

Over-Medication and Older Adults with Intellectual Disability: Risks for Brain Health

February 2023

Purpose

This document is issued jointly by the NTG and the HealthMatters™ Program as part of an advisory series on risk reduction in adults with intellectual disability and promoting healthy brain outcomes. We recognize that in some instances overmedicating can have negative consequences on physical and brain health, as well as potentially increase the risk for mild cognitive impairment or dementia. We hope that the information provided will lead to constructive scrutiny of medication use, avoid ‘medication harm’, and result in safer medication use and positive health outcomes.

Background^{1,2,3}

The prevalence of dementia in the nation’s population is progressively increasing and expectations are that this trend will continue over the next 20 years.^{1,2} Given this expectation efforts are being undertaken to mitigate the risk factors for dementia derived from Alzheimer’s disease and other etiologies. One risk factor stems from medications that when taken in combination may lead to *adverse drug events* (ADE) or *adverse drug reactions* (ADR).³ An adverse drug event occurs from the appropriate or inappropriate use of a drug whereas adverse drug reactions are events where harm is directly caused by a drug under appropriate use. Generally, *polypharmacy* is defined as being prescribed between 5 and 9 medicines and *excessive polypharmacy* is defined as being prescribed 10 or more medicines.⁴ A distinction is made between the use of ‘appropriate polypharmacy,’ which involves the prescribing of multiple medications that are clinically necessary and appropriate for the patient and ‘inappropriate polypharmacy,’ which involves being prescribed many medications which if taken at the same time can be harmful if taken for too long, in an questionable dosage, and without considering drug interactions.⁵

¹ National Task Group on Intellectual Disabilities and Dementia Practices and the Health Matters Program. (2023 [Feb]). *Over-Medication and Older Adults with Intellectual Disability: Risks for Brain Health and Dementia*. <https://www.the-ntg.org/cdc-bold-hbi-project>. This advisory was developed in collaboration with the Health Matters Program at the University of Illinois Chicago and supported by a grant from the Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion, the Healthy Brain Initiative Award #1 NU58DP006782-01-00, to the University of Illinois Chicago. Contents are solely the responsibility of the authors and do not represent the official views of CDC.

² A comment on the terminology. We realize that the terms drugs, medications, and pharmaceuticals, are often used interchangeably. However, we have chosen to use ‘medication’ throughout this advisory, except when the term ‘drug’ is part of accepted usage for an event or is used in the broad sense of a substance ingested that may not have a direct medicinal purpose. We also recognize the oft use of ‘side effect’ and ‘adverse event’, usually in reference to an unwanted undesirable effect that is possibly related to a medication. We have used these terms within a specific context.

³Note: Acknowledged are the contributions and comments of the following: Matthew P. Janicki, Ph.D., Seth M. Keller, M.D., Mike Koronkowski, PharmD, BCGP, Beth Marks, Ph.D., RN, FAAN, Dawna T. Mughal, Ph.D., Nancy Murray, M.S., Kathryn Pears, MPPM, Rick Rader, M.D., Kathryn P. Service, RN, MS, FNP-BC, CDDN.

Research has found that many older persons use multiple medications as they age. A study published in *JAMA Internal Medicine* found that the proportion of older people taking five or more prescription medications, over-the-counter drugs, and supplements is about 67%.⁶ Another study in the *American Journal of Emergency Medicine*, noted that polypharmacy increased the risk of adverse drug events from 13%, which is associated with taking two medications, to 58%, which is associated with taking five medications. When adults took seven or more medications, the risk of ADEs surpassed 80%.⁷

Many older adults take a considerable number of medications... Some two-thirds of older adults take five or more prescribed drugs, over-the-counter medications, or supplements.

'Polypharmacy' is a prime risk factor for the development of adverse drug reactions (ADRs) if the medications taken are not carefully monitored. A study in the *American Journal of Emergency Medicine* reported that medications often associated with ADRs included those used to treat high blood pressure and other cardiac conditions, pain control for neurological conditions, certain antidepressants, and antibiotics (such as amoxicillin).⁸ Adverse effects include dry mouth, ankle swelling, headaches, dizziness, gastro-intestinal (GI) upsets, sedation, and confusion. Adults prescribed 10 or more medications have a threefold increased risk of experiencing a reaction, and women are at least 50% more likely to have ADRs than men. Most of the symptoms affect food intake, nutrition, and enjoyment of meals. Nutritional status can affect a person's response to therapy. Polypharmacy and inappropriate prescriptions can cause harm, including serious unwanted effects, adverse drug interactions, and decreased quality of life. Polypharmacy can also lead to an increased risk of overmedication, significantly affect both physical and cognitive function, and contribute to an increased risk of death.

Polypharmacy and intellectual disability

Overutilization of prescription medication, or polypharmacy, is also prevalent among adults with intellectual disability. Studies have found that many adults with intellectual disability are reported to have been prescribed multiple drugs.^{9, 10, 11} Often antipsychotics are the most prescribed drug class (19% of all prescribed drugs), followed by benzodiazepines (13%) and laxatives (12%). The risk of adverse drug events associated with polypharmacy is of concern due to the potential for serious health consequences, particularly among adults with comorbidities. As the risk of drug interactions increases with multiple medications, the risk of incorrect dosing, less adherence (even confusion) regarding directions for use, or inadequate monitoring of drug effects is also greater. Additionally, older adults may be more prone to adverse drug reactions due to changes in pharmacokinetics and pharmacodynamics associated with aging.¹² Pharmacokinetics considers how an organism affects the drug, whereas pharmacodynamics considers how a drug affects an organism.¹³

Medications should be used appropriately, and any changes should be closely monitored to ensure safety and reduce the risk of adverse effects. Regular review of all current medications (including, over-the-counter drugs, medicinal herbs, and dietary supplements) and consideration of the appropriateness of each drug is essential to ensure the best outcomes. Gathering this comprehensive

information is helpful to assessing the full impact of all medicinal intake and potential adverse effects. For example, ginkgo biloba extract taken with warfarin can increase risk for bleeding and St. John's wort taken with a selective serotonin reuptake inhibitor can increase risk for excessive accumulation of serotonin in the body or serotonin syndrome.¹⁴ Also, "add-on therapy" – that is, what was needed at the time of the original prescription may not be true as time goes on – is common practice and calls for consideration in any reviews.

Although the use of medications in adults with intellectual disability to manage challenging behavior and psychiatric symptoms is well-recognized, the risk of polypharmacy and specifically psychotropic polypharmacy in this population is of concern and should be addressed.¹⁵

Effective strategies to reduce the risk of polypharmacy and psychotropic polypharmacy include the implementation of evidence-based guidelines for prescribing, more frequent medication reviews, better patient education and adherence, and regular monitoring of drug therapy. Also, non-pharmacological interventions warrant early consideration and should always be co-utilized when medications are initiated.¹⁶ These factors reinforce the need for further research on the use of medications, especially psychotropic medication, to aid aging adults with intellectual disability and to identify the most effective strategies for reducing polypharmacy and psychotropic polypharmacy in this population.

In summary, the findings of numerous studies on medication use underscore the need for further research, education, and advocacy for healthcare professionals, caregivers, and families to ensure the appropriate use of medications and to limit unchecked or inappropriate polypharmacy. These findings also suggest that efforts to reduce polypharmacy are necessary to minimize the risks of adverse effects and improve quality of life, and that overprescribing is often due to multiple healthcare providers involved in an adult's care and a lack of communication with each other, the limited availability of evidence-based medical guidelines, deficiencies in medication literacy among adults with intellectual disability, and the lack of knowledge and skills of healthcare professionals in the health management of this group of adults.^{17,18, 19, 20, 21}

The effects of medications on brain health

Medications that have been associated with increased risk of cognitive impairment include those that treat overactive bladder (felt to be causing incontinence), pain, GI reflux or heartburn, and sleep issues and anxiety. The risk of cognitive impairment increases when these medications are taken in higher doses and over longer time periods.²² A study in *JAMA Internal Medicine* examined the risk of dementia among persons 55 years or older who were using different types of anticholinergics. The study found that adults had higher dementia risk with exposure to anticholinergic antidepressants, certain antiparkinson drugs, antipsychotic drugs (including benztropine – which is commonly used to treat tardive dyskinesia), bladder antimuscarinics, and antiepileptic drugs.²³ These findings relative to specific types of anticholinergic medications suggest that these drugs should be prescribed with caution in

Adults with intellectual disability often take multiple medications, prescribed over time for a variety of reasons, including medications for physical and mental health issues.

Polypharmacy is common as adults with intellectual disability grow older and some of the medications being taken can impair brain health and result in earlier cognitive decline.

middle-aged and older adults. With respect to adults with Down syndrome, who experience accelerated aging, such caution should apply beginning with age 30. In addition, consideration of the potential cumulative effects of regular use of anticholinergic medications, as well as the potential for drug-drug interactions on cognitive impairment is important. A drug-drug interaction (that is, a change in a drug's effect on the body when the drug is taken together with a second drug) can delay, decrease, or enhance absorption of either drug.

Modifiable risk factors, including hypertension, hearing loss, depression, diabetes, and smoking account for around 35% of dementia cases.²⁴ Long-term use of anticholinergic medications is another potentially modifiable risk factor as its use can be mitigated. This broad group of medications, which acts by blocking the neurotransmitter acetylcholine in the central and peripheral nervous system, includes some antihistamines, antidepressants, and medications for gastrointestinal and bladder disorders. These medications can have short-term adverse effects, including confusion and memory loss in older persons, although the impact of long-term use and increased risk of Alzheimer's disease is less certain.²⁵

Many older adults with intellectual disability are on multiple medications (including psychotropics), some prescribed earlier in life, and some prescribed by multiple practitioners. Psychotropic polypharmacy is often associated with being male, being aged 50+ years, and having a long-term psychiatric diagnosis. Also, being prescribed psychotropic drugs above the defined daily dose, while not having a psychiatric diagnosis, suggests the possibility of 'off label' prescribing.²⁶

Ensuring appropriate medication use and monitoring any changes are critical in efforts to reduce the risk of adverse effects which may lead to cognitive impairment. Regular review of current medications and consideration of the appropriateness of each drug is essential to ensure best outcomes.²⁷

Studies of adults with intellectual disability indicate that medication use, in high doses, alongside polypharmacy and psychotropic polypharmacy, is highly prevalent.²⁸ This exposure to multiple medications increases the risk of developing adverse drug events, experiencing drug-drug interactions and medication-related problems, and has a negative impact on quality of life, overall health, and psychosocial functioning.

In summary, studies show that polypharmacy and inappropriate prescribing are very common in adults including those with intellectual disability, even though the medical literature and experts advocate for the avoidance of inappropriate prescribing. Such inappropriate prescribing occurs for various reasons: multiple practitioners involved over extended time, reluctance of practitioners to deprescribe another practitioner's prescription, trialing via medication for physical problems, prescribing medications to control 'challenging behaviors', lessening co-utilization of non-pharmacological interventions, and insufficiently vigilant reviews of medications being undertaken. We propose that the goal is to minimize overprescribing and sustain 'optimal prescribing' (that is, prescribing a medication

Reducing inappropriate polypharmacy can be accomplished by '*optimal prescribing*'... that is, prescribing a medication that is the most clinically appropriate, safe, effective, and necessary to a treatment plan... and its effects and value are reviewed periodically.

that is the most clinically appropriate, safe, effective, and integral to a treatment plan which is subject to periodic review).

What actions can be taken?

The research findings suggest that polypharmacy and potentially inappropriate prescribing is prevalent and carries a higher risk of ADRs in older adults. Some strategies or actions that can be undertaken to confront overprescribing of medications, include the following:

- **What can practitioners do?** Health care providers should consider the risk factors associated with polypharmacy when prescribing any new medications to older patients with intellectual disability and take extra caution when prescribing multiple medications for prolonged periods of time. Regular monitoring of all medications should include the reasons and effectiveness to minimize the risk of adverse drug reactions. Communication among providers is critical for such monitoring. Reconcile medications by creating the most complete and accurate list possible of medications the adult is taking and comparing the list to those on the patient's record or medication order.

Also, monitor cascade prescribing (that is prescribing a medication to treat the adverse effects of previously prescribed medication). Pharmacokinetic testing is another useful tool,⁴ as is consulting with a clinical pharmacist regarding the medications prescribed. Comprehensive medication reviews (CMRs) should target deprescribing potentially inappropriate medications, especially if currently prescribed medications may be causing unwanted behavioral or functional changes, physical symptoms of distress, lethargy or dullness, or other troublesome features.

- **What can agencies/organizations and caregivers do?** Agencies providing supports can ensure that periodic CMRs are undertaken during times when person-centered care individual support or dementia care plans are examined and updated, at least annually, or when new medications are prescribed, or doses are being adjusted. In addition, providers/agencies should provide education to their clientele on the potential risks associated with polypharmacy and should encourage them to discuss any potential unwanted effects with their family, advocate, or health care practitioner. The involvement of clinical professionals knowledgeable in medication use and effects, in particular any interactions that may be adverse due to aging or the introduction of new prescriptions, should be *de rigueur* as part of such meetings and reviews. Discussions of any new or significant behavioral or functional changes that may be evident following the introduction of newly prescribed medications are particularly important.

Direct support professionals (DSPs) can also be part of this process, for they may recognize a behavioral change following a modification in a medication dosage or the introduction of another prescribed medication, or use of an over-the-counter product or medicinal herbs.^{29,30} "See something, say something" is the mantra when being suspicious about the relationship between behavior and medications and any concerns should be discussed with program managers or clinical staff. The same applies to home health aides and others who are charged with making home visits and supporting individuals who are living on their own, with family, or in other semi-autonomous housing situations.

⁴ Pharmacokinetic (PK) testing of a newly prescribed drug involves taking several blood samples over a period of time from the adult to determine how the body is handling the substance.

Among family members, caregivers or advocates can request a periodic CMR (which can be done by a pharmacist) of all medications being taken, their effectiveness and necessity, and whether any prescribed medications might be producing or have the potential to produce adverse reactions. Being surveillant of any unexplained changes in behavior or function following the introduction or change of a medication is important. Keeping an up-to-date accurate list of medications being taken, including reason for use, doses, frequencies, and any significant (or even less notable) changes, will help allay concerns when discussing the need to continue medications and modifying their dosages. When concerns arise, reviews of medications (and over-the-counter drugs and supplements) should be undertaken in discussion with the health practitioner or a pharmacist.

Family members and caregivers should become familiar with the medications that someone in their care is taking and why they have been prescribed. The use of reliable internet resources (generally those provided by a health/medical center, organization, or government entity) is recommended to become acquainted with any notable adverse effects of medications being taken. The same applies to adults with intellectual disability who have the capacity to administer their own medications, as well as their advocates. Easy-read medication information sites are available online and post useful information (such as the National Institute of Health). See the recommended readings noted in 'Reading Resources' below for a few excellent reviews of medications and their values and potential problems that may arise from their use, particularly when taken in combination. For quick reads see the listing below under 'Easy-to-read information from various organizations.'

In summary, providers, organizations, and caregivers need to be vigilant of the medications being taken by adults with intellectual disability to mitigate 'medication harm'. Regular reviews of the medications and any potential adverse effects should be undertaken. Clinical professionals knowledgeable in medication use and effects should be included in these reviews. Family members, too, should request such periodic CMRs and should understand the potential adverse effects of medications being taken.

Reading resources for more detailed information

- O'Dwyer, M., McCallion, P., McCarron, M., & Henman, M. Medication use and potentially inappropriate prescribing in older adults with intellectual disabilities: a neglected area of research. *Therapeutic Advances in Drug Safety*, 2018, 9(9), 535–557. <https://doi.org/10.1177/2042098618782785>
- Rochon, P.A. (2023, Jan). *Drug prescribing for older adults*. Uptodate. <https://www.uptodate.com/contents/drug-prescribing-for-older-adults>
- Royal College of Psychiatrists (UK). (2021). *Stopping The Over-Medication of People with Intellectual Disability, Autism, Or Both (STOMP) And Supporting Treatment and Appropriate Medication in Paediatrics (STAMP): Position Statement*. https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/position-statements/position-statement-ps0521-stomp-stamp.pdf?sfvrsn=684d09b3_6
- Williams, C.M. Using medications appropriately in older adults. *American Family Physician*, 2002, 66(10), 1917-1925. <https://www.aafp.org/pubs/afp/issues/2002/1115/p1917.html>

Easy-to-read information from various organizations

- What Older Adults Can Do to Manage Medications. (2023). Patient Education Handout. American Geriatrics Society/Health in Aging. <https://www.healthinaging.org/medications-older-adults/what-older-adults-can-do-manage-medications>
- Avoiding Overmedication and Harmful Drug Reactions. (2023). Tip Sheet. American Geriatrics Society/Health in Aging. <https://www.healthinaging.org/tools-and-tips/tip-sheet-avoiding-overmedication-and-harmful-drug-reactions>
- 10 Tips for Safe Medication Management for Seniors. (2023). Daily Caring. <https://dailycaring.com/medication-management-for-seniors-10-safety-tips/>
- Too Many Meds? How to Prevent Polypharmacy in People with Intellectual/Developmental Disabilities. (2016). Kansas Disability and Health Program (DHP), University of Kansas. <https://ihdps.ku.edu/sites/ihdps/files/documents/FINAL%20Tips%20to%20Prevent%20Polypharmacy%20in%20People%20with%20Intellectual%20disabilities--fixed.pdf>

Supplemental Aids

For a **glossary of terms** related to medications, a comprehensive listing can be found in the *Glossary of Pharmaceutical Terms* (2016), produced by the Pharmaceutical Pricing and Reimbursement Information (PPRI) network and the World Health Organization (WHO). https://ppri.goeg.at/sites/ppri.goeg.at/files/inline-files/Glossary_Update2016_final.pdf

Citations

- ¹ Centers for Disease Control and Prevention (CDC). 2019. *Minorities and women are at greater risk for Alzheimer's disease*. <https://www.cdc.gov/aging/publications/features/Alz-Greater-Risk.html>
- ² Alzheimer's Association. 2023. *Alzheimer's disease facts and figures*. <https://www.alz.org/alzheimers-dementia/facts-figures>
- ³ Larson, E.B., Kukull, W.A., Buchner, D., & Reifler, B.V. Adverse drug reactions associated with global cognitive impairment in elderly persons. *Annals of Internal Medicine*, 1987 Aug, 107(2), 169-173. doi: 10.7326/0003-4819-107-2-169. PMID: 2886086
- ⁴ Masnoon, N., Shakib, S., Kalisch-Ellett, L., Caughey, G.E. What is polypharmacy? A systematic review of definitions. *BMC Geriatric*, 2017 Oct 10, 17(1), 230. doi: 10.1186/s12877-017-0621-2.
- ⁵ Williams, C.M., Using medications appropriately in older adults. *American Family Physician*, 2002, 66(10), 1917-1925.
- ⁶ Qato, D.M., Wilder, J., Schumm, L.P., Gillet, V., & Alexander, G.C. Changes in prescription and over-the-counter medication and dietary supplement use among older adults in the United States, 2005 vs 2011. *JAMA Internal Medicine*, 2016 Apr, 176(4), 473-482. doi: 10.1001/jamainternmed.2015.8581. PMID: 26998708; PMCID: PMC5024734.
- ⁷ Goldberg, R.M., Mabee, J., Chan, L., & Wong, S. Drug-drug and drug-disease interactions in the ED: analysis of a high-risk population. *American Journal of Emergency Medicine*, 1996 Sep, 14(5), 447-450. doi: 10.1016/S0735-6757(96)90147-3. PMID: 8765105.
- ⁸ Doherty, A.S., Boland, F., Moriarty, F., Fahey, T., & Wallace, E. Adverse drug reactions and associated patient characteristics in older community-dwelling adults: a 6-year prospective cohort study. *British Journal of General Practice*, 23 January 2023. BJGP.2022.0181. DOI: 10.3399/BJGP.2022.0181
- ⁹ Lonchamp, S., Gerber, F., Aubry, J.M., Desmeules, J., Kosel, M., & Besson, M. Prevalence of polypharmacy and inappropriate medication in adults with intellectual disabilities in a hospital setting in Switzerland. *Frontiers of Psychiatry*, 2021 Jun, 25, 12, 614825. doi: 10.3389/fpsy.2021.614825. PMID: 34248693; PMCID: PMC8267250.
- ¹⁰ O'Dwyer, M., McCallion, P., McCarron, M., & Henman, M. Factors associated with polypharmacy and excessive polypharmacy in older people with intellectual disability differ from the general population: a cross-sectional observational nationwide study. *BMJ Open*, 2016, 6, e010505. doi: 10.1136/bmjopen-2015-010505

- ¹¹ Alonso-Sardón, M., Sáez-Lorenzo, M., Chamorro, A.J., Fernández-Martín, L.C., Iglesias-de-Sena, H., González-Núñez, V., Santos-Sánchez, J.Á., Carbonell, C., Lorenzo-Gómez, M.F., & Mirón-Canelo, J.A. Adverse effects in patients with intellectual and developmental disabilities hospitalized at the University Clinical Hospital. *Journal of Personalized Medicine*, 2022 Nov 13, 12(11), 1898. doi: 10.3390/jpm12111898.
- ¹² Zazzara, M.B., Palmer, K., Vetrano, D.L. et al. Adverse drug reactions in older adults: a narrative review of the literature *European Geriatric Medicine*, 2021, 12, 463–473. <https://doi.org/10.1007/s41999-021-00481-9>
- ¹³ Wikipedia.org. S.v. "pharmacodynamics." Retrieved February 9, 2023, from <https://encyclopedia.thefreedictionary.com/pharmacodynamics>
- ¹⁴ Ruscin, J.M. & Linnebur, S.A. (2022). *Pharmacodynamics in older adults*. <https://www.merckmanuals.com/professional/geriatrics/drug-therapy-in-older-adults/overview-of-drug-therapy-in-older-adults>
- ¹⁵ SAMSHA. (2019). *Guidance on inappropriate use of antipsychotics: older adults and people with intellectual and developmental disabilities in community settings*. <https://store.samhsa.gov/product/Guidance-on-Inappropriate-Use-of-Antipsychotics-Older-Adults-and-People-with-Intellectual-and-Developmental-Disabilities-in-Community-Settings/PEP19-INAPPUSE-BR>
- ¹⁶ Abraha, I., Cruz-Jentoft, A., Soiza, R.L., O'Mahony, D., & Cherubini, A. Evidence of and recommendations for non-pharmacological interventions for common geriatric conditions: the SENATOR-ONTOP systematic review protocol. *BMJ Open*. 2015 Jan 27, 5(1), e007488. doi: 10.1136/bmjopen-2014-007488.
- ¹⁷ Varghese D, Ishida C, Haseer Koya H. *Polypharmacy*. [Updated 2022 Sep 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK532953/>
- ¹⁸ Behnke, J. (2021, Mar). *Polypharmacy in the elderly: Causes and dangers*. *Comprehensive medication management*. <https://blog.cureatr.com/polypharmacy-in-the-elderly-causes-and-dangers>
- ¹⁹ Flood, B., & Henman, M.C. Experiences of the medication use process by people with intellectual disabilities. What a pharmacist should know! *Pharmacy*, 2021, 9(1), 24. <https://doi.org/10.3390/pharmacy9010024>
- ²⁰ Wilkinson, J., Dreyfus, D., Cerreto, M., & Bokhour, B. "Sometimes I feel overwhelmed": Educational needs of family physicians caring for people with intellectual disability. *Intellectual and Developmental Disabilities*, 2012 Jun, 50(3), 243-250. doi: 10.1352/1934-9556-50.3.243.
- ²¹ Smith, M.V.A., Adams, D., Carr, C., & Mengoni, S.E. Do people with intellectual disabilities understand their prescription medication? A scoping review. *Journal of Applied Research in Intellectual Disabilities*, 2019 Nov, 32(6), 1375-1388. doi: 10.1111/jar.12643.
- ²² Rowe, N., & Gordon, K.E. (2022, Nov 18). *A list of drugs linked to dementia*. GoodRX Health. <https://www.goodrx.com/conditions/dementia/these-drugs-could-increase-your-risk-of-dementia>
- ²³ Coupland, C.A.C., Hill, T., Denning, T., Morriss, R., Moore, M., & Hippisley-Cox, J. Anticholinergic drug exposure, and the risk of dementia: a nested case-control study. *JAMA Internal Medicine*, 2019, 179(8), 1084–1093. doi:10.1001/jamainternmed.2019.0677
- ²⁴ Livingston, G., Sommerlad, A., Orgeta, V., Costafreda, S.G., Huntley, J., Ames, D., Ballard, C., Banerjee, S., Burns, A., Cohen-Mansfield, J., Cooper, C., Fox, N., Gitlin, L.N., Howard, R., Kales, H.C., Larson, E.B., Ritchie, K., Rockwood, K., Sampson, E.L., Samus, Q., Schneider, L.S., Selbæk, G., Teri, L., & Mukadam, N. Dementia prevention, intervention, and care. *Lancet*, 2017 Dec 16, 390(10113), 2673-2734. doi: 10.1016/S0140-6736(17)31363-6. Epub 2017 Jul 20. PMID: 28735855.
- ²⁵ Coupland, C.A.C., Hill, T., Denning, T., Morriss, R., Moore, M., & Hippisley-Cox, J. Anticholinergic drug exposure, and the risk of dementia: a nested case-control study. *JAMA Internal Medicine*, 2019, 179(8), 1084–1093. doi:10.1001/jamainternmed.2019.0677
- ²⁶ Deb, S. (2018). *The use of medication for the management of problem (challenging) behaviour in adults who have intellectual disabilities*. University of Hertfordshire (UK). <http://www.intellectualdisability.info/mental-health/articles/the-use-of-medications-for-the-management-of-problem-behaviours-in-adults-who-have-intellectual-disabilities>
- ²⁷ O'Dwyer, M., McCallion, P., McCarron, M., & Henman, M. Medication use and potentially inappropriate prescribing in older adults with intellectual disabilities: a neglected area of research. *Therapeutic Advances in Drug Safety*, 2018, 9(9), 535–557. <https://doi.org/10.1177/2042098618782785>
- ²⁸ O'Dwyer, M., McCallion, P., McCarron, M., & Henman, M. Medication use and potentially inappropriate prescribing in older adults with intellectual disabilities: a neglected area of research. *Therapeutic Advances in Drug Safety*, 2018, 9(9), 535–557. <https://doi.org/10.1177/2042098618782785>
- ²⁹ US Department of Labor. (2023). *Direct Support Professionals (DSPs). The Role of a DSP*. <https://www.dol.gov/agencies/odep/program-areas/individuals/DSP>
- ³⁰ NADSP. (2023). *Who are direct support professionals?* <https://nadsp.org/>



Contributors: Matthew P. Janicki, Ph.D. (University of Illinois Chicago & National Task Group), Seth M. Keller, M.D. (American Academy of Developmental Medicine and Dentistry & National Task Group), Mike Koronkowski, PharmD, BCGP (ENGAGE-IL & University of Illinois Chicago), Beth Marks, Ph.D., RN, FAAN (HealthMatters™ Program, University of Illinois Chicago), Dawna T. Mughal, Ph.D. (Gannon University & National Task Group), Nancy Murray, M.S. (Achieva & National Task Group), Kathryn Pears, MPPM (National Task Group), Rick Rader, M.D. (Orange Grove Center & National Task Group), Kathryn P. Service, RN, MS, FNP-BC, CDDN (National Task Group).



www.the-ntg.org

V 2'21'23j-b