



Foundations · Educational evidence summary

From receptor binding to clinical outcomes: different types of anticholinergic evidence

This foundation article explains from receptor binding to clinical outcomes: different types of anticholinergic evidence.

UnifiedACB · Published October 3, 2026 · Updated October 4, 2026

[Read the current article](#)

<https://unifiedacb.com/articles/010-from-receptor-binding-to-clinical-outcomes-different-types-of-anticholinergic-evidence/>

Follow the claim from the laboratory to the clinic

“There is evidence” is incomplete unless the type of evidence is identified. A medicine can bind to a receptor in an experiment, show activity in an assay, receive a category in a scale and be associated with an outcome in a clinical study. Those findings are related, but they do not make the same claim.

Understanding the distinction helps explain why a medication may deserve attention even when the effect on an individual remains uncertain. It also prevents a laboratory result from being presented as a diagnosis, or an observational association from being presented as proof that changing treatment will improve an outcome.

Receptor and assay evidence: what was actually measured?

Laboratory methods define an experimental system, test conditions and readout. The [study of 107 medications by Chew and colleagues](#) used a radioreceptor assay and specified concentrations. That work provides a direct example of measured activity under defined conditions. Its findings should retain their experimental meaning.

The interpretation depends on the preparation, concentration and measurement approach. Detectable activity can support biological plausibility. It does not establish how much drug reaches a particular tissue in every clinical use. Likewise, failure to detect activity under the tested conditions does not prove absence of every relevant effect under all other conditions.

An assay result therefore needs its units and conditions. Replacing those details with a familiar ordinal label can hide the difference between measured activity and a later classification based partly on that activity.

Medication scales: an organized interpretation of evidence

A scale translates selected evidence into a usable classification system. That makes it possible to inspect a medication list without repeating each original experiment. The tradeoff is that a category compresses information. It reflects the source’s rules about which findings matter and how uncertainty should be handled.



The [ADS study](#) examined the relationship between a medication scale and serum anticholinergic activity. Such work can test one aspect of construct validity. It does not make the classification and the assay interchangeable, or prove that the scale predicts every clinical outcome that might be linked to anticholinergic exposure.

UnifiedACB preserves the classification as a source observation. The [underlying record](#) includes the source version and locator, allowing readers to investigate the evidence behind the compact display. It does not claim that the displayed value is a direct measurement from the person using the website.

Observational outcomes: association in a defined setting

A clinical association asks whether people with a particular measured exposure experience an outcome differently from an appropriate comparison group. Its interpretation depends on how exposure was defined, how the outcome was measured and how differences between groups were addressed.

The [Health ABC longitudinal analysis](#) related a defined medication exposure measure to later physical function. That is more directly relevant to function than a receptor assay, but it remains a particular study with a particular design. The medication measure included sedative as well as anticholinergic exposure, so its interpretation should not be narrowed to one mechanism without evidence.

Confounding also matters. Illness severity can influence both prescribing and outcomes. A medicine may be prescribed for symptoms that precede the outcome under study. Statistical adjustment can address measured differences, but it does not automatically remove every alternative explanation. These are reasons to describe the association accurately, not reasons to dismiss it.

Intervention evidence: what happens when exposure changes?

An intervention asks whether a defined change in care produces a meaningful benefit compared with an appropriate alternative. This is different from observing that exposure and outcome are associated. A lower burden score is an intermediate result; improvement in cognition, mobility or quality of life is a separate outcome to measure.

The [randomized trial of reducing anticholinergic drug burden in frail older people](#) illustrates why the distinction is necessary. Its existence does not justify promising benefit from any score reduction in any patient. The specific intervention, follow-up and measured outcomes must be examined.

Treatment changes also involve the condition being treated. An analysis focused only on an exposure measure can miss symptom recurrence or loss of benefit. A clinically meaningful evaluation considers both sides instead of assuming that a smaller number necessarily represents a better overall outcome.

Criteria and guidance: another evidence role

The [AGS Beers Criteria](#) organize prescribing concerns for defined older-adult contexts. They are clinical criteria, not an additional receptor assay or a newly calculated burden scale. Their role is to help identify situations that merit review, with the source's qualifications retained.



A coherent explanation can therefore contain a published scale value, a relevant geriatric criterion and a clinical evidence limitation. Keeping the labels distinct allows each piece to contribute what it actually supports.

Match the strength of the sentence to the evidence

Use “measured activity” for an assay, “classified” for a scale, “associated with” for an observational finding and “improved after the tested intervention” only when an intervention study establishes that result. These verbs are not stylistic niceties. They tell the reader which step from biological plausibility to clinical benefit has actually been examined.

References

1. Chew ML, et al. Anticholinergic activity of 107 medications commonly used by older adults. J Am Geriatr Soc. 2008;56:1333-1341. [Source](#)
2. Vennard O, Stewart C, Tolia M, Soiza RL, Myint PK. Anticholinergic Medication Burden Scales: A Systematic Review. J Am Geriatr Soc. 2026;74(6):1771-1784. [Source](#)
3. Carnahan RM, et al. The Anticholinergic Drug Scale as a measure of drug-related anticholinergic burden: associations with serum anticholinergic activity. J Clin Pharmacol. 2006;46:1481-1486. [Source](#)
4. Rudolph JL, et al. The anticholinergic risk scale and anticholinergic adverse effects in older persons. Arch Intern Med. 2008;168:508-513. [Source](#)
5. Boustani M, et al. Impact of anticholinergics on the aging brain: a review and practical application. Aging Health. 2008;4:311-320. [Source](#)
6. Lisibach A, Benelli V, Ceppi MG, et al. Quality of anticholinergic burden scales and their impact on clinical outcomes: a systematic review. Eur J Clin Pharmacol. 2021;77(2):147-162. [Source](#)
7. UnifiedACB. Preserved public source-observation dataset, v3.0 RC12 final; inspected for this editorial revision. [Source](#)
8. Hilmer SN, et al. Drug burden index score and functional decline in older people. Am J Med. 2009;122:1142-1149.e1-2. doi:10.1016/j.amjmed.2009.02.021. [Source](#)
9. Kersten H, et al. Cognitive effects of reducing anticholinergic drug burden in a frail elderly population: a randomized controlled trial. J Gerontol A Biol Sci Med Sci. 2013;68:271-278. doi:10.1093/gerona/gls176. [Source](#)
10. American Geriatrics Society. 2023 updated AGS Beers Criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc. 2023;71:2052-2081. doi:10.1111/jgs.18372. [Source](#)

Explore the evidence

[Ask UnifiedACB](#) about a medication or source, browse the [Medication Library](#), or read the [methodology](#).

Disclosure

Funding: None. Conflict of interest: None declared for the UnifiedACB educational project.

Educational evidence summary. This content does not provide patient-specific medical advice and does not replace clinical judgment, medication reconciliation, or prescribing guidance.