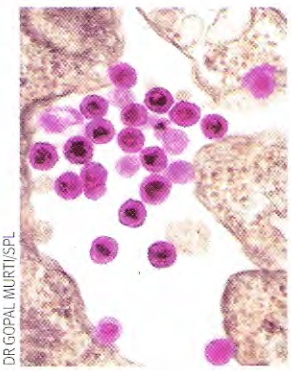

DR GOPAL MURTI/SPL

up new avenues of treatment. Some saw this as a definitive response not only to those few professionals who, they claim, continue to doubt the reality of the syndrome, but also to the larger number of professionals who believe that, irrespective of causation, rehabilitative treatments can reduce symptoms and disability. It is depressing that the first, untenable, view is too often confused with the second, a perspective that offers hope to patients and is backed by evidence.

However, as with any discovery, the data must be unequivocal, and the finding has to be confirmed by others. In January 2010, our own group found no evidence of XMRV in a well characterised cohort of 186 patients with chronic fatigue syndrome in the United Kingdom.[3] Van Kuppeveld and colleagues' study adds to this negative evidence. Although the study is small, the patients are well defined and matched in age, sex, and geographical location. The polymerase chain reaction used to amplify XMRV gene sequences has been well controlled and its sensitivity is sufficient to detect low virus copy numbers. XMRV was not detected in this Dutch cohort, a result that comes in the wake of a third study published this month,[10] which also failed to identify XMRV in 170 patients with chronic fatigue syndrome.

The fact that the four studies used different protocols is irrelevant because amplification is controlled by inclusion of a "housekeeping gene"—to show that a known human gene can be amplified under the conditions used—and the sensitivity of the assay is known, as was the case in all three European studies.

Meanwhile, a different strategy is also being considered to reconcile these different findings: that new blood samples should be taken from patients with diagnosed chronic fatigue syndrome and sent to laboratories capable of carrying out the analysis. This is likely to happen.

Three studies have now generated data that are in stark contrast to those of the original study. However, at least two explanations for this are still possible. The first, and more unlikely, explanation is that XMRV infection is geographically confined to the United States. The second is that the virus is infecting an atypical cohort. This may well be so. Although the patients were not well described in the original study, van Kuppeveld and colleagues provide the additional information reported at a conference last year that the patients in question came from an outbreak of chronic fatigue syndrome at Incline village on the northern border of Lake Tahoe in the mid-1980s. Whether or not this was a genuine cluster was never established,[11] but an association with viruses, such as Epstein-Barr virus and human herpesvirus 6, has already been suggested.[12] It is possible that XMRV is implicated in the Lake Tahoe episode but does not play a substantial role in most cases of chronic fatigue syndrome elsewhere.

The results from other US laboratories investigating XMRV and chronic fatigue syndrome are eagerly awaited. If the link fails to hold up, it will be another bitter disappointment to affected patients although XMRV may turn out to be important in the pathogenesis of other diseases.

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Use of full body scanners at airports

Medical risk is negligible, but concerns about privacy remain

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doc2doc

Doctors on doc2doc, BMJ Group's online global clinical community, are discussing the use of full body scanners at airports. To have your say in the discussion, visit http://tinyurl.com/ygyp9eb

Since the attempted bombing of an aeroplane bound for the United States on Christmas Day 2009, several countries have made or are in the process of making a decision about mandatory use of full body scanners at airports. "Full body scanners" or "whole body scanners" can be classified as either "millimetre radio wave" or "backscatter" technologies.

Millimetre radio wave systems scan travellers by bombarding them with radio waves and collecting the reflected radio waves via antennae to generate an image.[1] This technology does not use x rays. In contrast, backscatter systems use low intensity x rays to scan the body. The x rays do not penetrate the body but bounce off the skin, and are then captured by detectors to create images. These x rays are useful for detecting objects hidden under clothing and taped on the skin but not for detecting objects hidden inside the body.[2] For this, transmission x ray systems are needed.[2] The table lists the doses of radiation produced by backscatter systems and the number of backscatter scans needed to yield an equivalent dose to that of a chest x ray and other radiation sources.[3-8]

A typical backscatter scan takes about eight to 15 seconds to perform and provides two images—front and back.[2] For the past few years, full body scanners have been in use as secondary screening devices at various airports, including Heathrow Airport in London, and travellers have been allowed to opt out.

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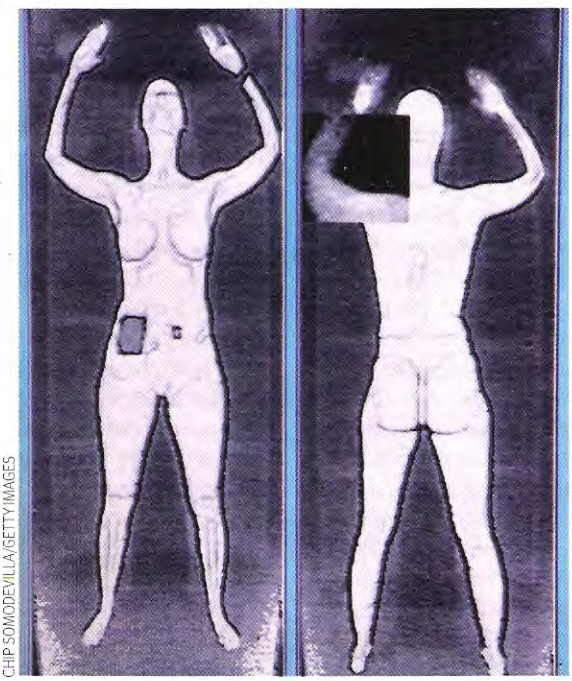
With increased emphasis on airport security, however, mandatory screening of travellers with full body scanners may soon become routine.

Several important concerns exist regarding full body scanners—biological risks to travellers and concerns about privacy, the longevity of images, and the stability of scanners. In this context, it is recommended that radiation doses from backscatter systems should not exceed 0.1 μSv, and the doses measured have been reported to be between 0.05 μSv and 0.1 μSv per scan.[2 3]

A person would therefore have to undergo 1000-2000 backscatter scans before receiving a dose equivalent to a medical chest x ray (100 μSv).[4] The dose of radiation from a single backscatter scan is equivalent to that received from less than 30 minutes of background radiation and two to 10 minutes of average air travel.[5 6 9]

The National Council of Radiation Protection and Measurements (NCRP), an advisory body to the United States government, uses the concept of "negligible individual dose (NID)," which is, "an effective dose corresponding to the level of average annual excess risk of fatal health effects attributable to radiation exposure below which effort to further reduce the exposure to an individual is not warranted." NID is set at an annual effective dose of 10 μSv per source or practice.[7] A person would have to undergo 100-200 backscatter scans before receiving a dose equivalent to NID.



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Radiation doses from backscatter systems and number of backscatter scans equivalent to doses from various sources of radiation

Source	Dose or dose equivalent
Backscatter scan (μSv/scan)	0.05-0.1
No of scans equivalent to typical chest x ray dose (100 μSv)[4]	1000-2000
No of scans equivalent to annual dose limit for public from a single source (~250 μSv)[9]	2500-5000
No of scans equivalent to one day of natural background radiation (10 μSv/day)*	100-200
No of scans equivalent to NID† dose	100-200
No of scans equivalent to average dose from air travel (4 μSv/h)[7]	40-80

*Annual natural background radiation ~3100 μSv[5] or ~2400 μSv[6].
†NID=negligible individual dose (~10 μSv)[8].

The Nuclear Regulatory Commission in the United States recommends an annual limit on doses to the public of 1000 μSv, and 250 μSv a year from any single source or practice.[8] To exceed 250 μSv a year at a dose of 0.1 or 0.05 μSv per scan, a traveller would need to have 2500-5000 scans, which is highly unlikely in one year.

Another concern about backscatter systems is the ability of scanners to deliver a low radiation dose but yield images of sufficient quality. This is especially pertinent in countries where poor or non-existent infrastructure means that periodic checks are not guaranteed. It is therefore essential to establish routine maintenance and quality assurance programmes and involve trained professionals, such as health physicists or medical physicists, to verify the radiation dose delivered by the backscatter systems.[10 11] Even though the radiation exposure to operators is negligible, they should undergo radiation safety training to avoid any inadvertent exposure to radiation.[2 10 11]

The term "virtual strip search" has arisen because detailed images may infringe personal privacy but concerns can be mitigated by having the image viewing stations at remote locations, not next to the scanners, and also by ensuring that images cannot be saved in the long term. Software programs have been developed to modify the backscatter image to make the image appear more like a "chalk outline," with less personal detail. Currently, the use of full body scanners is optional, but when it becomes mandatory, the alternative measures for people who decline to go through these scanners are complete physical pat-downs and other technologies that may be even more intrusive and cumbersome.

Current calculations indicate that backscatter systems are safe for general use, even in infants and children, pregnant woman, and people with genetically based hypersensitivity to radiation. When considered in the context of a potential increase in security, the benefits outweigh the potential for harm.

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