

# Gene mutations may increase adverse event risk in older adults taking multiple meds

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Gene mutations that affect drug metabolism may explain higher hospitalization rates for some older adults taking multiple medications, according to researchers from Columbia University.

The study was published recently in *Pharmacogenetics and Personalized Medicine*.

Use of multiple medications, known as [polypharmacy](#), is on the rise among U.S. seniors. Nearly 40 percent of Americans 65 or older take at least five or more medications. Previous studies have shown that [older adults](#) with polypharmacy are more prone to adverse events and hospitalizations than those taking fewer medications. However, few studies have investigated individual, [genetic risk factors](#) for [adverse drug events](#) in this population.

For this small pilot study, the researchers hypothesized that older adults with polypharmacy and increased hospitalization rates would have more genes associated with altered drug metabolism or lack of sensitivity to certain drugs than those with fewer hospitalizations.

The researchers performed pharmacogenetic testing to identify five such genes—CYP2C19, CYP2C9, VKORC1, CYP2D6, CYP3A4/5—in older adults with polypharmacy. The study included six seniors who had been admitted to the hospital at least three times over the past two years and six age-matched controls who had fewer hospitalizations. Both groups had an average age of 77 years, and were taking an average of 14

medications.

In the higher hospitalization group, each of the participants had at least one of the mutations, and half had more than one. None of the controls had any of the mutations.

"Although this was a very small pilot study, the findings suggest that routine testing for these gene variants could improve health outcomes for older adults taking multiple medications," according to Joseph Finkelstein, MD, PhD, director of the Center for Bioinformatics and Data Analytics in Oral Health at the Columbia University College of Dental Medicine, associate professor of health informatics in dentistry at Columbia University Medical Center, and lead author of the paper. "In dentistry, for example, pharmacogenetic testing could be part of a personalized approach in which clinicians select pain medications that are most effective and least risky for each patient."

Because of the small size of the pilot study, Dr. Finkelstein and his colleagues are planning a larger clinical trial to investigate whether identification of [drug-metabolism](#)-altering mutations in adults with polypharmacy may improve outcomes.

The study is titled, "Pharmacogenetic polymorphism as an independent risk factor for frequent hospitalizations in older adults with polypharmacy: a pilot study."

Provided by Columbia University Medical Center

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