

Space Adaptation Urinary Incontinence 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: 3

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 Loss of Crew and probability	Table 4 - Clinical Phase 1, 2 durations Table 5 – CP 2 Loss of Crew	Table 4 – RTDC % Table 6 – RTDC Loss of Crew	Table 4 – Loss of Crew Life % Table 7 – Loss of Crew Life, Loss of Crew	Table 8 – TI
Score	3	3	3	4	4	3

Comments and limitations:

1. General comments. This CLIFF examines urinary incontinence (involuntary leakage of urine) which occurs during the first 5 days of space flight after insertion into orbit. Urinary incontinence is usually divided into categories including stress, overflow, urge and functional incontinence. There have been several cases of urinary leakage during the initial days of spaceflight, all of the reports have been in women. Since urinary retention is also more commonly reported in females, some of the cases are attributed to overflow incontinence after urinary retention. Other cases could be from stress incontinence or urinary tract infection. Other cases may have simply been post-void dribbling (also very common in men) which is only a minor nuisance. The best case is considered to be an uncomplicated course of urinary incontinence which resolves by itself or causes minimal discomfort during the first 5 days of spaceflight. There is no worst case defined. Of note, urinary incontinence secondary to urine retention is addressed in ICL 98 Space Adaptation Urinary Incontinence.

2. Incidence. The incidence for this CLIFF was derived from LSAH data that collected the inflight reports of urinary incontinence. Two gender-specific distributions were calculated based on the reported differential incidence between males and females. There have been no reports of urinary

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incontinence in males, so the incidence distribution was derived using the spaceflight data of 0 events over 692 person-missions. The resulting distribution with a non-zero mean could be an overestimation since no events have occurred. The female distribution is based on 5 events occurring over 115 person-missions. The best case/worst case probability is calculated to be 100%/0% because there is no worst case defined. The clinical phase durations are based on observational data that show the best case usually lasts from 0 to 24 hours. There are no values given for worst case events since worst case is not defined. RTDC and Loss of crew life probabilities were considered to be zero given the medical condition definition. The probability density curve that was derived appears to be a reasonable representation of the data presented.

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 spaceflight 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. This medical condition is dependent on mission phase as it only occurs during the first five mission days.

6. Limitations

- The data studied only a limited number of subjects and used specific vehicle and mission profiles. Future missions may differ in terms of vehicles and mission profiles.
- There have been no reports of urinary incontinence in males, so the incidence distribution was derived using the spaceflight data of 0 events over 692 person-missions. The resulting distribution could be an overestimation since no events have occurred.
- The clinical phase II durations for this CLIFF were taken from the prior IMM CLIFF which is based on LSAH data. The ExMC composer/editor of this CLIFF did not have access to the primary source but felt after looking through multiple other sources that these estimates for duration were reasonable given that they are spaceflight specific.

Reviewed by:

David C. Hilmer