

Interpreting Health Risks from Radiation Dose

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The Canadian Space Agency (CSA) and other space-faring nations are preparing for crewed exploration beyond lowEarth orbit (BLEO). In preparation for these exciting missions, an extensive effort is underway to improve understanding of the radiological risks that may be experienced.

There are many elements that go into understanding the radiological risks associated with BLEO missions including: (1) the accuracy of environmental models which describe the deep space radiation environment, (2) the quality and applicability of radiation transport tools used to assess dose and shielding effectiveness from high-charge and energy (HZE) radiation species, (3) approaches to dosimetry including measurement and interpretation, (4) results from available radiobiological studies for evidence-based risks of cancer and non-cancer effects, and finally (5) how risk is assessed and quantified.

The International Commission on Radiological Protection (ICRP) Task Group (TG) 115 was recently established with the aim to reach consensus between space-faring nations on these and other parameters. The CSA is represented on TG115 and the work that CNL is performing is intended to inform and advise the Canadian perspective. That is the goal of our 3-yr project which will end in FY21/22.

Our approach for this FY will be to review the current state of knowledge on these and other parameters, to summarize uncertainties and identify where CNL can contribute moving forward. This project addresses several Theme 1 (Health) strategic areas including improving the health and wellness of Canadians and working towards quantification of radiation health risks.