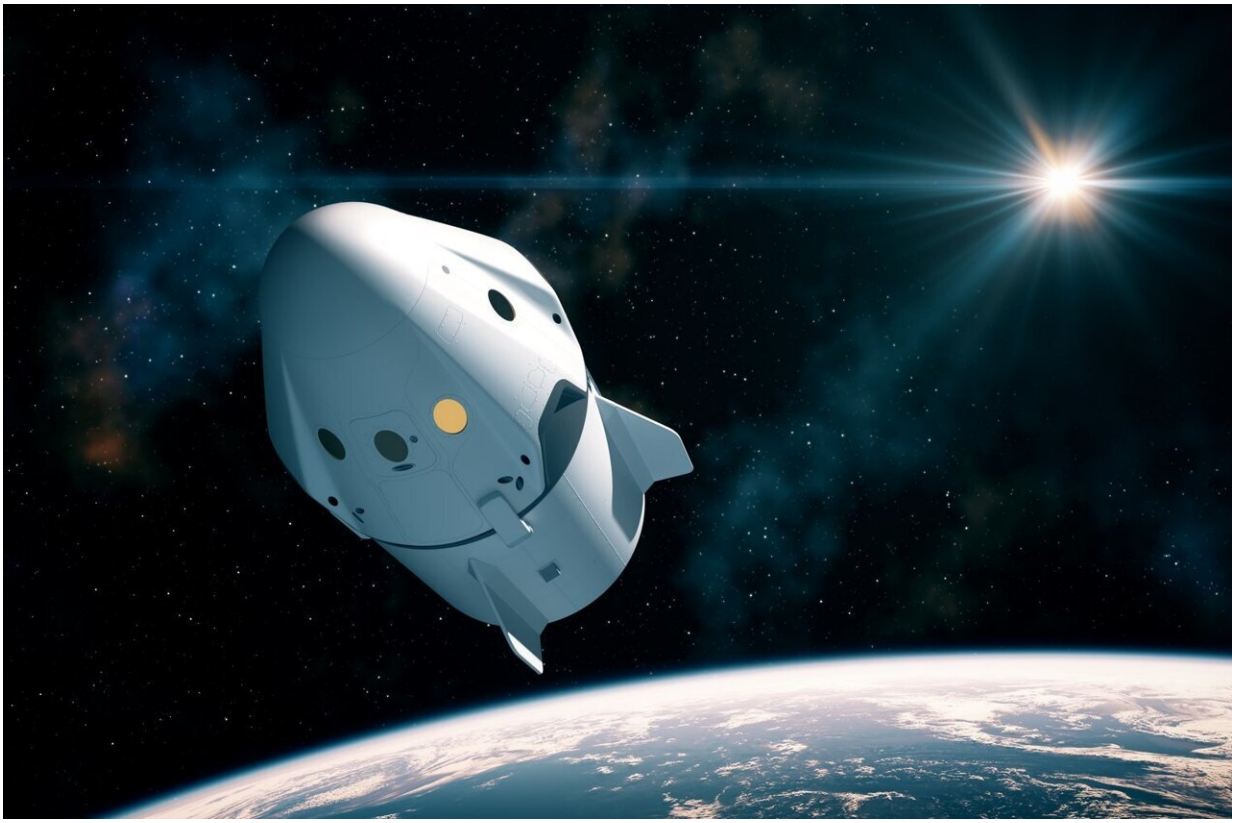
Short commercial space flights may not have big impact on health

June 11 2024, by Carole Tanzer Miller



The first all-civilian space mission is shedding light on the potential health risks facing private astronauts. The takeaway is short-duration spaceflights appear to pose none that are significant. The study sample

was small—four people who spent three days in low-earth orbit (LEO) on the 2021 Inspiration4 mission.

But it lays the groundwork for an open biomedical database for commercial astronauts' health data and establishes best practices for collecting and dealing with this information, according to a team led by Baylor College of Medicine's Center for Space Medicine in Houston.

"Civilian participants have different educational backgrounds and medical conditions compared to astronauts with career-long exposure to space flight," said study co-author Dr. Emmanuel Urquieta, chief medical officer of the Translational Research Institute for Space Health (TRISH) at Baylor.

"Understanding their physiological and psychological responses to spaceflight and their ability to conduct research is of utmost importance as we continue to send more private astronauts into space."

Like astronauts who do months-long tours of duty on the International Space Station, the hazards facing these four included radiation exposure, sustained microgravity, confinement and isolation. Researchers said the mission provided important insights about the body's earliest response to these stressors.

Some noteworthy findings:

- Two of the four citizen-astronauts had motion sickness.
- Effects of spaceflight on heart function and mental performance varied from person to person but were modest in all cases.
- Changes in immunity to viruses dovetailed with findings from other space missions.
- Biological analyses of various bodily systems found "a broad set of molecular changes."

In short, the mission demonstrated that private astronauts can do meaningful scientific research in orbit with minimal risk.

But it also underscored the need for developing tools to monitor their health and performance in future missions.

"The data and biosamples represent the first of, hopefully, many commercial spaceflight missions to come," said co-author Jimmy Wu, deputy director of TRISH.

The findings are based on data and biological samples collected before, during and after the mission—and they demonstrated the effectiveness of various information-gathering tools that require little or no training to deploy.

For example, the astronauts used a hand-held ultrasound device to obtain images of the bladder, jugular vein and the eyes. Smartwatch data, skin swabs and biopsies, saliva testing, as well as tests of memory and thinking skills as well as sensory and nervous system function were also evaluated.

"Frequent space travel is on the horizon and more commercial spaceflight participants are eager to venture forward," said co-author Dorit Donoviel, executive director of TRISH. "We must plan appropriately and ensure scientific research in space is performed as accurately and safely for everyone."

The findings were published June 11 in the journal *Nature*.

More information: C. W. Jones et al, Molecular and physiologic changes in the SpaceX Inspiration4 civilian crew, *Nature* (2024). DOI: 10.1038/s41586-024-07648-x

There's more about the research into the health effects of space travel at the Translational Research Institute for Space Health.

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