

Reducing Potentially Inappropriate Medications in Older Adults

1. Project Lead/Key Contact (name, email & phone number)

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2. Why are you interested in participating in the Improvement Scholars Program?

Dr. Amy Abramowitz- I am an early career geriatric psychiatrist on the faculty at UNC with an interest in quality improvement and patient safety. As a psychiatry resident I attended the Academy of Emerging Leaders in Patient Safety and was one of the first two psychiatry residents to attend. The Academy inspired me to apply to join the University of Illinois Hospitals Quality and Safety Strategy and Leadership (QSSL) Committee and I was one of four residents elected to serve on this committee. As a chief resident, I was involved in several projects to improve quality and safety for psychiatric inpatients. After residency, I completed a geriatric psychiatry fellowship and developed an interest in mild cognitive impairment and joined the faculty at UNC in 2021. At UNC I am a co-director of the Aging Brain Clinic, which is an interdisciplinary clinic focusing on older adults with early cognitive impairment. I also see older adults in the outpatient setting in psychiatry and in integrated care within Geriatric Medicine. I would like to further develop my interest and skills in QI and focus on reducing potentially inappropriate medications in patients with cognitive impairment as an Improvement Scholar.

Dr. Emily Cetrone - Ever since I started medical training, I have had immense joy in patient care. Among other places that I work, I am a primary care physician in the Geriatrics Specialty Clinic at UNC, and it is a pleasure to care for our older adult population there. What I have noticed, however, is that even though we have an extremely dedicated and hardworking interprofessional team, there are certain recurring errors and adverse events. These are not errors or events that any one individual can fix but rather, the root of the issue lies in the processes we use and the systems in which we work. Getting to these roots impacts the patient care that I love in a more expansive way, and it can improve workflow for clinicians as well. In fellowship, my co-fellows and I looked at ways to reduce no-shows for our telehealth visits, and as faculty, I have started a Morbidity & Mortality conference series for the Geriatrics division; I want to continue to learn more about patient safety and quality improvement. I would be honored to participate in the Improvement Scholars Program. It would be a privilege to receive this mentoring and guidance in order to not only implement a specific project next year, but also to learn skills that I would be able to carry with me for the rest of my career.

3. Which UNC Health improvement priority will your project address?

The project will primarily address patient harm prevention and mortality reduction by focusing on medication safety and stewardship of potentially harmful medications in a population vulnerable to adverse effects. It will also improve outpatient care for older adults by addressing one of the factors that can contribute to multimorbidity and cognitive impairment.

4. What is the problem or gap in quality you seek to improve?

One of the main sources of morbidity in older adults is inappropriate medication use. Potentially inappropriate medication use is defined as overusing or misusing a drug. This can include a drug used without a valid indication, the incorrect choice of drug, incorrect dose, or incorrect duration. Inappropriate medication use is strongly associated with polypharmacy, which is

typically defined as the concurrent use of multiple medications, typically five or more medications. Polypharmacy becomes particularly problematic when multiple medications are prescribed inappropriately, or when the intended benefit of the medication is not realized, or when the harms of a medication outweigh the benefits. About 40% of older adults take five or more medications and this number seems to be increasing. These rates are higher among African-Americans and people with low incomes. Psychiatric illness is also strongly associated with exposure to potentially inappropriate medications. Of the five most common potentially inappropriate medications prescribed, three were psychotropic medications (1).

5. Describe the patient population affected, scope, and impact of the problem

a. What is the specific patient population your project will impact?

While inappropriate medication use can impact many patient populations, there is more risk of harm in older adults. Combinations of medications can shift the risk-benefit analysis in older adults, and individual drugs can become harmful when used in complex regimens. Problematic polypharmacy and inappropriate medication use are associated with adverse drug effects and negative health outcomes in older adults, including falls, cognitive impairment, frailty, and mortality. Nearly half of hospitalizations after ER visits for adverse drug effects were in adults 80 and over (2). One study found that 35% of ambulatory older adults experienced an adverse drug effect (3).

The project will focus on addressing potentially inappropriate medication use in the outpatient setting, specifically the Geriatrics Specialty Clinic at UNC. This clinic serves a large percentage of the older adult population at UNC, in particular those with cognitive impairment, frailty, and multi-complexity, in whom polypharmacy and inappropriate medication use are the highest concern. Focusing on prescribing practices in this setting can potentially prevent adverse effects and hospitalizations.

b. How many patients are in the population?

There are about 3400 patients in the Geriatrics Specialty Clinic (GSC).

c. How frequently does the problem occur?

Estimates vary, but it is thought that about 40-50% of Medicare beneficiaries experience polypharmacy (4). There are likely at least similar rates in the GSC population, which equates to about 1700 patients. This number may be higher, however, because people with dementia are more frequently impacted by polypharmacy, and the GSC serves a large percentage of patients with dementia and other degrees of cognitive impairment. For example, at least 50% of patients with dementia have been found to be taking psychoactive medications, and 14% are prescribed three or more of these medications (5).

In the past month 3062 new prescriptions were written for 1412 patients in the GSC. We included information regarding the number of prescriptions written for some common conditions in the supplemental figures. Of note among antihistaminergic medications, loratadine has the highest anticholinergic burden compared to fexofenadine which has the least. There were 7 new prescriptions for loratadine in the past month compared to 3 for fexofenadine. We also found 359 new prescriptions of psychoactive medications for anxiety and depression as well as 294 new prescriptions for pain conditions.

d. What is the impact of the problem?

Polypharmacy and inappropriate medication use have been linked to numerous adverse outcomes at any age or stage of health. As above, older adults are especially susceptible and are at higher risk of falls, kidney failure, delirium, and readmissions - among many other significant adverse effects - due to polypharmacy and inappropriate medication use. Additionally, people with cognitive impairment, most of whom are over 65, are particularly vulnerable to the harmful effects of inappropriate medication use. These patients tend to have multi-complexity, communication barriers, decreased function at baseline, and evolving goals of care in the context of life-limiting illness. Many of the medications that are commonly prescribed to treat the behavioral, psychiatric, and sleep symptoms of dementia are sedating and can worsen cognition and increase their risk of falling.

6. What do you think are the underlying causes of the problem? Why do you think the problem is happening?

There are many factors that contribute to polypharmacy and inappropriate medication use in the geriatric population. The patients that we serve in the GSC often have many specialists following, and multiple physicians in a patient's care is a known contributor to polypharmacy. Additionally, within Epic, it is not always readily apparent what medications a patient is currently prescribed because over-the-counter medications and supplements are not included in the medication list. The main medication list also does not incorporate the pharmacy fill history. Accurate and comprehensive medication reconciliation takes time, which is challenging in the primary care setting.

7. What is the history of improvement or attempted improvement at UNC Health? What work will your proposed improvement build on?

At UNC Health, there have been a number of important research endeavors that have looked at the effects of polypharmacy in older adults. For example, Dr. Joshua Niznik, PharmD, specifically looked at deprescribing acetylcholinesterase inhibitors in a nursing home population (6). Additionally, an interprofessional team of pharmacists, geriatricians, and researchers created a framework and toolkit for deprescribing opioids and benzodiazepines in older adults, represented by the acronym A-TAPER, which stands for Assess medication use, Talk about risks versus benefits, select Alternatives, Plan next steps, Engage patient, and Reduce dose (7). While these are important efforts in better understanding the problem of polypharmacy, no specific quality efforts have been undertaken at the Geriatrics Specialty Clinic in order to address this issue.

8. Please complete the "[Measures Table](#)".

Measure Name	Measure Type	Measure Calculation	Measure Exclusion	Data Source	Baseline	Goal	Collection Frequency
Decrease in the number of anticholinergic medications over a six-month period	Outcome	Numerator: anticholinergic burden scale at six months Denominator: anticholinergic burden scale at initial visit	Patients who only have one visit, patients with an anticholinergic scale of 0, or do not have a follow up within six months	EHR	~50%	80%	Every 3 months
Patients will bring their medications to in person visits	Process	Numerator: Number of visits in which patient brings their medications Denominator: Number of in person visits at the Geriatrics clinic at Eastowne	Patients who do not take any medications	Care partner documentation	~ 5%	50%	Monthly
Care partners will complete a handoff with clinicians after their medication reconciliation	Process	Numerator: number of medication reconciliation handoffs completed Denominator: number of in person visits	Patients who do not take any medications	Electronic Health record – care partner documentation	<10%	50%	Monthly
Adding over the counter medications and supplements to the medication list	Process	Numerator: patients with over the counter and supplements added to the medication list Denominator: patients on over-the-counter medications and supplements that are not on the medication list	Patients not on any over the counter medications	EHR	~ 10%	30%	Monthly

Measure Name	Measure Type	Measure Calculation	Measure Exclusion	Data Source	Baseline	Goal	Collection Frequency
Increase in encounters after reducing in anticholinergic medications	Balancing	<p>Numerator: Number of encounters in the six months after a decrease in an anticholinergic medication – number of encounters in the six months prior to change in anticholinergic medication</p> <p>Denominator: average number of encounters in a six-month period</p>	Patients not on any anticholinergic medications	EHR	50%	30%	Every 3 months

9. What ideas do you have for changes that will result in improvement?

First, we would like to improve the rate that patients bring their medications to clinic appointments. One challenge regarding medication reconciliation is that many patients often are not sure exactly what medications they are taking. Pharmacy colleagues have noted that medications that are purchased over the counter and supplements are often not identified. When patients bring physical pills or an up-to-date medication list, the reconciliation is much more accurate. We hope to incorporate verbal and written reminders to patients to bring medications along with other communications with patients. We will work with care partners and nursing to include reminders at check out when appointments are scheduled by care partners and when patients communicate with nursing regarding appointments. More targeted reminders to patients with polypharmacy on their problem list would also be helpful.

Next, we hope to improve the medication reconciliation that is done first by CMA care partner clinics and then reviewed by the MD/NP clinician during the visit. We hope to work with the care partner and nursing leadership to develop a brief educational tool for care partners so that they are completing medication reconciliations more accurately and efficiently. One feature of the reconciliation process that can be improved is checking pharmacy information available in the EHR to review when medications were last filled. We want to ensure that care partners know how to find this information and that it is reviewed.

After care partners review medications, we plan to develop a very brief handoff tool to communicate medication information between care partners and clinicians. This tool would include a basic assessment of how familiar a patient or their caregiver is with their medications. It would also include whether they have medications or their list with them. Care

partners would note whether they assessed over the counter medications and supplements. This tool would help ensure that the team has a shared mental model of the patient's understanding of their medications which will help clinicians manage their time with patients more effectively.

Finally we hope to work with care partners and clinicians to ensure that over the counter medications and supplements are added to the medication list in the chart. We would like to encourage clinicians to add "polypharmacy" to the problem list for patients with an anticholinergic burden scale of 3 or more, patients taking 3 or more psychoactive medications, or patients prescribed 5 or more total medications.

We plan to focus our outcomes on minimizing anticholinergic medications because they are potentially overlooked when clinicians do not realize patients are taking over the counter medications with anticholinergic properties. We suspect that by examining and improving the process surrounding medication reconciliation that we will also reduce the total number of medications patients are taking, particularly inappropriate medications. These medications are ubiquitous in primary care and are used to manage a variety of common conditions including sleep, depression, headaches, and overactive bladder.

One of the unintended consequences of minimizing polypharmacy is that when stopping or switching a medication, sometimes symptoms that were being managed by that medication worsen. One way we plan to monitor this is using a balancing measure for the increase in encounters after decreasing anticholinergic burden. We will compare the change in the number of encounters in the six months after decreasing anticholinergic medications and the average number of encounters in six months.

10. How has this problem been addressed successfully elsewhere?

One approach to avoid inappropriate medication use is the drug list approach. There are negative lists, which inform providers about which drugs to avoid. There are also positive-negative lists, which include alternatives. The best-known list is the Beers Criteria which are lists of potentially inappropriate medications for older adults. About half of older community-dwelling adults were found to be receiving at least one medication in the Beers Criteria. In 2008, the STOPP/START criteria were published, which includes medications that are significantly associated with adverse drug events (STOPP list) and potential prescribing omissions (START list). Use of the criteria has been found to be associated with improved medication appropriateness and decreased hospital length of stay (8).

Other types of interventions include educational programs, medication review, computerized decision support tools, and regulatory interventions. Interventions are more effective if they focus on factors beyond solely the number of prescribed medications (9). A systematic review of interventions found that pharmacy-based interventions seem to reduce inappropriate prescribing (10). We hope to focus our interventions on improving our medication review process using an interdisciplinary team. Of note, very few studies have looked at over-the-counter medications because this data is not routinely included in the EMR.

Computerized tools may include checklists or flags integrated into the electronic health record or performance reviews using electronic health data. A review of computerized decision tools found that they were only somewhat effective in the outpatient setting, reducing potentially inappropriate medications by 23%. For example, a study that incorporated STOPP guidelines into the EMR failed to show a significant decrease in prescribed inappropriate

medications. This was thought to be due to gaps in EMR data quality and to problems with the way the alerts were incorporated into the workflow which resulted in clinicians often overlooking them (11).

11. How will [high performance management](#) tools (Just Culture, SAFE reporting, team communication and teaming skills, huddles, and visual management boards) be used to support the work?

Our project will use TeamSTEPPS tools, specifically improving communication between care partners and clinicians using a handoff when patients are identified as being at risk for taking potentially inappropriate medications. We will ensure that all encounters are using cross-monitoring when completing medication reconciliation.

12. Please describe how your project addresses each of the 5 elements reflected in the [Quintuple Aim for Health Care Improvement](#).

Improved health: There are many clinical risks that have been found to be associated with polypharmacy, particularly related to anticholinergic medications. Anticholinergic side effects include confusion, dry mouth, urinary retention, and constipation. These effects are particularly concerning for older adults, many of whom have underlying cognitive impairment. We hope to reduce the harms of medications using less risky alternatives to manage symptoms.

Enhanced patient experience: Patients will benefit from improvements in communication between all team members during an encounter, and it will be helpful to patients to have more reminders to bring medications to appointments. They will also benefit from shared-decision making in regards to their medications. Often, patients are not aware of the risks of their medications, and sometimes, when raising polypharmacy as a concern, patients can become defensive, especially when a clinician has prescribed a medication that has been effective. By identifying polypharmacy as a medical problem, often an iatrogenic one, patients may weigh risks and benefits differently and decrease their medication use. It is important to provide education and guidance and then to allow patients to make decisions that are in line with their values and goals.

Enhanced clinician and staff experience: Staff and clinicians will benefit from education and improved communication by including a handoff with information about medication reconciliation. By having a structured tool, care partners will feel more confident in communicating their impressions to clinicians. This standardized approach will help create a shared mental model for patients' familiarity with medications, particularly when time reviewing medications is limited. Clinicians will hopefully feel supported in their efforts to minimize the risk of medications by a clinic-wide effort to include polypharmacy on the problem list.

Health equity – race and ethnicity are key risk factors for polypharmacy. Polypharmacy is more common in patients with multiple chronic conditions, cognitive dysfunction, and low health literacy all of which are more common in racial and ethnic minorities and patients with low socioeconomic status. African-American patients are at highest risk and are more likely to be prescribed more complex, older, and generic medications than other racial groups (12). Ensuring that all individuals, regardless of race and ethnicity, socioeconomic status, or availability of resources, have access to the highest-quality medications required to manage their health needs is known as pharmaco-equity, and minimizing polypharmacy in older adults from marginalized groups can be one way of advancing pharmaco-equity. Beyond looking at disparities in our population, we plan to tailor our communication strategies to be culturally

sensitive and to ensure that our more vulnerable patients have equitable access to all interventions (13).

Reduced costs – Potentially inappropriate medications are associated with increased healthcare utilization and higher costs (14). A cost-effectiveness trial for clinical medication review found that it was very likely that this intervention was cost-effective (15).

13. Please describe the support and engagement you have from leadership for the work you are proposing. Please indicate leaders with whom you have consulted about this proposal.

Dr. Busby-Whitehead will meet with us at least quarterly as our project sponsor in order to help ensure we are on task and making progress. Dr. Gilliam has experience with quality improvement and is very invested in our clinic processes and workflows. Dr. Samantha Meltzer-Brody is also supportive of our project and particularly Dr. Abramowitz's use of administrative time to lead this effort. She has indicated that she will be available to help support the project as needed. Dr. Michael Kane and Dr. Xiaoming Zeng from the UNC Psychiatry Informatics Core have helped provide input as well.

14. Who will comprise the project team?

The project leads will be Amy Abramowitz, MD, and Emily Cetrone, MD. The rest of our team will be comprised of the following:

- Project sponsor: Jan Busby-Whitehead, MD; chief of Geriatrics
- Project supervisor: Meredith Gilliam, MD, MPH; medical director of the Geriatrics Specialty Clinic
- Other team members: Jena Burkhardt, PharmD; Ashley Owens, CMA; Elizabeth Potter, RN; Ulysses Toche, MD

We have a strong interprofessional team who is invested in the excellent care of our geriatric patients. As project leads, Drs. Abramowitz and Cetrone will meet regularly to meet all necessary benchmarks, complete scholarly tasks, and participate in trainings. Dr. Toche is a geriatric fellow this year and is planning on staying on for a second year. He has an interest in improvement and will be able to dedicate some of his fellowship time to our project. As our clinical pharmacist, Dr. Burkhardt has a keen interest in polypharmacy and its negative effects, and she dedicates part of her clinical team to meeting with patients to address this issue. Ms. Potter, and Ms. Owens also both serve key roles in the workflow we are proposing to improve, and their perspective will be crucial for success. Ultimately, we expect our team to have a larger impact on other units because what we learn could ultimately benefit other outpatient clinical sites.

15. How will you ensure sufficient time to dedicate to the project over the scholar year?

Dr. Abramowitz has 25% administrative time to work on scholarly activity and plan to use this time to work on project-related activities. This administrative time was in part to spend on developing the geriatric psychiatry fellowship. During the 2023-2024 academic year, there will not be a fellow and applications for the fellowship will already have been submitted so I will have some extra flexibility to pursue other academic interests.

Dr. Cetrone also has administrative time that she will be using for this project over the scholar year. My clinical responsibilities are shifting next year, which will allow for more flexibility and time to devote to such scholarly activity.

Train care partners regarding medication reconciliation		x	x	x	x	x	x	x	x	x	x	x
Implement reminders for patients to bring medications				x	x	x	x	x	x	x	x	x
Develop educational tool about med reconciliation handoffs				x	x	x						
Incorporate training and handoffs with medication reconciliation						x	x	x	x	x	x	x
Monitor adding over the counter and supplements to the medication list								x	x	x	x	x
Regular monitoring of outcomes									x	x	x	x

19. References

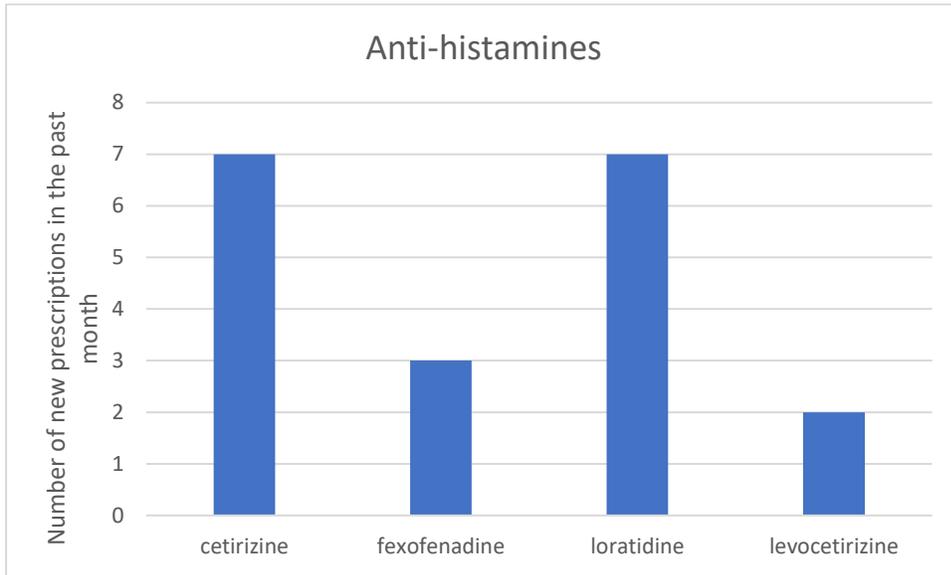
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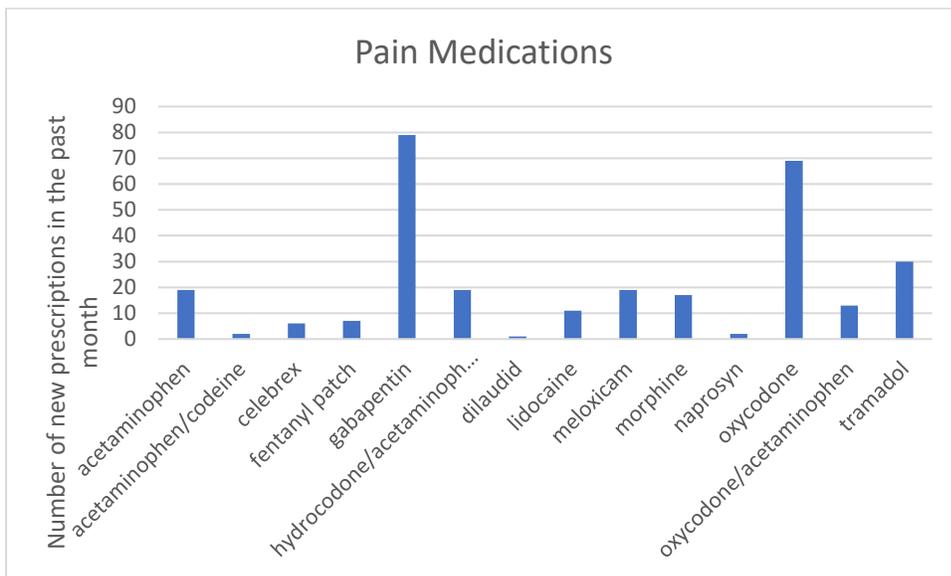
20. Letters of Support: Two letters of support are required. One from the project sponsor (defined below) and one from your supervisor. Submit both letters with the application.

See attached pdfs

Supplemental Figure 1.



Supplemental Figure 2.



Supplemental Figure 3.

Anxiety/Depression

