

Carbon monoxide exposure in hospital accommodation

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In 2020, a surgical registrar rotated to a rural Australian hospital. Due to COVID-19 lockdown conditions and elective surgery cancellations, they spent at least ten hours per day at their hospital accommodation. The accommodation's open-flued gas heater was used frequently as outside temperatures reduced to -1°C. Over two months they noted increasing fatigue, persistent headaches and nausea. When their family visited, their spouse also developed headache and nausea. The couple reported these symptoms to hospital administration, requesting a gasfitter inspection.

The Vulcan Heritage gas-heater failed a negative pressure test and was immediately decommissioned. The last inspection date had not been documented. The hospital proactively initiated an investigation into all properties leased to rotating hospital staff and determined

that 12 of 38 properties (31.6%) had open-flued gas heaters but no carbon monoxide detector installed. Only one unit (the index case) failed testing.

Carbon monoxide poisoning, nicknamed 'the silent killer', is simultaneously entirely preventable yet the leading cause of accidental poisoning worldwide (1). In Australia, carbon monoxide poisoning is responsible for one death and 365 hospital admissions annually (2). Carbon monoxide is a colourless, odorless gas that binds haemoglobin with up to 300 times greater affinity than oxygen, causing tissue hypoxia. Non-specific symptoms such as headache, nausea and fatigue characterize mild carbon monoxide poisoning (carboxyhaemoglobin level <30%); more serious exposures (carboxyhaemoglobin level >50%) cause altered conscious state, seizures or sudden death (3).

Gas heaters are notorious for releasing carbon monoxide, particularly the Vulcan and Pyrox Heritage models which were withdrawn from sale in 2018. Following coronial investigations of multiple deaths, Australian safety guidelines now recommend all gas-heaters should be inspected second-yearly and have a carbon monoxide detector installed on premises (4).

All Australian specialty training programmes require periods of rotation to rural communities, with onsite accommodation usually provided by local hospitals. The Australian Medical Association has published a position statement defining minimum safety standards of such hospital accommodation, but do not explicitly require carbon monoxide detection systems (5).

Rural training rotations can be a highly positive experience, providing unique training and clinical exposure, and encouraging return to rural areas after specialization. At the same time, challenges arising from frequent relocations have been described (6). The risk of sudden death of trainees (in this case a young family with an infant) due to an entirely preventable cause has not previously been highlighted.

The finding that 31.6% of properties provided by one rural training site were at-risk of carbon monoxide exposure is deeply concerning. We encourage all rural hospitals providing accommodation to protect their medical staff by eliminating open-flued gas heaters, or at least ensuring gas heaters have been recently inspected and carbon monoxide detectors installed according to governmental recommendations (4).

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