An Evidence Base for Human Spaceflight Risks in Wikipedia

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Abstract

NASA’s Human Research Program (HRP) is focused on understanding and mitigating the risks to crew health and performance in exploration missions beyond low Earth orbit. The HRP has developed an evidence report for each of the risks. Most evidence reports are a brief review article describing the evidence available to mitigate each specific risk. The evidence reports are written by an educated, non-specialist reviewer. Each evidence report captures the current state of knowledge from both terrestrial and space-based research. Two features of the evidence reports have become apparent: (1) they are updated infrequently, and (2) they do not take full advantage of the expertise available in other space-agencies and in related fields of terrestrial research. Therefore, the HRP is experimenting with the use of Wikipedia articles as a repository for evidence. Wikipedia’s accessibility to the international space flight community and researchers in related terrestrial fields creates the opportunity to generate a more timely and comprehensive evidence base. Initial Wikipedia articles were populated for seven risks using a subset of the information in the HRP-approved evidence reports. Fatigue and Sleep Loss, Treating Anxiety and Managing Stress, Reducing the Catastrophic Risk of Spaceflight, EVA in a Closed-Loop Life Support System, Countermeasures to Support the Performance of Extravehicular Activities, Heat Stress, and Spaceflight-Related Acute Renal Failure. The HRP plan is to update and reorganize the Wikipedia articles as data emanate from the HRP and other space-agencies and research institutes. The articles will report on the nature of the contributions made after the initial articles were created, the comprehensiveness of the resulting Wikipedia articles, and the effort required to maintain quality control of the content. The Wikipedia approach will also be compared to wiki tools that use more traditional editorial control of content input to policing.

1st Generation Evidence Base

- 2008 Evidence Book
  - One volume
  - One chapter for each HRP risk
  - Review paper format
  - Aimed at scientifically educated, non-specialist reader
  - Current state of knowledge from both research and operations.
- Authors
  - Human Research Program
  - National Space Biomedical Research Institute

2nd Generation Evidence Base

- The Gene Wiki precedent
  - Involves the creation of a collaborative wiki, continuously updated, high-quality review article for all (~10,000) human genes.
- Wikipedia
  - Collaboration involves experts in the fields of knowledge
  - Links, add and edit content
  - Wikipedia.org/humangenome_list

- The HRP Implementation
  - portal page in wikispace
  - Main article for each HRP risk
  -extensive list of resources, additional information
  - Summary of HRP-approved Evidence Report

https://en.wikipedia.org/wiki/Space_HumanHealth_and_Performance_in_Space

3rd Generation Evidence Base

- Wiki based, but not Wikipedia
- Editorially controlled
  - Editorial Board for each Evidence Report
- Initial content = HRP-approved Evidence Reports
  - Versioned copy of full Evidence Report
- Contributions
  - Default: pre-screened by editorial board
  - Option: Pre-approved contributors provide input that is screened post-publication
  - Coming Fall 2013
- Humanresearchroadmap.nasa.gov/Evidence

The 32 Risks

Limitations

- Limited authorship
  - NASA and NSBRI
  - Missing international partners
  - Missing researchers studying related terrestrial issues
- Laborious update process
  - Resulting in "all or none" updates
- Infrequent updates

Strengths

- Extremely accessible
- Reading
- Contributing
- Many "hits"
- Links to other wiki content

Conclusion

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<tr>
<th>Type of Contribution</th>
<th>Number of Contributions</th>
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<thead>
<tr>
<th>First Generation</th>
<th>Second Generation</th>
<th>Third Generation</th>
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<tbody>
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<td>Viewed others; very open to contributions</td>
</tr>
<tr>
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</tr>
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- Limited authorship;
- infrequent updates
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- very few contributions

Some limitations in the evidence base include:

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- Missing researchers studying related terrestrial issues
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