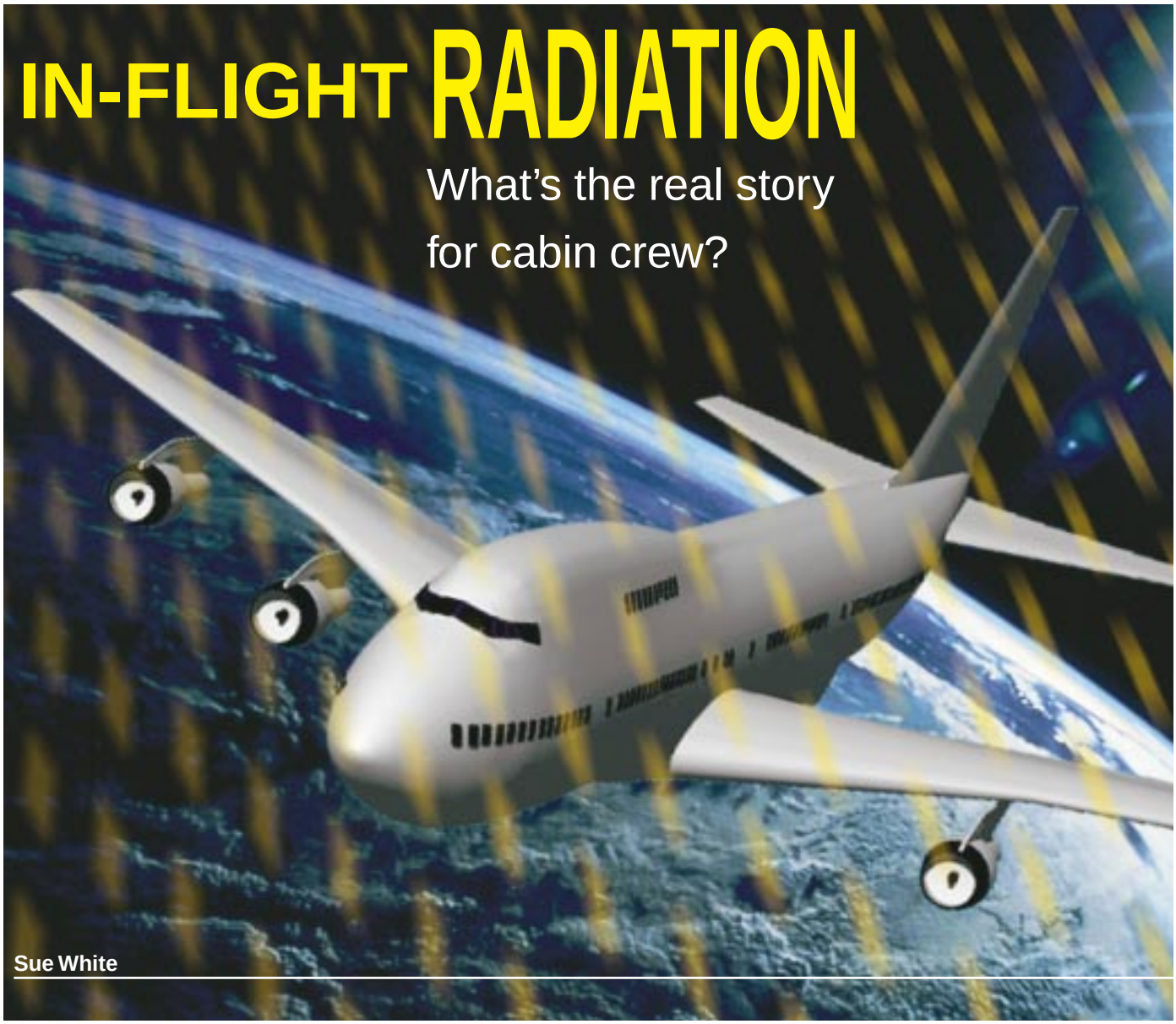
IN-FLIGHT RADIATION

What's the real story for cabin crew?



Sue White

THE PHRASE "IN FLIGHT RADIATION" never fails to grab the attention of working cabin crew. But is the hype justified? According to Dr Peter Wilkins, Acting Director, Aviation Medicine, for CASA , Australian cabin crew have little to fear.

Everyone is exposed to some radiation during their daily lives. Background radiation is absorbed by humans in a variety of forms. Low levels of radiation are present in soil, rocks, bricks and tiles. Radon gas is generated through decaying subsoil in concrete slabs, and radioactive atoms are present in the food we eat, the air we breathe and the water we drink.

In addition to radiation from the earth, people who fly in aircraft can be exposed to radiation from the sun (solar cosmic radiation) and radiation from outside our solar system (galactic cosmic radiation). Our exposure to these forms of radiation increases with altitude and latitude: the higher we fly and the closer we get to either the north or south poles, the more radiation our bodies absorb.

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Galactic radiation is of greatest concern to flight crew. It consists of high energy particles which interact with oxygen and nitrogen in the upper atmosphere to produce secondary radiation. Solar radiation does not penetrate the earth's atmosphere except during solar flares (which occur on average once every six years) and even then the radiation only rarely reaches altitudes flown by subsonic aircraft.

Radiation levels are measured in millisieverts (mSv), with 1 mSv equivalent to around 20 chest x-rays (depending on equipment used and the size of the patient).Through normal background radiation, most adults absorb about 2mSv per annum. Flight crew, on the other hand, are generally exposed to higher radiation doses because of their long term exposure to galactic cosmic radiation. This figure, though, is well below prescribed occupational safety limits, as explained below.

Recent studies commissioned by Qantas estimate that the absolute maximum dosage of additional radiation (above background

radiation) received by their long-haul crews would fall between 2mSv and 4mSv. For domestic crew the figure is even lower. To obtain 4mSv of exposure, a crew member would need to continually fly only polar routes – for example, Johannesburg, Buenos Aires and New Zealand – for the entire year. This is put into perspective when we consider that the tightest international regulation on radiation dosage allows for flight crews to accumulate up to 20mSv per year, more than five times the maximum level that could be absorbed by a Qantas crew member.

European and North American crews are worse off in this respect because they generally fly at higher latitudes, and are therefore exposed higher amounts of galactic radiation than Australian crews, who usually fly more equatorial routes.

According to CASA medical officer Peter Wilkins, "the majority of long haul crew would find it impossible to reach the 20mSv limit through aviation duties if they tried". He adds, "the other key point for crew to remember is that the 20mSv is a figure which is set deliberately low in the grand scheme of things – the real "danger" figure is probably closer to 70 or 80mSv, or even higher."

While Australian flight crews fall well below international limits for radiation dosage, greater caution must be exercised by pregnant crew members. A 1990 study by the International Commission on Radiological Protection (ICRP) recommends a limit for unborn children of 1mSv from the time of declaration of the pregnancy to full term. The report goes on to suggest that once a woman has declared she is pregnant, her working situation should be assessed to see if any special provisions are necessary to limit the radiation dose to the foetus.

Routes should then be selected with lower susceptibility to radiation (your airline should be able to help you with this) and flight duties ceased when the radiation total approaches the 1mSv recommended limit. Staff members in this situation have sometimes opted to undertake ground duties where this is possible.

Overall, it appears that Australian based cabin crew (aside from pregnant women) have little to fear from in-flight radiation. If in doubt, speak with your company OH&S officer.

Sue White is a researcher with Flight Safety Australia. Research sourced from Radiation Industry Workshop held in May 1999. Used with permission.

COMPARE THE HEALTH RISK

Industry / Activity	Risk of death per year
Smoke 10 cigarettes per day	1 in 200
Fishing	1 in 800
Natural causes (age 40 years)	1 in 850
Driving a car	1 in 5,000
Police work	1 in 5,000
Coal mining	1 in 6,000
Aircrew exposed to 4 mSv per year	1 in 6,300
Construction industry	1 in 6,800
Metal manufacturing	1 in 11,000
Aircrew exposed to 2 mSv per year	1 in 12,500
Accidents in the home	1 in 26,000

Most Australian cabin crew fall into the category exposed to 2 mSv of galactic cosmic radiation per year. To move into the category exposed to 4mSv annually, crew would need to fly solely polar routes for most of the year.
Source: Radiation Dosimetry Systems.