, or other factors cause a significant delay in the launch, the Crew Commander, Crew Surgeon, and Director, FOD will determine whether to extend the quarantine period or terminate until a new launch date is defined.

### 6.6.3 CREW FAMILY/PERSONAL CONTACTS PREVENTION MEASURES

Crewmembers in quarantine may visit with their spouses or significant others and

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immediate family members and guests during the quarantine period. Crewmembers' young children, especially those attending school or daycare, pose a significant risk of infection to those in quarantine. It is imperative that crewmembers and their families understand and manage these risks. The HSP assists crewmembers and their families in minimizing the risk of infectious disease by complying with the following:

- A. Providing an educational briefing to crewmembers and spouses or significant others at a pre-mission Spouse (or Significant Other) Briefing (preferably prior to L-45 days). This briefing will describe the HSP and the families' role in preventing infectious within L-14 days. The briefing will be conducted by JSC Clinical Services Branch personnel.
- B. Family member PCs will complete a medical questionnaire and brief medical assessment prior to initial contact with the crew.
- C. Individuals younger than 12 years of age, including crewmembers' children, are restricted from visiting crewmembers during the quarantine period. Children under the age of 12 may under some circumstances be permitted contact with the crew (see 6.7 Travel Timeline). The minimum age for visitation may be adjusted at the discretion of the Crew Commander and/or the Crew Surgeon, as circumstances warrant.
- D. Family visits during the quarantine period will be limited during quarantine at JSC AQF, KSC ACQ, KSC Beach House, or BHP organized activities. Visits outside of these sanctioned events must be approved by the Chief, Astronaut Office.
- E. Having Flight Surgeons available to families during quarantine to assess whether a possibly infectious condition is present that warrants avoiding contact with the crew.

#### **6.6.4 OPERATIONAL GROUP (OG) PREVENTION MEASURES**

The OG is comprised of all individuals required to have direct access to the Crew in support of launch activities within L-14 days (examples include agency-approved personal contacts, technical and medical support personnel, and management necessary for this purpose). All members of the OG shall be identified by the sponsoring parties and the list of primary and alternate members made available to NASA for review by L-45 days. All OG personnel are required to comply with the following procedures:

- A. Education – OG personnel shall complete the standardized medical briefing on infectious disease control by L-21 days and shall abide by the hand and respiratory hygiene techniques outlined in Appendix B, Contents of the Educational Briefing.
- B. Medical Screening – OG personnel shall provide a medical questionnaire for

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NASA medical review by L-21 days, and undergo initial and periodic medical screenings with nominal frequency outlined below. The initial on-site physical examination will be limited to the purpose of determining risk of communicable disease and is expected to be extremely brief. Body temperature shall be measured to ensure individuals are afebrile (temperature less than 100.4° F). A short medical interview will be performed. Examination of the throat, auscultation of the lungs, and other physical examination techniques may be used at the examining physician’s discretion, but are not necessary for the nominal exam.

- C. Immunization – OG personnel shall have up-to-date immunization confirmed before initial contact with the Crew. If immunizations are not complete and up to date, PPE (specifics as directed by examining physician) shall be required for contact with quarantined Crewmembers without exception (see Option B below).
- D. Observation Period - A NASA or delegated physician will examine OG members upon arrival to the launch site, and assess temperature as clinically indicated during a 72 hour period of observation prior to initial encounter with quarantined crewmembers if arriving at less than L-14 days. At minimum, OG members arriving at less than L-14 days will receive an initial in-person medical assessment at the start of the observation period, and a second assessment at the conclusion of 72 hours or prior to initial contact with Crew, whichever occurs last. In the event that 72 hours of observation cannot be completed, PPE will be required for contact with quarantined crewmembers (see Option B below).
- E. Limited contact.
  - 1. Duration of contact with Crewmembers shall be limited to operational requirements and BHP support. The duration of interactions for BHP support shall be determined by Crew Operations. Private interactions between Crewmembers and contacts which satisfy this document’s guidelines are allowed.
  - 2. Interactions between Crewmembers and individuals who are not members of OG are limited to operational necessity and must be authorized by the DL-IDCT, with concurrence from the OG Lead and mission-assigned physicians. All non OG personal contacts are limited in duration and subject to additional precautions including but not limited to distance a minimum of 1.5 meters or PPE.
  - 3. The Crew surgeon from the Crewmember’s Agency shall have 24-hour access to, including direct contact with, the Crew at the Crewmember’s discretion. This includes Crew surgeon presence at all procedures and examinations.
- F. Limitation of Exposure – OG personnel including BHP support personal

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contacts shall minimize ID threats during their OG duties by avoiding public transportation, public eateries, and other public institutions within L-14. The number of OG members required to travel to public locations such as grocery stores should be kept to the minimum number possible, and observation of hand and respiratory hygiene practices per Appendix B, Contents of the Educational Briefing. Those required to travel to public locations must maintain a minimum of 1.5 meter distancing or don PPE droplet mask if complying with Option A, outlined below.

As OG members are expected to have varied work and home environments, the HSP supports two paths to allowing direct access to the Crew for OG members, given the OG is comprised of individuals deemed critical to the successful launch of the Crew. The paths below are a supplement to the above requirements, which are applicable to all OG members.

**Option A: OG members allowed contact with Crew without PPE.**

1. Limited Exposure Housing – OG personnel shall be housed in limited access accommodations away from public activity locations (e.g. personal home or dedicated hotel block shared with other occupants observing OG guidelines, utilizing personal vehicle transport including carpool with other OG members, with home preparation of meals satisfies 6.6.4-F. and Option A-1).
2. Immunizations status confirmed up-to-date.
3. Successful completion of 72 hour observation if arriving less than L-14 days (afebrile, maintenance of hand and respiratory hygiene per Appendix B, Contents of the Educational Briefing, compliance with Limitation of Exposure guideline, cleared by medical screening)
4. Work duties outside of the Quarantine Facility allow compliance with Limitation of Exposure guideline (e.g. office work requiring contact less than 1.5 meters from non-OG members within L-14 days is prohibited).
5. If Living Locally – OG members living locally may satisfy Limitation of Exposure criteria by either:
  - a) Ensuring all cohabitating individuals meet vaccination and Limitation of Exposure guideline (e.g. spouse or significant other avoids public areas and transportation, children are not attending school or public gatherings, vaccinations complete for all members) for the duration of L-14 days.
  - b) Obtaining alternate housing within L-14 days that allows compliance with F above.

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- c) Utilizing PPE for Crewmember contacts and access to quarantine areas (See Option B below).

**Option B: OG members required to wear PPE for all Crew contact within L-14.**

1. Non-Limited Exposure Housing - OG personnel living locally with working spouses or significant others or children attending school may not be able to comply with 6.6.4-F.
2. Immunization Status unable to be confirmed or confirmed not up-to-date. These individuals may be precluded from inclusion in the OG at the IDCT's discretion.
3. Work duties outside of the Quarantine Facility that violate Limitation of Exposure guideline (e.g., Critical duties unable to be performed by non-OG member require contact with non-OG personnel within L-14 days).

Even for OG members pursuing Option B, contact with non-OG members should be limited to the greatest extent achievable within L-14 to reduce the risk of ID transmission.

- G. Responsibility – OG personnel carry personal responsibility for ID prevention and will undertake every available measure to protect their health and prevent infectious disease transmission to crewmembers. Individuals who develop symptoms are required to abstain from further Crewmember and OG contacts, and report to their designated OG Representative, OG physician on duty, and (or) DL-IDCT for urgent decision-making, which may include dismissal from the OG and selection of an alternate (previously identified by sponsoring agency in the L-21 day OG personnel list). Clearance from the IDCT is required for re-initiation of Crewmember contact. Individuals who have broken isolation after initial assessment will restart 72 hours of observation by the designated medical provider, or don PPE for all interactions with crew per Option B above.

**6.6.5 SPECIAL GUESTS AND VIP PREVENTION MEASURES**

Crewmembers in quarantine typically have a visit with extended family members and guests during the quarantine period. These family members/guests often travel to Florida from other parts of the country, arriving shortly before the scheduled visit. Invitation to these events is strictly limited by the Astronaut Office, and is coordinated by the Astronaut Office Family Support Group. Individuals who do not receive official invitation from the Astronaut Office are not permitted to attend.

All individuals will be cleared by a NASA physician to assure they are free of signs

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and symptoms of communicable diseases before being allowed to attend. The examining NASA physician has the authority and responsibility to deny attendance to anyone they assess who poses a health risk to the crew. DL-IDCT has the discretion to require PPE to be worn by Special Guests and VIPs prior to close contact with the crew.

Family/Guests/VIPs who attend pre-launch events with the Prime Crew during the flu season (November-April) are subject to the PC Influenza Vaccination policy (see 6.5.2-C Immunization).

Guests include family members and friends who are not included in the OG for direct BHP support. Guests may be housed in hotels or other accommodation outside the launch facility (quarantine zone). The measures for Guest and VIP visitation with launching Crewmembers include:

- A. Standardized medical screening (questionnaire and in-person assessment).
- B. Standardized educational briefing.
- C. Adherence to hand and respiratory hygiene.
- D. For direct (no glass) contact, distancing of a minimum of 1.5 meters is required.
- E. Additional Personal Protective Equipment (PPE) (mask + gloves) may be required based on the screening assessment.
- F. Handshaking and embraces with Crewmembers are prohibited.

The predominant format of contacts of Guests and VIPs with the crew is indirect contact, i.e. virtual contact or across a glass partition or similar barrier. In exceptional cases, upon a decision of the OG Lead and under supervision of IDCT, a direct contact may be allowed. Direct contacts are limited in the number of individuals (2-3 individuals) and PPE shall be required.

#### **6.6.6 PREVENTION MEASURES AMONG STAFF WITH ACCESS TO CREW QUARTERS OR CREW VEHICLE, WITHOUT CREW CONTACT**

Staff who require access to crew quarters, crew vehicle, or areas to be occupied by quarantined crew are required to take steps to minimize the risk of disease transmission within L-14 days. Staff shall comply with measures including:

- A. Standardized educational briefing with certification within 1 year of supported launch activity.
- B. Adherence to hand and respiratory hygiene.
- C. Initial standardized medical screening prior to initial controlled area access (questionnaire OR in-person assessment)

PLUS

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- D. Personal Protective Equipment (PPE) (mask + gloves) required during access to controlled areas.
- E. Self-reporting to IDCT representative and opt-out of any vehicle or crew quarters access for subjective symptoms or sick contact (e.g. sick child at home requires voluntary opt out if not picked up in C. above).

## 6.7 TRAVEL TIMELINE FOR ALL PRIMARY CONTACTS

The requirements for isolation of OG members and other PCs depend on the time of arrival in the pre-launch period. Arrival is defined as the time at which the individual arrives at the training facility or launch site. For those PCs living locally, the below timeline shall be interpreted as time of arrival equals time of initial duties requiring direct contact with crew (i.e. time when PC status required to fulfill operational responsibilities).

There are three main options for arrival (see Figure 6.7.1-1). All options have the same core requirements:

- A. All options require an initial health screening prior to Crewmember contact which should be performed by a physician who is not an assigned or expected member of the OG.
- B. Contacts who have been determined to have a known exposure to an infectious disease agent shall undergo a risk assessment (per 6.0 C HSP Implementation for U.S. Launches) before Crew contact.
- C. Risk assessment elements include consideration of the pathogen, the nature of exposure (mode, duration etc.), contact and Crewmember vaccination status, contact's underlying health, and results of the screening questionnaire.
- D. Based on the risk assessment, the requirement for enhanced precautions such as masks, gloves and distancing will be incorporated into Crew contact requirements.
- E. Symptomatic contacts are excluded from contacts with the crew and OG until the diagnosis is established or ruled out, and are isolated to a separate room. The diagnostic workup is conducted by licensed physicians of agencies or local specialists in ID.
- F. An ID patient is not allowed to enter the quarantine zone until confirmation of recovery becomes available by clinical or laboratory means.

### 6.7.1 OPTION1 – EARLY ARRIVAL PRIOR TO L-14 DAYS

- A. Asymptomatic contacts age 12 and older may have interactions with the Crew not restricted by epidemiological considerations. Early arriving



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contacts who are asymptomatic do not require isolation before interacting with the Crew prior to L-14, and then join the OG in the enhanced observation mode on transition to the launch site.

- B. Children under the age of 12 are considered upon request of the crewmember as an exception and in coordination with the sponsoring Agency – on a case-by-case basis after assessment of ID risk including behavioral observation for ability to adhere to control measures. To become part of the OG and proceed to the launch site, children under the age of 12 require:
1. A request from the Crewmember’s Agency coordinated with the launch Agency and the IDCT Lead
  2. Permission coordinated with all members of IDCT
  3. Medical documentation of absence of ID signs
  4. Medical documentation of adequate behavioral state of child
  5. Identification of an accompanying behavioral control person (family member included in OG besides the crewmember, the crew surgeon, and the manager)
  6. Availability of mandatory daily medical monitoring by a health care provider trained in age appropriate care; and
  7. Availability of an established mechanism for exclusion of the child from OG in case of an infectious disease or inadequate behavior.

### **6.7.2 OPTION 2 – ARRIVAL AT L-14 DAYS**

- A. Asymptomatic contacts age 12 and older arriving at L-14 days may directly interact with the Crew without requiring prior isolation, distancing or personal protective equipment on condition of their inclusion in the OG and observation of hygiene and anti-epidemic measures common for all OG members. They must be in the enhanced observation mode and comply with health maintenance measures.
- B. Children under the age of 12 will not have direct unprotected interaction with the crewmember if arrival is at L-14 days or later and will not join the OG.

### **6.7.3 OPTION 3 – ARRIVAL AFTER L-14 DAYS**

- A. Asymptomatic contacts age 12 and older arriving after L-14 days will require a minimum period of observation of 72 hours before direct interactions with Crewmembers. During the minimum three day observation period, direct

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contact with Crewmembers is not permitted but interactions across a glass partition are permitted.

- B. Crew contact with ID protection measures other than glass, by use of droplet masks and 1.5 meters distancing, may be allowed only by IDCT and only for medical or mission-critical encounters. Following the observation period of 72 hours, once approved by the IDCT, contacts arriving in the pre-launch period to join the OG may have direct access with the Crewmember. Individuals not included in the OG may have temporary direct contact with their Crewmembers per the rules established by NASA (e.g. glass partition or use of masks and minimum 1.5 meters distancing across the table) and approval by the IDCT.
- C. Agencies sponsoring personal contacts for BHP support within L-14 days are encouraged to arrange for arrival prior to L-14 days to avoid the requirements for separate observation or enhanced precautions (masks, distancing).
- D. Children under the age of 12 will not have direct unprotected interaction with the crewmember if arrival is at L-14 days or later and will not join the OG.

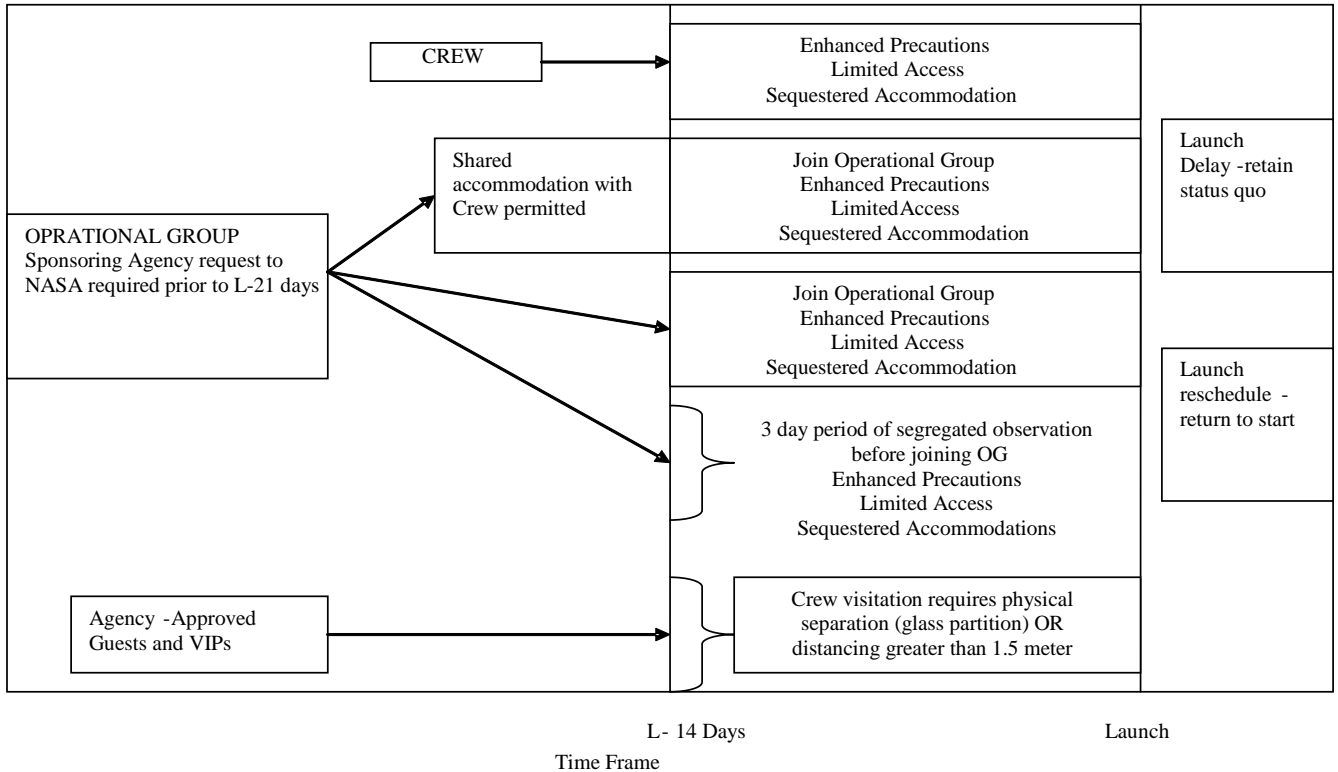


FIGURE 6.7.1-1 PRIMARY CONTACT TRAVEL TIMELINE

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## **6.8 GROUP-SPECIFIC DISEASE CONTROL MEASURES FOR MANAGEMENT OF SUSPECTED OR CONFIRMED INFECTION (ANTI-EPIDEMIC MEASURES)**

In all cases of suspected or confirmed infectious disease, additional environmental sanitation measures may be required based on the nature of the suspected pathogen and on evidence-based infection control practices, in accordance with local public health requirements or regulations. This may include, but is not limited to, increased frequency of cleaning surfaces in quarantine facility areas, vector control spraying, additional scrutiny of food handling, water and housing conditions etc., with input from the IDCT. In all cases of suspected or confirmed infection, an investigation of the causes and contributing factors to the incident shall be prepared and presented to the MMOP by the DL-IDCT.

### **6.8.1 CREWMEMBER DISEASE CONTROL MEASURES**

Crewmembers who develop symptoms suggestive of an infectious disease are required to report immediately to the Crew Surgeon or any member of the IDCT. If the possibility of an infectious disease is confirmed, enhanced precautions must be initiated immediately. Exclusion from unprotected contact with other Crewmembers and OG members for seven days will ensure the prevention of transmission of most infections of concern. The symptomatic Crewmember should be provided alternate accommodations (e.g. medical isolation room) spatially isolated from other Crewmembers. The Crewmember should be medically assessed and treated with available means locally unless hospitalization is required. Decision on flight readiness in association with the presence of ID is made by the OG Lead (if Astronaut Office (CB) Representative) or designated CB/FOD Representative based on a written recommendation from IDCT, a copy of which is also directed to MMOP/MSMB for concurrence for ISS operations.

### **6.8.2 OG/PC DISEASE CONTROL MEASURES**

OG members or other PCs having symptoms of ID shall not have access to Crewmembers or unprotected access to other OG members. Symptomatic individuals must undergo additional risk assessment and follow recommendations on enhanced precautions under IDCT supervision for any direct contact with Crewmembers or other OG members, if such are operationally necessary.

- A. A one week period of exclusion from unprotected contact with enhanced precautions including masks, gloves and 1.5 meters distancing will prevent the spread of most infections of concern.
- B. Should a contact develop symptoms after having completed the screening and clearance process, this should be immediately reported to a member of the IDCT, the affected individual removed from OG and Crewmember

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contact, and replaced with an alternate previously designated in the L-21 day OG alternate list if appropriate.

- C. The source of the infection should be sought by considering possible environmental contamination, insufficient distancing from public, thus possible exposure to unprotected contacts, or other reasons for the emergence of a new infection in a protected environment. Sources of infection should be eliminated or controlled.

### **6.8.3 DISEASE CONTROL MEASURES AMONG STAFF WITH ACCESS TO CREW QUARTERS OR CREW VEHICLE, WITHOUT CREW CONTACT**

- A. Staff with symptoms of ID are removed from work until complete recovery, confirmed clinically or by laboratory means.
- B. For staff with symptoms of ID who for any reason cannot be removed from work, they are precluded from access to crew vehicle or crew quarters areas within L-14 days. For other areas, a one-week period of enhanced precautions is required in which the staff member is required to wear a mask, gloves and a minimum 1.5 meters distancing to prevent the spread of most infections of concern. Exclusion from unprotected contact for 1 week will ensure the prevention of transmission for most infections of concern. If the use of required PPE prevents the staff member from completing job tasks, consideration should be given to excluding the staff from further work in the quarantine area until treated.
- C. For staff requiring access to crew vehicle or crew quarters within L-14 days, symptoms of ID preclude access to these areas even with use of PPE.

## **6.9 QUARANTINE FACILITIES**

The quarantine facilities will limit the number of people the crewmembers come in contact with and lower the risk of exposure to infectious diseases. Crewmembers are required to stay within specific quarantine areas during the quarantine period.

### **6.9.1 DEDICATED CREW QUARANTINE FACILITIES**

Quarantined Crewmembers are permitted access to several types of facilities. Dedicated quarantine facilities are the primary residence of the crew during the quarantine period. These facilities, which include their personal home, AQF at JSC and the ACQ at KSC, provide a quiet, clean, comfortable living environment where the crewmembers can prepare for the upcoming mission. Access to these facilities is limited to authorized personnel because limiting contact lowers the risk of exposure. To assure controlled access, the crew quarters have a single entrance/exit.

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Dedicated quarantine facilities are equipped with the following:

- A. Lighting systems to assist crewmembers with circadian sleep shifting
- B. Individual crewmember bedrooms and bathrooms that are dark, quiet, and have individual climate controls
- C. Crew training/briefing rooms with full computer and telephone access as well as audiovisual conferencing capability
- D. Common dining and entertainment areas
- E. Common exercise facilities
- F. Medical examination room

The facilities are also equipped with the ability to exclude sunlight from all crew use areas. Quarantine facilities must be cleaned prior to the commencement of each preflight period. Facility Managers must inspect the quarantine facilities to ensure they are sufficiently clean. Additionally, facility inspections shall include water quality testing for Coliform and Legionella, and air handling unit testing for Legionella within the past year. Quarantine facilities must have ample locations for hand washing with soap and water and provide alcohol-based hand sanitizing liquids (minimum alcohol content = 62 %).

## 6.9.2 RESTRICTED ACCESS FACILITIES

Crewmembers in quarantine require access to a number of on-site facilities whose access is limited to authorized personnel only. Crewmember use of restricted access facilities does not violate HSP policy provided facility staff meet HSP requirements as outlined below. These facilities include:

- A. Johnson Space Center
  - 1. Columbia Center (Building 26)
  - 2. Neutral Buoyancy Lab
  - 3. Baseline Data Collection (BDC) facilities
  - 4. Training facilities
- B. Kennedy Space Center
  - 1. Beach House
  - 2. Launch Pad(s)
  - 3. BDC facilities
- C. Cape Canaveral Air Force Station Launch Pad

Access to these facilities is further limited only to necessary personnel 14 days prior

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to use by quarantined Crewmembers, and during Crewmember utilization. Facility Managers are responsible for limiting the number of personnel entering the facilities during crew use, and must determine which personnel require close contact with quarantined crewmembers during this time. Any personnel requiring close contact with crewmembers within L-14 days at restricted access facilities shall be identified as a member of the OG, and either complete 72 hours of observation prior to contact or don PPE as outlined above (see 6.6.4 OG Prevention Measures)

Individuals requiring close contact with quarantined crewmembers for official purposes receive annual training regarding the purpose and responsibilities of the HSP. This training requirement for NASA personnel can be fulfilled in two ways:

- A. Attend one of the annual group education seminars conducted by Clinical Services Branch at JSC or by the Aerospace Medicine and Occupational Health Branch at KSC.
- B. Successfully complete the on-line SATERN HSP training

For Commercial Provider personnel, IPs, and other non-NASA but Agency-affiliated personnel, this training requirement may be fulfilled through an alternate educational program that fulfills the minimum educational requirements outlined in Appendix B, Contents of the Educational Briefing.

### 6.9.3 GENERAL ACCESS FACILITIES

Crewmembers must transit through general access NASA facilities during the quarantine period, where contact with the general population can occur. Such facilities include entry guard stations at JSC, the Base Operations Area of Building 276 and flight line of Ellington Field, and the Base Operations Area and flight line of the Shuttle Landing Facility at KSC. There are no quarantine-specific facility requirements in these areas.

JSC and KSC Center Security is responsible for cordoning non-primary contact employees from quarantined crewmembers during visits to general access facilities. Security personnel will keep all individuals not identified by the Astronaut Office a minimum of 1.5 meters from quarantined crewmembers.

### 6.9.4 QUARANTINE FACILITY RESIDENTS/STAFF

The quarantine facility residents consist of facility staff, astronauts, and the Crew Surgeon/IP Surgeon. FOD and the Astronaut Office determine who is allowed to reside in JSC AQF or KSC ACQ. These individuals must meet the requirements denoted in sections 6.6.2 Crew Quarantine Period, 6.6.3 Crew Family/PC Prevention Measures, and 6.6.4 OG Prevention Measures.

The Crew Surgeon will brief all quarantine facility residents and staff at the beginning of each quarantine period. The briefing will include techniques to identify

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and mitigate infectious disease risks and the prevalent infectious risks at the time of quarantine.

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## APPENDIX A-1 - VERIFICATION OF FLIGHT CREW COMPLIANCE WITH HSP REQUIREMENTS

### FLIGHT CREW HEALTH STABILIZATION PROGRAM CONTRACT FLIGHT CREW QUALIFICATIONS FOR TEMPORARY PC

**Purpose:**

The purpose of the Flight Crew Health Stabilization Program is to prevent astronauts from contracting communicable diseases immediately prior to launch. Astronauts are placed in quarantine fourteen days prior to launch, in order to mitigate potential contact with infectious agents. The only individuals allowed contact with astronauts during this quarantine period must receive PC designation. PCs are instructed not to approach the quarantined astronauts (or other PCs) if they have or suspect they have a cold, flu, or other contagious condition. They are also instructed to report symptoms to the designated physician to determine when contact may be allowed.

Contractor aircrews may be used to transport quarantined astronauts and other PCs (i.e. astronauts' families) to the launch facility. The HSP mandates that all individuals in contact with quarantined astronauts must be free of communicable disease; however, implementing the PC process for all contractor aircrew is not feasible. This document instead outlines the health requirements that contractor flight crew must meet when transporting quarantined astronauts or PCs in contract aircraft. Aircrew who do not meet these health requirements must be replaced before the contract flight can occur.

**Requirements:**

- 1) Contractor aircrew must be free of respiratory symptoms, regardless of cause. These symptoms include:
  - a) cough
  - b) runny nose/congestion
  - c) hoarseness/sore throat
  
- 2) Contractor aircrew must not have a fever within 24 hours of the flight. A fever is defined as body temperature greater than 100.4° F, measured either via oral or tympanic membrane thermometer.
  
- 3) Contractor aircrew must be free of gastrointestinal symptoms, regardless of cause. These symptoms include:
  - a) nausea
  - b) vomiting
  - c) diarrhea
  
- 4) Handshaking with quarantined astronauts/PCs is prohibited.
  
- 5) Alcohol-based hand gel must be available on the aircraft for use by passengers and aircrew.

I acknowledge that I am free of the above symptoms, and will meet the requirements defined above.

---

Name (Print)      Sign      Date Reviewers Initials: \_\_\_\_\_

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## **APPENDIX A-2 - VERIFICATION OF PRIMARY CONTACT COMPLIANCE WITH HSP REQUIREMENTS**

### **FLIGHT CREW HEALTH STABILIZATION PROGRAM REQUIREMENTS FOR TEMPORARY PRIMARY CONTACT DESIGNATION**

**Purpose:**

The purpose of the Flight Crew Health Stabilization Program is to prevent astronauts from contracting communicable diseases immediately prior to launch. Astronauts are placed in quarantine fourteen days prior to launch, in order to mitigate potential contact with infectious agents. The only individuals allowed contact with astronauts during this quarantine period must receive Primary Contact (PC) designation. PCs are instructed not to approach the quarantined astronauts (or other PCs) if they have or suspect they have a cold, flu, or other contagious condition. They are also instructed to report symptoms to the designated physician to determine when contact may be allowed.

This document outlines the health assessments and requirements for those individuals seeking visitation with Prime and Backup Crewmembers during the pre-launch quarantine period. These requirements must be met to receive permission to be in close contact with the crew.

**Requirements:**

1. Must be free of respiratory symptoms, regardless of cause. These symptoms include:
  - a. cough
  - b. runny nose/congestion
  - c. hoarseness/sore throat
  
2. Must not have a fever within 72 hours of the visit. A fever is defined as body temperature greater than 100.4° F, measured either via oral or tympanic membrane thermometer.
  
3. Must be free of gastrointestinal symptoms, regardless of cause. These symptoms include:
  - a. nausea
  - b. vomiting
  - c. diarrhea
  
4. Must refrain from handshaking or close personal contact with quarantined Prime Crewmembers.
  
5. Must cleanse their hands (with soap and water or alcohol-based hand sanitizing liquids (minimum alcohol content = 62%)) prior to visiting with the Prime Crew, as well as any time their hands contact their face.
  
6. Must report recent antibiotic use. If yes, then dates started and completed for review.
  
7. Must report on skin integrity, including:
  - a. Presence of any skin diseases e.g. impetigo, psoriasis
  - b. Current cuts/abrasions
  
8. Medical history for infectious disease risk factors, i.e. chronic diseases, recent hospitalization, surgery, or immune compromise.
  
9. Must provide exposure history. Recent exposure history includes individuals with symptoms of an infectious disease (e.g. respiratory or GI as above)

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10. Must report recent travel, tourist activity, concert attendance, or similar contact with large masses of people.

11. Must undergo brief in-person medical screening evaluation by NASA physician prior to initial contact.

Influenza Prevention:

- a. Anyone with close contact to an individual who has been diagnosed with influenza within the previous week is not permitted access to the Prime Crew during quarantine.
- b. During flu season, all PCs must wear a medical treatment mask at all times while they are visiting with Prime Crew or are in Astronaut Crew Quarters, UNLESS they have received the current annual flu vaccination(s) and are free of symptoms.

For recurrent screening after arrival at the launch facility while maintaining isolation conditions, only items 1-3 are required.

I acknowledge that I am free of the above symptoms, and will meet the requirements defined above.

---

Name (Print)          Sign                  Date

Reviewers Initials: \_\_\_\_\_

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## APPENDIX A-3 - VERIFICATION OF PRIMARY CONTACT COMPLIANCE WITH HSP REQUIREMENTS

### L-45 SCREENING QUESTIONNAIRE

#### FLIGHT CREW HEALTH STABILIZATION PROGRAM REQUIREMENTS FOR TEMPORARY PRIMARY CONTACT DESIGNATION

**Purpose:**

The purpose of the Flight Crew Health Stabilization Program is to prevent astronauts from contracting communicable diseases immediately prior to launch. Astronauts are placed in quarantine fourteen days prior to launch, in order to mitigate potential contact with infectious agents. The only individuals allowed contact with astronauts during this quarantine period must receive Primary Contact (PC) designation. PCs are instructed not to approach the quarantined astronauts (or other PCs) if they have or suspect they have a cold, flu, or other contagious condition. They are also instructed to report symptoms to the designated physician to determine when contact may be allowed.

This document outlines the health assessments and requirements for those individuals seeking visitation with Prime and Backup Crewmembers during the pre-launch quarantine period. These requirements must be met to receive permission to be in close contact with the crew.

**Requirements:**

1. Must report recent antibiotic use. If yes, then dates started and completed for review.
2. Must report on skin integrity, including:
  - a. Presence of any skin diseases e.g. impetigo, psoriasis
3. Medical history for infectious disease risk factors, i.e. chronic diseases, recent hospitalization, surgery, or immune compromise.
4. Must provide exposure history. Recent exposure history includes individuals with symptoms of an infectious disease.
5. Must report recent travel, tourist activity, concert attendance, or similar contact with large masses of people.

I acknowledge that I am free of the above symptoms, and will meet the requirements defined above.

---

Name (Print)                  Sign                  Date

Reviewers Initials: \_\_\_\_\_

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## **APPENDIX B – CONTENTS OF THE EDUCATIONAL BRIEFING**

An educational briefing dedicated to ID control is a requirement for all crew contacts. The briefing is preferably completed by viewing the audiovisual presentation. This may be completed before arrival by arrangement with the sponsoring Agency.

The educational briefing should include the following topics:

- A. The importance of vaccination, and vaccination requirements.
- B. Proper hand washing and hand hygiene techniques (see Hand Hygiene section below).
- C. Respiratory hygiene/cough etiquette (see Respiratory Hygiene section below).
- D. Recognition and understanding of the importance of avoiding crew contact and arranging to see a member of the IDCT at the first sign of illness.
- E. Physical separation/distancing. Briefing information will include the rationale and importance of physical separation/distancing in specific circumstances, for example when a contact may have been exposed to an infectious agent during travel, and for children.
- F. Personal protective equipment, including the rationale for the use of masks and gloves in particular circumstances.
- G. Medical screening. Discussion of the rationale for the requirement for medical screening before Crew contact.
- H. Limitation of access. Discussion of the reasons why some individuals may be excluded from Crew contact for specific periods of time, and the evidence-based rationale for the visitation restriction and specific duration.
- I. Avoidance of high risk activities for infectious disease transmission, including, for example, food and beverage contamination risk, public transit, large public gatherings.

### **HAND HYGIENE**

Hand hygiene is the most important practice to reduce the transmission of infectious agents since many ID agents can be transmitted through unclean hands. All personnel are required to follow a standardized hand-hygiene procedure prior to interactions with Crew. This will include hand washing and/or disinfection with alcohol-based hand sanitizer with an alcohol concentration of at least 62%.

Visibly soiled hands shall be thoroughly washed with soap (either antimicrobial or non-antimicrobial) and water following the approved protocol. Nails should be kept trimmed and clean.

For non-visibly soiled hands, either thorough hand-washing or alcohol-based hand disinfection products may be used. These products should contain a minimum of 62% (but not 100%)

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alcohol, and should be widely distributed and easily accessible for Crew and visitors at strategic positions.

Disease agents are often transmitted by indirect contact through surface contamination, and all personnel should avoid unnecessary touching of surfaces.

#### HAND WASHING PROCEDURE - World Health Organization (WHO) recommendations

1. Duration of the procedure – 40-60 seconds.
2. Wet the hands and apply soap.
3. Rub palms against each other.
4. Apply the palm of one hand on the back of the other and rub; switch hands.
5. Interlock fingers of the two hands and rub along and across.
6. Grab the thumb of one hand with the other hand and rub with rotational movement.
7. Scratch palms of hands with fingernails of the other hand.
8. Rinse hands.
9. Dry with a paper towel and use the towel to close the tap.

Also see Centers for Disease Control (CDC) website for hand washing.

#### **RESPIRATORY HYGIENE TECHNIQUES**

Respiratory transmission is the second major means of infectious disease transmission.

Proper respiratory/cough hygiene must be maintained when in contact with Crewmembers, or Crewmember contacts. Cough and sneeze hygiene measures include containment in sanitary tissues, or if not readily available sleeves (not hands). Hands should be washed or sanitized immediately following sneezing or coughing.

Respiratory hygiene targets contacts with cough, sneezing, congestion, rhinorrhea, or increased respiratory secretions for which the cause is unknown or unconfirmed. This may include individuals with undiagnosed (i.e. cause unknown) transmissible respiratory infections but may also include persons with uncontrolled allergy symptoms in whom the possibility of a respiratory infection cannot be ruled out.

Signs displaying proper cough etiquette and health practices should be placed at entrances and strategic places as a reminder of the importance of good respiratory hygiene. An example can be found at [http://www.cdc.gov/flu/protect/pdf/cdc\\_cough.pdf](http://www.cdc.gov/flu/protect/pdf/cdc_cough.pdf).

Also see CDC website for Seasonal Influenza (Flu) - Cover Your Cough.

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## **DISTANCING/PHYSICAL SEPARATION**

Distancing is an effective preventive measure in risk reduction for transmission of respiratory pathogens. Evidence-based studies indicate spatial separation of 5 feet (~1.5 m) is effective in preventing respiratory disease transmission for most common, respiratory pathogens. Distancing/spatial separation should be increased to 6 to 10 feet (~2-3 m) when exposure to emerging pathogens is possible, although in such circumstances, exclusion may be an appropriate measure.

The combination of hand and respiratory hygiene together with distancing of 5 feet will effectively prevent the transmission of infection from symptomatic, otherwise healthy, screened and vaccinated individuals to Crewmembers.

## **PERSONAL PROTECTIVE EQUIPMENT**

Personal Protective Equipment refers to the use of face masks and gloves to reduce the risk of transmission of infectious agents. Combined with distancing, the use of PPE effectively prevents the spread of infectious disease. Individuals so directed must use PPE as instructed. Failure to do so may compromise infectious disease prevention and may constitute grounds for termination of visitation rights.

PPE is normally disposable and is discarded upon single use. When required, the selection of PPE (masks, gloves or both) is based on the known mode(s) of transmission of the exposure pathogen (e.g. masks for respiratory infections). Designated disposal containers should be conveniently placed near where the PPE would be removed. Hand hygiene is required after removal of PPE.

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## **APPENDIX C – DEFINITION AND MODES OF INFECTIOUS DISEASE TRANSMISSION**

### **INCUBATION PERIOD**

The time between invasion with an infectious agent and the appearance of the first sign or symptom of disease. The incubation period is an Indicator of the timeframe during which further cases may emerge.

### **MODES OF TRANSMISSION**

(Reference: CDC Guideline for Isolation Precautions, Siegel et al., 2007)

There are 3 modes of transmission: (1) Contact, (2) Droplet, (3) Airborne and Blood borne. Some infectious agents may be transmitted by more than one route. Contact transmission is the most common, and can be divided into 2 subgroups: direct contact and indirect contact transmission.

#### **DIRECT CONTACT TRANSMISSION**

Transfer of infectious agent from one infected person to another person without a contaminated intermediate object or person. Examples include blood containing fluid contacting a mucous membrane, scabies mites, and ungloved herpetic whitlow while providing oral care.

#### **INDIRECT CONTACT TRANSMISSION**

Transfer of an infectious agent through a contaminated intermediate object or person. Examples include transmission to hands from a colonized inanimate object, medical devices, or shared toys. Agents such as Herpes simplex virus (HSV), respiratory syncytial virus, and Staphylococcus aureus can be transmitted this way.

#### **DROPLET TRANSMISSION (GREATER THAN 5µm)**

Note that Droplets are not the same as Droplet nuclei (less than 5µm)

Infectious respiratory droplets are transmitted directly from the respiratory tract of the infected individual to the mucosal surfaces (nasal mucosa, conjunctiva, and less frequently the mouth) of another person over short distances. Required personal protective equipment includes the use of facial protection such as masks. Area of identified risk is  $\leq 1.5$  meters. Using this distance for donning masks has been effective in preventing transmission of infectious agents via the droplet route, i.e., masks are required to be closer than this.

Examples of agents transmitted through this route include: Influenza, Rhinovirus (which is the cause of 30-50% of Upper Respiratory Tract Infections in adults and children), Adenoviruses,

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Pertussis, Group A Streptococcus, Mycoplasma pneumoniae, Severe Acute Respiratory Syndrome associated coronavirus (SARS-CoV), Neisseria meningitis.

Organisms transmitted by the droplet route do not remain infective over long distances, and therefore do not require special air handling and ventilation.

**AIRBORNE TRANSMISSION: DROPLET NUCLEI ( $\leq 5\mu\text{m}$ )**

Dissemination of either droplet nuclei  $\leq 5\mu\text{m}$  or small respirable particles that remain infectious over time and distance, and which may be dispersed by air currents over long distances. Such particles may be inhaled by susceptible individuals who have not had face-to-face contact with (or been in the same room with) the infectious individual. Prevention requires special air handling and ventilation systems for containment and removal and PPE of N95 or higher respirator is needed. Examples of agents transmitted by this route include: Tuberculosis, Measles, Chicken pox, Aspergillus spores.

**BLOOD BORNE TRANSMISSION**

Transmission of microorganisms in blood and certain body fluids can cause disease in humans. Potential exposure occurs through contact with blood, saliva, vaginal secretions, semen, and other potentially infectious bodily fluids.



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## APPENDIX D – OPEN WORK

Table D-1 lists the specific To Be Determined (TBD) items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (i.e., <**TBD 4-1**> is the first undetermined item assigned in Section 4 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBD will not be renumbered.

**TABLE D-1 TO BE DETERMINED**

TBD	Section	Description
4-1	4	The document number and creation schedule is To Be Determined.
4-2	4	Document is To Be Determined
4-3	4	Document is To Be Determined

Table D-2 lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (i.e., <**TBR 4-1**> is the first unresolved issue assigned in Section 4 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

**TABLE D-2 TO BE RESOLVED ISSUES**

TBR	Section	Description

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## APPENDIX E – ACRONYMS

ACQ	Astronaut Crew Quarters
AQF	Astronaut Quarantine Facility
BDC	Baseline Data Collection
BHP	Behavioral Health and Performance
CB	Astronaut Office
CCP	Commercial Crew Program
CDC	Centers for Disease Control
CEF	Crew Exam Facility
CMORD	Commercial Medical Operations Requirements Document
DL	Designated Lead
FOD	Flight Operations Directorate
GCTC	Gagarin Cosmonaut Training Center
GI	Gastrointestinal
HH&P	Human Health and Performance
HSP	Health Stabilization Program
ID	Infectious Disease
IDCT	Infectious Disease Control Team
IMG	Integrated Medical Group
IMMT	ISS Mission Management Team
ISS	International Space Station
IP	International Partner
JSC	Lyndon B. Johnson Space Center
KSC	John F. Kennedy Space Center
L-	Launch minus
MED	Medical Evaluation Documents
MMOP	Multilateral Medical Operations Panel
MMT	Mission Management Team
MSMB	Multilateral Space Medicine Board
MMPB	Multilateral Medical Policy Board
NASA	National Aeronautics and Space Administration
NPR	NASA Procedural Requirement
NPD	NASA Policy Directive
OCHMO	Office of the Chief Health and Medical Officer
OG	Operational Group
PC	Primary Contact
PPE	Personal Protective Equipment
SATERN	System for Administration, Training, and Educational Resources for NASA
SME	Subject Matter Expert
SMOT	Space Medicine Operations Team
U.S.	United States
VIP	Very Important Person
VITO	Vehicle Integration & Test Office

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WHO

World Health Organization

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