

# Study finds no evidence that anesthesia in young children lowers intelligence

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A Mayo Clinic study finds no evidence that children given anesthesia before their third birthdays have lower IQs than those who did not have it. A more complex picture emerges among people who had anesthesia

several times as small children: Although their intelligence is comparable, they score modestly lower on tests measuring fine motor skills, and their parents are more likely to report behavioral and learning problems. The findings are published in *Anesthesiology*.

The U.S. Food and Drug Administration warned in 2016 that prolonged or repeated sedation before age 3 may affect brain development. The warning was based largely on data from animals, which may or may not apply to [children](#).

Mayo researchers studied 997 people born from 1994 through 2007 in Olmsted County, Minnesota, the home of Mayo Clinic's Rochester campus. They were grouped according to the [anesthesia](#) exposures they had before their third birthdays: 206 had two or more; 380 had one; and 411 had none. Ear, nose and throat procedures were the most common surgeries.

The researchers used the Rochester Epidemiology Project medical records database, brain function testing at ages 8-12 or 15-20, and parent reports to assess behavior and brain function. Beyond their [anesthesia exposure](#), the three groups of patients were matched to be as similar as possible.

Intelligence, memory, and several other measures of [brain function](#) were similar among the groups.

However, those with multiple exposures to anesthesia had modest declines in [fine motor skills](#), such as the ability to draw figures with a pencil, and how quickly they processed information when reading. Their parents reported more learning and behavioral problems, such as difficulty reading; behaviors consistent with attention deficit hyperactivity disorder; breaking rules; or displaying aggression, anxiety or social withdrawal.

Parents whose children had anesthesia once under age 3 reported more problems with mental skills known as executive functions - skills that help with memory, impulse control, planning and flexibility - but not with other behaviors.

"For the majority of kids undergoing [surgery](#), the results overall are reassuring," says lead author David Warner, M.D., a pediatric anesthesiologist at Mayo Clinic Children's Center. "About 80 percent of kids who need surgery under age 3 only need one, and it's relatively brief."

Several other studies also show little evidence that a single anesthetic is associated with significant harm.

"Although we do have some concerns about the children who are receiving multiple anesthetics, it's important to note that our results don't allow us to conclude that anesthesia itself is causing problems," Dr. Warner says, adding that other factors, such as the conditions that make surgery necessary, could contribute. "However, the fact that we found some problems in some of these children means that research in this area needs to continue, including further analysis of our data."

In the meantime, in most cases the benefit of surgery outweighs any risk, Dr. Warner says. However, the potential for problems may need to be part of the decision-making process when parents and surgeons discuss surgery, he adds.

**More information:** David O. Warner et al. Anesthesia and Neurodevelopment in Children, *Anesthesiology* (2018). [DOI: 10.1097/ALN.0000000000002121](https://doi.org/10.1097/ALN.0000000000002121)

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