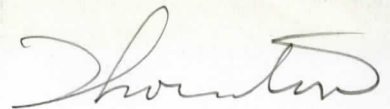


UNITED STATES GOVERNMENT

# Memorandum



TO : DC5/H. O. Wheeler, Ph. D.

DATE: October 17, 1969

FROM : CB/J. P. Kerwin

SUBJECT: Comments on inflight medical support system

This is a much needed study, and here are some ideas on how to go about it.

a. For Apollo Applications (AAP), speed and simplicity are of the essence so we can get it onboard. We should put our heads together and decide broadly what sorts of things we'll need to treat, without doing a big study on the subject. For the space station, the approach should be to do a study on the "epidemiology" of disease in healthy middle-aged males, and then plan a more sophisticated treatment capability.

b. The IMSS should be designed on the assumption that a physician is onboard; i.e. we're not planning merely a first-aid kit. On flight without a physician we can merely curtail the use of the system.

c. Once we've decided roughly what to treat, let's negotiate a study contract with a professional medical organization, NOT a hardware contractor, to tell us what the preferred methods of diagnosis and treatment are and what equipment is needed. I mean a medical group (because the military are the experts in medical care of isolated groups). Specifically, we should have the service of experts in the fields of internal medicine, general surgery, Ear, Nose, and Throat, ophthalmology and pharmacology, at least.

d. Then we should take the output of that study, massage it for feasibility, and let our hardware contract(s) for assembly and packaging of the system. This way we keep control, get the best professional inputs, and wind up with a practical package. For AAP, ground rules should include no spacecraft interface, minimal qualification requirements.

Let me run through an off-the-cuff requirements study by way of example:

- a. We should concentrate on the treatment of
  - (1) acute infectious disease



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- (2) trauma
- (3) preliminary care of selected medical emergencies

b. Acute infectious diseases to be considered include:

- (1) upper respiratory disease pharyngitis, [sinusitis, otitis media
- (2) bronchitis and pneumonia
- (3) GI disorders: gastritis, diarrhea
- (4) GU disorders: cystitis, phylonephritis

c. Equipment useful in diagnosis of the above includes:

- (1) clinical thermometer
- (2) stethoscope
- (3) blood pressure cuff (might as well throw it in here)
- (4) otoscope, with attachment for sinus transillumination
- (5) laryngeal mirrors, include 4 x 4 gauze, means of heating mirrors, and a self-powered head-mounted light source (better than head mirror)
- (6) Examining table: use M131 letter chair
- (7) blood examination equipment: need to do WEC and diff, and hopefully Hgb; requires microscope and stain/smear capability.
- (8) sputum exam: same as above, and gram stain. Culture desirable, but too ambitious for AAP. Antibiotic sensitivity could be feasible.
- (9) urine examination: pH, sugar, acetone are easy but not very important: ability to examine a stained? sediment is very desirable. Occult blood, also for stools.

d. Treatment: Prepare list of antibiotics, expectorants, anti-spasmodics, antacids, etc. Special diets (e.g. ulcer, liquid) need consideration, but not for AAP.

e. Types of trauma to be considered includes:

- (1) fracture/dislocation/crush injuries



- (2) lacerations
- (3) sprain/strain/contusions
- (4) burns (assume small area)
- (5) head injury: fracture, concussion, intracranial hemorrhage

f. Additional diagnostic equipment: primarily x-ray, which is premature for AAP but important for space station.

g. Additional treatment equipment: very interesting area:

- (1) sterile preparation and debridement
- (2) Suturing and hemostasis
- (3) local anesthesia and sedation
- (4) immobilization, splinting, ? traction (probably not for AAP, most fractures require x-ray for setting). Consider inflatable splints, but reentry is a problem there (splint will deflate).
- (5) bandaging
- (6) treatment of shock. Requires method of administering i.v. fluids; measurement of central venous pressure, etc. Requires onboard EKG readout capability

h. Medical emergencies to be considered:

- (1) "acute abdomen"
- (2) urinary tract stone
- (3) myocardial infarction/CVA/pulmonary embolism (low probability but severe)
- (4) acute hypoxia and dysbarism
- (5) ? electrocution (cardiac arrest or arrhythmia). Most of these can safely be ignored on AAP, but we need to start thinking about them.)

i. Additional diagnostic and treatment equipment for the above: I haven't really thought it out, and the memo is getting too long. But that's the approach we ought to take.

cc: All AAP Astronaut

*Joe*  
Joe Kerwin