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## Airport Security Scanners and Radiation



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Many air passengers wonder whether it is safe to go through airport backscatter x-ray scanners. Professor Peter Vock from Bern, Switzerland, will address concerns about the radiation exposure from these scanners during the session 'Security scanners at airports: are they safe?' on Thursday afternoon.

Airport backscatter scanners represent one of two types of scanner used to improve security by detecting the presence of suspicious or concealed items on airline passengers. To do so, the scanners use x-rays (ionising radiation). The World Health Organization has classified ionising radiation, a substance naturally present in the atmosphere, as a carcinogen. However, experts agree that the risks associated with radiation exposure depend on how much radiation is used. In the case of backscatter scanners, the radiation dose is very low.

"The effective radiation dose to travellers from a backscatter x-ray scan is around 0.05–0.1  $\mu\text{Sv}$ , which is the equivalent of less than two minutes of flying in an aircraft at cruising altitude. To give you a rough idea, one hour of air travel is equal to 40–80 backscatter scans; a chest radiograph is 1,000–2,000 scans and a CT scan is 50,000–100,000 backscatter scans," said Vock.

The biological impact of such small doses is unknown, although possibly negligible, he added. According to the linear no-threshold (LNT) model, an established dose-impact standard, stochastic radiation risks are proportional to the dose with no lower limit, meaning that some risk remains even at low doses. However, the model has not yet been proven at the dose level of x-ray backscatter scanning.

The As Low As Reasonably Achievable (ALARA) principle means that radiation should be avoided or kept as low as possible. In order to know if a risk is worth taking it must first be weighed against the likely benefits, Vock explained.

"With the low-energy x-rays used in backscatter scanners, the results are good for excluding foreign bodies, such as weapons, on the body surface. The method is less effective for detecting objects in deep body cavities and might occasionally even miss superficial objects. Based on its limited benefit, discussions on the small risk from repeated exposure, as well as the scanning of children and pregnant women, continue. Actually, after three years of experiment, the EU has recently banned backscatter x-ray scanners, and now the other type of scanners, using non-ionising microwaves, can replace them," he said.

Most travellers perceive the loss of privacy as a greater concern than radiation exposure. The scanners can create detailed images of the skin surface and have been accused of producing images of the naked body. To avoid the misuse of backscatter x-ray images, image readers are separated from passengers, images are not stored, filters hide identifiable details of the image, or reading is only carried out by computer programmes. Lower speed and concerns over privacy have prompted authorities in the US to switch from backscatter x-ray scanners to microwave scanners. Existing backscatter x-ray scanners will still be used at small airports, but travellers can choose a physical search instead.

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