

# Research team develops screening tool for traumatic brain injuries

June 10 2024

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SwRI has developed an Advanced Military Measure of Olfaction smell test as a screening tool to assess potential traumatic brain injury. The inability to identify the scents correctly correlates highly with positive results for TBI on an MRI exam. Credit: Southwest Research Institute

Southwest Research Institute (SwRI) has developed a field-ready screening tool for traumatic brain injury (TBI). The Advanced Military Measure of Olfaction (AMMO) kit includes an array of scents, deployable anywhere from the battlefield to the football field, to help screen for TBIs in minutes.

"The AMMO test kit is not intended as a [diagnostic test](#) but as a [screening tool](#)," said SwRI Senior Research Engineer Kreg Zimmern, the project's leader.

The kit includes six sealed vials that release a range of odors, such as fruity and spicy aromas. When squeezed, a test vial turns blue to indicate that a smell has been released and is ready for use. Patients are asked to identify the odor from four possible choices on an attached card. Answers are documented on a separate answer card; the correct answers are hidden behind a sticker. Research shows that failing to identify the scents correctly correlates highly with positive results for TBI on an MRI exam.

"Someone exposed to a blast on the battlefield could be screened immediately with AMMO instead of waiting for the onset of signs or symptoms of TBI. The inability to identify the scents could be used as rationale to justify an MRI," Zimmern said.

AMMO is undergoing stability studies to determine how long the kit can be stored and still be effective. SwRI is developing AMMO in compliance with relevant FDA and ISO guidelines. It's the only olfactory test kit to undergo such rigorous controls.



SwRI's AMMO test kit uses smell tests to screen for TBIs in minutes, without specialized training. It can be used in the field to assess sports or battleground injuries or in emergency rooms or nursing homes to determine if patients need additional evaluation, such as an MRI. Credit: Southwest Research Institute

"The kit is inexpensive, compact, has no special storage conditions and doesn't need electricity," Zimmern said. "This makes it a potential screening tool in emergency rooms as well as at workplaces, nursing homes and youth, collegiate and professional sports games."

While AMMO doesn't require any specialized training to administer, the results can inform the [decision-making process](#) for first responders and doctors.

"Traumatic brain injuries can have profound and sometimes long-term effects," said Zimmern. "They can dramatically change the course of lives. Plus, they are also notoriously difficult to diagnose and multiple

TBIs can be catastrophic."

SwRI collaborated with the Henry M. Jackson Foundation for the Advancement of Military Medicine and the Air Force Research Laboratory to develop AMMO.

Provided by Southwest Research Institute

Citation: Research team develops screening tool for traumatic brain injuries (2024, June 10) retrieved 18 June 2024 from <https://medicalxpress.com/news/2024-06-team-screening-tool-traumatic-brain.html>

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