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Guidelines for En Route Medical Care in Present and Future MEDEVAC Operations (COVID SMOG Annex)

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14. ABSTRACT

Although the authority for the transport of COVID patients resides with USTRANSCOM, it is imperative that MEDEVAC Companies be afforded the most evidenced based and holistic recommendations regarding the movement of COVID patients. A process improvement study involving 20 aeromedical authorities from 6 nations was conducted. 94 surveys/SOPs collected as part of this effort culminated in a virtual international conference conducted on 29 Jan 2021. Notable agencies participating in this process improvement project include U.S. Army MEDEVAC Units, the School of Army Aviation Medicine (SAAM), the FAA, our sister services, Joint Trauma Systems and Boston Med Flight. Individual participants in the SME analysis included Enroute Critical Care Nurses, Critical Care Flight Paramedics, MEDEVAC quality and safety executives, pilots, aerospace medicine specialists and emergency medicine physicians. The following recommended practices represent a concurrence of SAAM and Boston MedFlight policies and procedures, with additional subject matter expertise garnered from the 29 January 2021 international teleconference.

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Background and Methods

Although the authority for the transport of COVID-19 patients resides with the U.S. Transportation Command (USTRANSCOM), it is imperative that medical evacuation (MEDEVAC) Companies be afforded the most evidenced based and holistic recommendations regarding the movement of COVID-19 patients. This is especially so during the increased spread of this highly contagious virus.

A 2020 U.S. Army Aeromedical Research Laboratory (USAARL) process improvement study involving twenty aeromedical authorities from six nations was conducted from May, 2020 to December, 2020. Ninety-four surveys/standard operating procedures (SOPs) were collected as part of this effort which culminated in a virtual international conference conducted on January 29, 2021. Notable agencies participating in this process improvement project include U.S. Army active, Reserve, and National Guard MEDEVAC Units across the contiguous and non-contiguous U.S., the School of Army Aviation Medicine (SAAM), the Federal Aviation Administration (FAA), our sister services including the U.S. Air Force and U.S. Navy, Joint Trauma Systems, and Boston Med Flight – which has flown over 300 COVID-19 missions without a single instance of disease transmission to the aircrew throughout the pandemic. Individual participants in the subject matter expert analysis included En route Critical Care Nurses, Critical Care Flight Paramedics, MEDEVAC quality and safety executives, pilots, aerospace medicine specialists, and emergency medicine physicians.

Results and Discussion

The following recommended practices represent a concurrence of SAAM and Boston Med Flight policies and procedures, with additional subject matter expertise garnered from the January 29, 2021 international teleconference that took place over Microsoft Teams.

The following practices should be strongly considered for local adoption given high levels of evidence and/or subject matter consensus.

Institutional Policies:

Operations

- A flight surgeon/medical director should be available 24/7 for COVID-19 related advice
- Flight surgeon duties must be explicitly outlined in all local SOPs
- Short-term extension of aviation currencies are acceptable when social distancing and/or mission requirements preclude this training
- COVID-19 symptom and temperature screening of the entire flight crew should occur at the beginning of each duty day. However, the outgoing crew should not conduct this check given the potential for viral transmission to the oncoming crew
- Facilities should require employees to respond to symptom screening questions prior entrance the work facility
- Whenever possible, website portals for posting the latest COVID-19 related policies and resources – important updates should be made available in the reading file

- The same ‘bubble’ of crews and administrative staff should habitually work together in order to limit cross transmission between personnel
- Companies should require mask use for personnel in non-patient settings
- Companies should prohibit gaiters, bandanas, scarves, and turtlenecks in both patient and non-patient settings
- Companies should require the cleaning of crew eating rooms, with frequency dependent upon degree of crew turnover
- Companies should mandate occupancy limits
- Companies should ensure close monitoring of high demand supplies
- Companies should re-organize workstations as needed to preserve physical distancing
- The standardization pilot and Commander/1SG should serve as authorities for enforcement of local SOPs
- Flight operations should screen all calls for COVID-19 symptoms
- Local SOPs should be reviewed on an established schedule – quarterly to 2 years
- Change of shift brief should include review of personal protective equipment (PPE) procedures, anticipated loading challenges and decontamination requirements
- All meetings should be conducted via virtual platform, if possible

Training

- Companies should provide validated training on the use of PPE
- Flight Paramedic/nurse training should have a special focus on first time intubation success
- Companies should establish written procedures for emergency de-proning should re-intubation be required

PPE Management

- Unused N95 masks which are past expiration dates should continue to be used for individual training rather than disposed of without further use
- Quantitative fit testing of the N95 mask should be undertaken prior to mission assumption
- Quantitative fit testing should occur in the presence of all applicable safety equipment (i.e., visor down, helmet, and facial shield)
- Flight uniforms should be washed daily and if at all possible, an extra flight uniform should be provided to each member of the flight crew in order to mitigate the effects of repeated laundry cycles
- Decontamination procedures should be regularly drilled

Pre-Flight Procedures

- Crews should avail themselves of the toilet and ensure ample hydration in order to prepare for what may be very heated and prolonged PPE conditions
- Crews should take special care to remove rings and watches so as to not snag gloves
- Crews should pre-brief PPE and disinfection measures, cough etiquette, face and/or

hand hygiene through the medical crew
- Prior to flight, a deliberate staging area for disposal of PPE and biohazard bag should be designated
- Receiving healthcare facility should be notified if the patient is suspected or known to be COVID-19 positive
- Mission should group multiple COVID-19 patients on one aircraft to minimize crew exposure
- Patient escorts should be prohibited with the exception of when absolutely necessary (i.e., parent/legal medical decision maker). In these cases, the escort should be screened for symptoms, provided with an N95 mask, hand sanitizer, and instruction on cough etiquette

Patient Movement

- Patient loading should be supervised
- Static loading and unloading is preferred (presents lower risk for aerosolization of virus, potential PPE disruption, and/or foreign object debris secondary to rotor wash)
- Patients (ambulatory) should secure themselves into seat (with crew supervision), with the understanding that the movement of non-urgent patients is highly discouraged
- Patients (ambulatory) should use hand sanitizer if at all possible, with the understanding that the movement of non-urgent patients is highly discouraged
- Patients' dressings, infusions, and monitor attachment points should be reviewed in order to confirm secure placement
- Medics should not touch hospital doors, walls, or other surfaces during patient transfer
- Medics, prior to patient pick-up, should stow flying gloves, wash hands (as available) then don disposable gloves
- Crew should use hand sanitizer after entering and exiting aircraft
- Pilot and non-medical aircrew must wear PPE (full) if helping with loading (although assisting with loading is discouraged)
- Handwashing should occur after glove removal at any time
- Hands should be sanitized with soap and water washing if visibly soiled
- Hand sanitizing should occur with every location change (i.e., entering and leaving the cockpit, contacting any surface that may have been touched by others)
- Doors should be open for ventilation during static phase of transfer
- Crew members should not interact with refuelers and maintain a 6 foot distance
- Pilots should not exit the aircraft until the rotors are stopped and the area to the front of the aircraft cleared of other personnel during patient movement
- Patient's endotracheal tube should be confirmed as secure
- Medics should rehearse emergency deproning for unplanned extubation as well as cardiopulmonary resuscitation (CPR) hand placement on proned patients in the event of re-intubation immediately prior to transfer
- A clean runner should be designated during patient transfer

PPE and Isolation Measures

- Pre-packed COVID-19 kits should be assembled and contain enough equipment to allow for back-to-back missions
- Crew members should re-mask away from COVID-19 threat when an initial mask becomes damaged, uncomfortable, or damp
- Crew members should crosscheck PPE donning and doffing
- PPE should be matched for COVID-19 status; a minimum of a surgical mask for patients without suspected/actual COVID-19 status
- All flight crew should wear N95 mask and a maxillofacial shield with visor down. Non-medical crew may use a surgical mask (preferred over cloth mask) if supplies are limited but should otherwise be in the same PPE configuration
- Medical crew should wear a single pair of surgical gloves, changing them if soiled
- Patients (ambulatory) should use hand sanitizer prior to entering aircraft, with the understanding that the movement of ambulatory patients is highly discouraged.
- Patients should wear a surgical mask at a minimum
- Patient belongings should be sealed in plastic (biohazard) bag and name labelled
- Patients' nasal cannula (if required) should be placed under mask
- Facial hair that could impact mask use should be prohibited
- Hand sanitizing and avoidance of face touching during all phases of flight is critical
- Hand sanitizer should be within hands-reach and easily accessible for all crew
- Field expedient pods/patient isolation units are not recommended (no extra protection for ventilator patients, can cause respiration difficulty, may represent flight safety risk)
- PPE can cause fatigue – crew members should declare themselves and risk mitigate as appropriate
- Pilots should not be required to wear disposable gloves at the flight controls
- Generic (flammable) Tyvek suits should not be worn
- Improvised cockpit barriers should not be used

Airflow and Vent Systems

- Per the International Air Transport Association, the aircraft should be decontaminated at the receiving hospital helipad if possible, and the aircraft should be left to dry for 10 minutes after decontamination
- In general, ventilation within the cabin should be encouraged
- The decontamination team's PPE and process should be pre-established and use a team approach
- The medic and/or decontamination team should supervise the removal of PPE
- The crew should decontaminate any cell phone if used during flight
- The crew should decontaminate/discard any pens used for transcription/marking
- The medical crew should disinfect in the following manner - disinfect gloves, remove gloves, hand disinfection, remove aviation life support equipment (ALSE) and helmet, hand disinfection, remove flight suit and boots, clean hands
- The crew should wash the flight suit daily regardless of COVID-19 mission, ideally with disposable or washable liners in laundry hampers

- The crew should wash hands between washing and drying of laundry
- Cleaning of cockpit should be the responsibility of the pilot
- Decontamination sprays must be approved substances at recommended contact times
- Decontamination with compressed air is prohibited
- The outside of alcohol spray bottles should be decontaminated
- For helmet decontamination - apply disinfectant and let settle for 3 minutes (5 minutes for blood), do not scrub, wipe with clean cloth
- Decontaminate ALSE or survival equipment without the use of bleach
- Decontamination of ALSE and survival equipment should be the responsibility of the mission flight crew
- Decontamination of ALSE should be undertaken through gentle scrubbing
- Following full decontamination process, there should be immediate resumption of first up crew duties

Post Flight

- After-action reviews should be conducted after every mission in order to improve the evacuation process and increase safety
- The aircraft should be left open as long as possible after decontamination
- Aircraft decontamination should occur downwind if at all possible
- Currently, disinfective fogging should not be undertaken especially in the instrument areas
- Post flight health monitoring should be conducted in accordance with Center of Disease Control guidelines pertaining to anyone who has been exposed to COVID-19
- No need for quarantine if all PPE measures have been undertaken

References

COVID-19 RISK: Aim for the Lowest Achievable Risk (TA-595-0720 Version 1.1), July 2020.

Edwards M, Black M, Manson C, Hooper J et al., Life Flight Retrieval Medicine. (SOP-17 RW), Rotor Wing retrieval of Patients with Infectious Disease.

Cornelius B, Cornelius A, Crisafi L, et al. Mass Air Medical Repatriation of Coronavirus Disease 2019 Patients. Air Med J. 2020; 39(4): 251-256.

Rajbhandari B, Phuyal N, Shrestha B, Thapa M. Air Medical Evacuation of Nepalese Citizen During Epidemic of COVID-19 from Wuhan to Nepal. JNMA J Nepal Med Assoc. 2020; 58(222): 125-133.

Bae SH, Shin H, Koo HY, Lee SW, Yang JM, Yon DK. Asymptomatic Transmission of SARS-CoV-2 on Evacuation Flight [published online ahead of print, 2020 Aug 21]. Emerg Infect Dis. 2020; 26.

Borges LL, Guimarães CCV, Aguiar BGC, Felipe LAF. Military Nursing in "Operation Return to Brazil": aeromedical evacuation in the coronavirus pandemic. Rev Bras Enferm. 2020; 73 Suppl 2: e20200297).

Pongpirul K, Kaewpoungngam K, Chotirosniramit K, Theprugsa S. Commercial airline protocol during COVID-19 pandemic: An experience of Thai Airways International. PLoS One. 2020; 15(8): e0237299. Published 2020 Aug 6.

Osborn L, Meyer D, Dahm P, et al. Integration of aeromedicine in the response to the COVID-19 pandemic [published online ahead of print, 2020 Jun 4]. J Am Coll Emerg Physicians Open. 2020; 10.1002.

Albrecht R, Knapp J, Theiler L, Eder M, Pietsch U. Transport of COVID-19 and other highly contagious patients by helicopter and fixed-wing air ambulance: a narrative review and experience of the Swiss air rescue Rega. Scand J Trauma Resusc Emerg Med. 2020; 28(1): 40. Published 2020 May 14.

Sasidharan S, Singh V, Harpreet S. et al. Patient Evacuation Pods for COVID-19 Infected Patients – Is This the Answer. Journal of Anesthesiology Clinical Pharmacology. 2020; 36(1): S152-S155.

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