

A transportable MRI machine to speed up the diagnosis and treatment of stroke patients

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Victoria University of Wellington has designed a transportable MRI machine to speed up the diagnosis and treatment of stroke patients.

Named the 'MRI Ambulance', the design places a Magnetic Resonance Imaging (MRI) scanner within a refrigerated shipping container which can be transported on the back of a flatbed truck.

"Unlike mobile MRIs, the MRI Ambulance is designed to be used in emergency situations alongside a standard [ambulance](#), providing the ability for a patient who has had a stroke to be scanned en-route to the hospital," says student Nicole Marshall.

"It means the type of stroke is determined before the patient arrives at the hospital resulting in greater efficiency and better probability of the patient surviving and recovering."

The idea originated from Victoria University's Robinson Research Institute. Building on its knowledge of new superconducting technologies and MRI systems, the Institute developed a concept for a compact, robust MRI system suited for transportation.

The Institute then teamed up with Nicole and fellow student Michael Richards from the Schools of Design and Architecture, who were tasked with designing the interior layout of the ambulance.

The students' work was carried out as part of a Victoria Summer Research Scholarship project and under the supervision of Industrial Design Programme Director Dr Edgar Rodriguez and Media Design Lecturer Kah Chan.

Getting the patient in the correct position inside the scanner, providing a fully-functional working space and the patient and paramedic experience were the focus for the students.

The patient bed, a lightweight plastic stretcher with a collapsible foot rest and two lower wheels, allows ambulance operators to wheel [patients](#) in an upright position to the back of the truck. The wheels lock into two stainless steel rails on the loading system which winches the bed up and into the scanner. This also places the patients head in the correct position for scanning.

The MRI magnet uses "cryogen free" technology developed at the Robinson Research Institute.

"MRI magnets usually operate at -269°C , and do this by being immersed in liquid helium coolant. Instead, cryogen free magnets simply use a specialised electrical refrigerator. This greatly increases the suitability of the magnet for transportable applications," says Robinson Research Institute MRI expert Robert Slade.

By putting the cryogen free MRI magnet into a shipping container, a very compact and easily transportable MRI system became achievable. However, the challenge then became fitting the MRI Ambulance with the required balance of equipment.

Robert says he was impressed with the students' work in this regard.

"Their research and work through the design process was extremely

thorough—they have done a great job of packaging the entire patient handling hardware into a tight space."

The next phase of the project will involve collaborating with medics, ambulance operators and MRI technicians to ensure the concept meets the clinical need. The Robinson Research Institute is in discussion with Chinese MRI manufacturers to pave the way for production of a working prototype.

Provided by Victoria University

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