

Spaceflight Related Relationship Problems CLIFF Peer Review

1. *Strength of evidence presented in CLIFF in modeling the characteristics and mission impact of this medical condition within the spaceflight environment?*

Score: 2

Grading Scale:

4 - *Confident*

3 - *Somewhat confident*

2 – *Neutral*

1 – *Somewhat unconfident*

0 – *Not confident*

2. How confident are you that these data accurately represent the spaceflight environment?	Tables 1, 2 Composite Incidence and Level of Confidence	Table 3, 4 BC/WC LOC and probability	Table 4 - Clinical Phase 1, 2 durations Table 5 – CP 2 LOC	Table 4 – RTDC % Table 6 – RTDC LOC	Table 4 – Loss of crew life % Table 7 – Loss of crew life LOC	Table 8 – TI
Score	1	2	3	2	3	3

Comments and limitations:

1. General comments. This CLIFF characterizes relationship problems that may arise during spaceflight and that may affect crew cohesiveness and even mission success. Relationship problems are not unique to spaceflight, in fact, they are common in any organization or group that relies on team activities to achieve their stated goals. However, the isolation, confinement and lack of privacy during space travel all contribute to the risk for significant relationship issues. These problems may also include friction with Mission Control, organizational leaders, or family members. Studies of analog environments have shown a “third quarter phenomenon” in which negativity regarding team interactions peaks in the 3rd quarter of a mission and generally improves in the 4th. Differentiating between a significant relational conflict and minor irritation with a crewmate or family member is difficult. There are most likely daily small slights that go unrecorded. Finding evidence for the incidence of relationship problems during spaceflight is difficult as crewmembers may be reluctant to voice their frustrations or concerns. The best case is considered to be an Interpersonal conflict that is either quickly resolved or addressed appropriately. The conflict does not interfere with operations and/or does not create enduring negative impacts to relationships. The worst case is a continuous relationship problem (i.e. family, crew, mission support personnel) that cause significant personal stress that interferes with work performance, other relationships, social withdrawal, mood,

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or sleep and has marked negative impact on crew members, crew cohesion as well as on operations. Treatment is increased behavioral countermeasures and counselling.

2. Incidence. The incidence calculation was based on a review of 1256 diary entries that were made by ISS astronauts. Of these, 962 were classified as being associated with group interactions that dealt with relationships. From these, there were 150 that described relationship conflicts. This was chosen to inform the incidence distributions. It is felt that there are a number of shortcomings to this study, but it is the only one that could be found that describes the unique environment of spaceflight. The limitations to this study are listed below. The best case/worst case probabilities were derived from the same study which showed that the most difficult aspect of the mission was dealing with interpersonal relationships in 40% of astronauts who were surveyed. The clinical phase durations were based on SME estimates and duration of the mission, Both RTDC and Loss of crew life probabilities were considered to be zero based on consensus opinion. The probability density curve that was derived appears to be a reasonable representation of the data present

3. Clinical phase data. I am in agreement with the clinical phase 1 duration entered in this CLIFF. This data was compiled by a team of expert clinicians, and I was involved in the discussions leading to the calculation of the clinical phase duration. CP2 was supported by terrestrial evidence.

4. Task impairment. The analysis was performed and reviewed by a separate team of expert clinicians. I am aware of the methods that were used but did not directly participate in the discussions.

5. Dependence on mission phase or duration of mission. The incidence of this medical condition may vary over the course of the mission. The “3rd quarter effect” is the observation that relationship problems peak during the 3rd quarter of the mission and then decrease as the mission nears completion.

6. Limitations

- There is a paucity of published data relating specifically to spaceflight related relationship problems as defined by this CLIFF due to the often identifiable and sensitive nature of these issues.
- There is a paucity of published data related to the duration of this condition in the literature. Therefore, all durations are based on SME input from one Clinician in the Behavioral Health Program at NASA, Johnson Space Center.
- RTDC and Loss of crew life are not anticipated outcomes of this condition. Specific literature searches for these outcomes were not conducted, but no literature obtained elsewhere for the CLIFF endorsed these outcomes. BHP corroborated this assumption. However, although the probability of an interpersonal relational issue leading to the need to abort the mission is low, it is probably not zero. The worst case definition explicitly states that increased treatment is needed. If treatment is not available (UTWC), there is a finite possibility that the issue could end in loss of mission, requiring RTDC.
- The study that informed the incidence distribution had a number of limitations.
 - Some crewmembers wrote much more than others, leading to a differential output from crewmembers. This could lead to a bias.
 - Crewmembers may be reluctant to record comments that would be critical to other members of the crew.
 - “Double counting” may take place in which multiple entries could be associated with the same relationship conflict.

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- Crewmembers may discuss their shared experiences with each other that could influence the diary entries.
 - Determining the threshold for what constitutes a “relationship conflict” versus a minor irritation can be problematic.
- The incidence of this medical condition may vary over the course of the mission. The “3rd quarter effect” is the observation that relationship problems peak during the 3rd quarter of the mission and then decrease as the mission nears completion.

Reviewed by:

David C. Hilmers