

# ICU patients with non-brain-related injuries may suffer undetected cognitive dysfunction

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A new study led by Western University and Lawson Health Research Institute has found that most patients entering hospital intensive care units (ICU) for non-brain-related injuries or ailments also suffer from

some level of related cognitive dysfunction that currently goes undetected in most cases.

The findings were published today in the influential scientific journal, *PLOS ONE*.

Many patients spend time in the ICU for reasons that have nothing to do with a known brain [injury](#), and most [health care providers](#) and caregivers don't have any evidence to believe there is an issue with the brain. For example, a patient may have had a traumatic injury that does not involve the brain, yet still requires breathing support to enable surgeons to fix damaged organs, they may have issues with their heart or lungs, they may contract a serious infection, or they may simply be recovering from a [surgical procedure](#) like an organ transplant that has nothing directly to do with their brain.

For the study, Western investigators from the Schulich School of Medicine & Dentistry and the Brain and Mind Institute and researchers from Lawson assessed 20 such patients as they left the ICU and every single patient had detectable cognitive deficits in two or more cognitive areas of investigation, including memory, attention, decision-making and reasoning. Again, this is in spite of the fact that, on the face of it, they had no clear brain injury.

The discovery was made using online tests, developed by renowned Western neuroscientist Adrian Owen and his teams at the Brain and Mind Institute and BrainsCAN, which were originally designed to examine cognitive ability in patients following brain injuries but for this purpose, are being used to detect cognitive deficits in people who have spent time in an intensive care unit without a diagnosed brain injury.

"Many people spend time in an [intensive care unit](#) following a brain injury and, of course, they often experience deficits in memory,

attention, decision-making and other cognitive functions as a result," explains Owen, a professor at Schulich Medicine & Dentistry. "In this study, we were interested to see how patients without a specific [brain injury](#) fair after leaving the ICU. The results were astonishing."

Why cognitive ability declines even in non-brain related visits to the ICU likely varies from patient to patient, but Dr. Kimia Honarmand from Schulich Medicine & Dentistry says the lesson to be learned is that many conditions affect brain function, even though they might not directly involve the brain.

"If you are having trouble breathing, your brain may be starved of oxygen. If you have a serious infection, the inflammation that occurs as a result of infection may affect brain function. If you are undergoing major surgery, you might be given drugs and have procedures that may affect your breathing, which in turn may affect the flow of oxygen to the brain," explains Dr. Honarmand. "What we have shown here is that all or any of these events can lead to deficits in brain function that manifest as impairments in cognition. And healthy cognition is a vital determinant of functional recovery."

Dr. Marat Slessarev, Lawson Scientist, says these findings can shift how the medical community treats incoming [patients](#) and more importantly, outpatients following ICU visits.

"Historically, the clinical focus has been on just survival. But now we can begin to focus on good survival," says Dr. Slessarev, also an associate member at the Brain and Mind Institute and an assistant professor at Schulich Medicine & Dentistry. "These sensitive tests will enable doctors to both detect cognitive impairment and track cognitive performance over time, which is the first step in developing processes for optimizing [brain](#) recovery."

**More information:** Kimia Honarmand et al, Feasibility of a web-based neurocognitive battery for assessing cognitive function in critical illness survivors, *PLOS ONE* (2019). [DOI: 10.1371/journal.pone.0215203](https://doi.org/10.1371/journal.pone.0215203)

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