Reducing the Risk

Year 1 Report of the Polypharmacy in Nursing Homes Learning Collaborative
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About United Hospital Fund

UHF works to build an effective and equitable health care system for every New Yorker. An independent, nonprofit organization, we are a force for improvement, analyzing public policy to inform decision-makers, finding common ground among diverse stakeholders, and developing and supporting innovative programs that improve health and health care. We work to dismantle barriers in health policy and health care delivery that prevent equitable opportunities for health. For more on our initiatives and programs, please visit our website at www.uhfny.org and follow us on X, formerly known as Twitter, at www.twitter.com/unitedhospfund.
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Executive Summary

An estimated 40% of older adults take five or more prescription medications daily. Even medications that are necessary to treat a condition have associated risks of side effects and drug-drug interactions. The prescribing of an inappropriately high number of medications, known as polypharmacy, is a particular concern for residents of nursing homes. Adverse drug events, cognitive impairment, falls, and even hospitalizations are not uncommon.

In 2022 the Mother Cabrini Health Foundation awarded United Hospital Fund’s Quality Institute a grant in support of a Polypharmacy Learning Collaborative, a collaboration with six New York-based skilled nursing facilities (SNFs) to design and implement ways to better monitor and assess medication regimens and prescribing practices. The initiative is also supported by the TD Charitable Foundation.

The focus of the learning collaborative was managing the “deprescribing” process—that is, withdrawing patients from potentially inappropriate medications, supervised by a health care professional, with the goal of improving outcomes. This report provides a description of the learning collaborative approach, describes deprescribing interventions undertaken by the participating facilities, details the results, chronicles challenges and successes, and provides resources that can be useful to nursing homes as they focus on addressing the issue of polypharmacy. In addition, it offers recommendations for providers to alleviate the risks and burdens of polypharmacy.

Key Findings

1. The number of residents prescribed 10 or more medications decreased by 16% following the implementation of deprescribing interventions; the average number of medications prescribed per nursing home resident decreased from 10.7 to 8.7.

2. All participating nursing homes were able to achieve a decrease in the percentage of residents prescribed the targeted medications.

3. The use of a quality improvement approach and engagement of an interdisciplinary team can facilitate deprescribing initiatives in nursing homes.

4. Engagement of residents and caregivers, targeted communication strategies, and shared decision-making are critical to successful deprescribing.
Introduction

Medical providers and others have become increasingly concerned in recent years about the potential harms of polypharmacy—the prescribing of an inappropriately high number of medications. The problem has received growing attention in academic research, clinical settings, and the media. While there is no universally agreed upon definition of polypharmacy, it is frequently defined as taking more than five regularly scheduled medications. What is widely accepted is that the risk of adverse medication events grows as the number of medications an individual consumes increases. An estimated 40% of older adults take five or more prescription medications daily. Even medications that are necessary to treat a condition have associated risks of side effects and drug-drug interactions.

Polypharmacy poses even greater health problems in older adults, who are more likely to have multiple chronic conditions—such as hypertension, heart disease, and diabetes—that frequently require numerous medications to manage. As a result, it is common for older adults to be treated by multiple providers and to receive care that is not always well coordinated, leading to gaps in effective medication management and greater exposure to risks. There are also specific medications that should be avoided in older adults. Although the decades-old American Geriatric Society’s Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults enumerates these medications, they are still frequently prescribed. This increases the risk of adverse events and diminished quality of life, such as falls with injury, cognitive impairment, functional disability, weight loss, hospitalization, emergency visits, and increased risk of mortality—along with escalating costs. Frail older adults are even more vulnerable to these risks.

For the estimated 50% of nursing home residents receiving nine or more medications, the rate of adverse drug reactions is twice as high as in residents taking fewer than nine medications. While the use of multiple medications is often appropriate in managing patients with complex chronic diseases, some medications may be unnecessary; they may be duplicative, have limited benefit, have harmful side effects, or be inconsistent with a resident’s care goals and preferences or with current practice standards. They also may form part of a “prescribing cascade,” whereby the side effects of one medication lead to yet another prescription. Another contributing factor: a gap in the knowledge and skills for how and when to discontinue a medication even among clinicians who may be well-versed in prescribing a medication to treat or prevent a particular condition.

Mounting evidence supports a more standardized approach to minimize the potential harms of polypharmacy and improve appropriate medication use for older
adults. Many have called for focusing more attention on deprescribing, the thoughtful and systematic process of identifying problematic medications and either reducing the dose or stopping these medications in a manner that is safe and effective.

In 2020, the Lown Institute published a notable report, *Eliminating Medication Overload*, which called for a multifaceted national action plan to address this growing problem. Many of the report’s recommendations focus on deprescribing, including enhancing the information available to clinicians at the point of care, education and training of health professionals, and implementation of “prescription check-ups” designed to promote deprescribing and shared decision-making.

In 2021, focusing on the problem of polypharmacy in long-term care, the Society for Post Acute and Long Term Care of the American Medical Directors Association (AMDA) launched the Drive to Deprescribe. This national initiative emphasizes promoting awareness, as well as education and action, with the specific goal of a 25% reduction in medication use in long-term care settings. Given the growing population of older adults in the U.S. and the national recognition of polypharmacy as a serious safety problem, the time is ripe for providers and other stakeholders to systematically address this issue.

**UHF’s Approach**

In 2022 United Hospital Fund’s Quality Institute sponsored a learning collaborative with six nursing homes in the New York City area to address the problem of polypharmacy through deprescribing interventions. The initiative was supported by a grant from the Mother Cabrini Health Foundation. Additional support was provided by TD Charitable Foundation. UHF’s interest stemmed from the growing national attention focused on this problem as well as the organization’s previous work with skilled nursing facilities in transitions of care. This work was chronicled in a UHF report, *Heading Home from a Skilled Nursing Facility: Interventions and Tools for Improving the Transition*, which highlighted numerous medical, social, and community factors that may interfere with a successful transition to home. One of the key issues that surfaced was the problem of proper medication management. UHF staff found that patients were frequently discharged from skilled nursing facilities on numerous medications but without sufficient understanding of why they were prescribed or how to appropriately take them, as well as little awareness of side effects and interactions. Some of these medications were added during their acute-care hospitalization and subsequent post-acute stay, while others may have been long-standing medications taken for years at home.

Given the serious nature of this issue, the Quality Institute team decided to design a project to address it from a quality improvement perspective. Because of the limited time available in the short-term skilled nursing setting to review and appropriately adjust complex medication regimens with the goal of deprescribing, we chose to address this

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5 DRIVE TO DEPRESCRIBE: Optimizing Medication Use in PALTC. Available from: [https://paltc.org/d2d-meeting-archives](https://paltc.org/d2d-meeting-archives)
quality issue in the long-term care nursing home setting. In nursing homes, deprescribing initiatives hold promise for improving resident-centered health, achieving more individualized care, reducing harm, and realizing efficiencies in administering medications. To be effective, they require clinical leadership, an interdisciplinary team approach, standardized practices, and involvement of residents and families.

The Learning Collaborative

The goal of our project was to assist six nursing homes in the New York City area in implementing deprescribing interventions that would address the problem of polypharmacy in their organizations’ long-stay residents. The learning collaborative focused on providing education about polypharmacy, specific clinical content, best practices, quality improvement expertise, and technical support. UHF provided grants to the nursing homes to support their participation in the initiative.

The UHF Quality Institute team recruited two faculty to provide clinical expertise and serve as our subject matter experts: Dr. T.S. Dharmarajan, Vice Chairman, Department of Medicine, Clinical Director, Division of Geriatrics and the Program Director, Geriatric Medicine Fellowship Program at Montefiore Medical Center, as well as Professor of Medicine at Albert Einstein College of Medicine; and Dr. Jennifer Pruskowski, Assistant Professor in the Department of Geriatric Medicine, University of Pittsburgh School of Medicine, and Associate Director of Education and Evaluation at the Pittsburgh VA, and Geriatric Research and Education at the University of Pittsburgh School of Medicine.

Learning Collaborative Participants

The six facilities are in each of New York City’s five boroughs and in Suffolk County. They range in size from 148 to 480 long-term care (LTC) beds (average 293). Two are part of larger systems, while the others are independent facilities. All are nonprofit organizations. Two employ full-time pharmacists, and the remainder use consulting pharmacists. Each facility engaged a multidisciplinary team to guide their participation in the initiative, and each team was led by the facility’s medical director.

Learning Collaborative Participants

We structured our collaborative around four learning sessions (two in person and two virtual), which included the following topics: risks of polypharmacy in older adults, clinical knowledge on medication categories to be targeted for deprescribing, data collection and measurement, designing deprescribing interventions, techniques for communicating with residents and family, case studies, quality improvement tools, culture change related to deprescribing, and sustainability. Collaborative participants benefited from peers sharing their experiences and challenges with deprescribing in their organizations. Agendas for learning sessions and selected presentation materials are available in Appendix A. A resource library was developed and made available, which contained educational material as well as published algorithms for deprescribing specific medications (Appendix B).

Each facility was asked to identify two to three medications from a list developed by the UHF team and project faculty. Facilities chose medications that were frequently prescribed in their
Targeted Medications

Context

The burden of polypharmacy in older adults stems from a variety of drugs and supplements. Some medications, however, are of particular concern because of their potential for adverse events and harmful drug-drug interactions, which are identified by the Beers Criteria. The Beers Criteria is an important tool for those working with nursing home residents, who often experience frailty, chronic conditions, and multimorbidity, all of which place them at higher risk of adverse drug events.

Recognizing that some medications may be potentially inappropriate and more frequently contribute to polypharmacy in nursing home residents, UHF staff and project faculty selected a list of four medication categories: proton pump inhibitors, antihypertensives, benzodiazepines, and cholinesterase inhibitors and memantine. Participants could choose two on which to focus their interventions. They were also offered the opportunity to address a third area of focus, multivitamins, though this was optional.

We intentionally limited this list to focus the collaborative’s curriculum and promote shared learning experiences. In selecting the categories above, we prioritized the following findings from published literature:

1. Medication categories which are commonly prescribed in nursing homes despite there being evidence that they may be potentially inappropriate for older adults.
2. Medication categories for which the risks frequently outweigh the benefits in the nursing home population.
3. Medication categories for which there is a published, evidence-based algorithm to support decision-making around deprescribing decisions. Tools developed by the Bruyère Research Institute Deprescribing Guidelines Research Team and their collaborators to aid deprescribing decisions are available for most of the medications we selected on Deprescribing.org.

Note: Only scheduled medications were in scope for this project; PRN medications were excluded from the intervention design and the associated data collection.
### Profile of each medication

<table>
<thead>
<tr>
<th>Medication Type</th>
<th>Common uses in nursing homes</th>
<th>Common side effects</th>
<th># of nursing homes that selected medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proton Pump Inhibitors</td>
<td>Commonly prescribed for treatment of acid-related gastrointestinal disorders</td>
<td>Long-term PPI use associated with several risks: C. difficile, colitis, bone loss, and fractures 6, 7</td>
<td>5</td>
</tr>
<tr>
<td>Antihypertensive medications</td>
<td>Very commonly prescribed to treat high blood pressure, but some are used to treat other conditions (e.g., atrial fibrillation, heart failure)</td>
<td>Multiple side effects, which vary between the drug classes</td>
<td>3</td>
</tr>
<tr>
<td>Cholinesterase inhibitors and Memantine</td>
<td>Main class of drugs currently used for the treatment of Alzheimer’s, though benefits are thought to be mild, time-limited, and may not be clinically significant 12</td>
<td>Bradycardia (Cholinesterase Inhibitors)</td>
<td>3</td>
</tr>
<tr>
<td>Benzodiazepines and Z-drugs</td>
<td>Anxiety, sleeping problems, and other disorders (benzodiazepines)</td>
<td>Increased sensitivity and impaired metabolism, cognitive impairment, accidents/falls, and delirium 16</td>
<td>1</td>
</tr>
</tbody>
</table>

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Polypharmacy Interventions

Since the six nursing homes focused on different medication categories and varied in characteristics such as bed size, staffing, and services offered, UHF staff asked them to develop unique quality improvement interventions best suited to the needs of the organization and the residents as well as available resources. Despite organizational differences and the freedom to tailor their own projects, the nursing homes’ interventions included some common components summarized below.

The interventions were developed and outlined in a project plan template provided by UHF. Facilities were required to identify an overall aim statement or goal for their intervention, their own facility’s drivers of polypharmacy, PDSA (Plan Do Study Act) cycles to address those drivers, a strategy for engaging residents and caregivers, and more. A template of the project planning document can be found in Appendix C.

Building and Utilizing an Interdisciplinary Team

Core to the success of each nursing home, regardless of the medications chosen, was the relationship and collaboration between the medical director and pharmacist. Half of the facilities had pharmacists on staff who worked on this initiative, and the other half worked with consultant pharmacists. These individuals typically served as the official project leads and were also the champions for this work in their facilities. In most cases, the pharmacists would make recommendations about deprescribing opportunities to the medical director. UHF did not evaluate any difference in success between organizations with in-house pharmacists and those that used consultant pharmacists but observed that the in-house pharmacists had deeper and more regular involvement. For example, one facility’s in-house pharmacist was also able to take on the responsibility of data collection and submission and met regularly with the medical director each week to discuss progress on the project.

Collaboration across disciplines also played a part in facilities’ interventions, though the discipline depended on the medication categories a facility chose to address. For those that targeted cholinesterase inhibitors and memantine, the support of consultant psychiatry services was sought out from the beginning of the project. One facility determined early on that their psychiatry partner was a key driver of the high number of prescriptions for these medications. Educating their psychiatry provider and getting their buy-in was central to their ultimate deprescribing success. Another facility targeting cholinesterase inhibitors and memantine, as well as benzodiazepines, involved their department of therapeutic recreation to help observe and monitor residents’ behaviors and cooperation following dose reduction or discontinuation; this data was then shared with the medical director. One nursing home that chose to address multivitamins engaged in weekly nutrition meetings with the medical director and dieticians to assess residents’ nutritional status and the necessity of continuing a multivitamin. The interdisciplinary team is particularly important when specialists are also involved in caring for the resident, additional engagement is needed with caregivers, or when non-pharmacological interventions are incorporated into the patient’s care.
One nursing home built its interdisciplinary team by creating new positions supported by the UHF grant. The facility hired a grant coordinator to exclusively focus on the project by collecting and submitting data, monitoring resident progress, and evaluating opportunities for deprescribing. The nursing home also hired a certified nursing assistant to collect additional vitals three times a week for residents with reduced or discontinued antihypertensives to monitor for any adverse reactions in blood pressure or other symptoms. Hiring staff exclusively for time-limited quality improvement projects can sometimes jeopardize the project’s sustainability. But after seeing the contributions made by these new hires and the overall impact of the project, the facility now plans to recruit for these roles on a permanent basis to continue their deprescribing efforts.

**Staff Education & Data Sharing**

Before the nursing homes began implementing their interventions, UHF staff surveyed the facilities regarding their previous experience with addressing polypharmacy and deprescribing. Those that had engaged in previous deprescribing efforts had focused primarily on antipsychotic prescribing, a CMS measure, and proton pump inhibitors, which are well documented as common, unnecessarily prescribed medications. They reported mixed success with these efforts. There was also a mixed level of knowledge among the facilities about best practices and resources like the Beers List, STOPP/START criteria, deprescribing algorithms, the AMDA Drive to Deprescribe initiative, and general quality improvement methods.

Across the board, project teams used their existing meetings and regular staff interactions to educate people throughout their organizations. This usually included monthly medical meetings with prescribers, regulatory Quality Assurance and Performance Improvement (QAPI) meetings, weekly interdisciplinary team meetings, and in a few cases daily morning huddles with frontline staff. They used this time to inform staff of their project’s goals and activities, explain the risks of polypharmacy and how it can affect their residents, introduce deprescribing algorithms to prescribers, share approaches to communicate with residents and caregivers about deprescribing, and provide updates on progress and data results throughout the intervention period. Sharing data with providers was reported to be a key strategy for maintaining buy-in and instilling motivation to strive for continuous improvement across the facility.

To reinforce its staff’s education and awareness about prescribing, one nursing home created a best practice alert in their electronic medical record system that would pop-up any time a prescriber attempted to order a Proton Pump Inhibitor. The alert listed the evidence-based guidelines for the prescriber to review before completing the order.

**Targeted Medication Regimen Reviews**

Most of the opportunities to reduce or discontinue a resident’s medications during the project were identified during medication regimen reviews (MRR). Every nursing home is required by CMS to have a pharmacist perform a medication regimen review for each resident on a monthly basis to identify irregularities and communicate their findings to the physician. When implementing their interventions, most of the participants adjusted their MRR process to identify residents who may have been inappropriately prescribed the targeted medications. A more focused review of these medications helped ensure that all
opportunities for deprescribing or dose reduction could be identified. Unlike most MRRs, which take place virtually using the EMR, one facility directed its consultant pharmacist to periodically meet with individual prescribers face-to-face to discuss deprescribing opportunities among the residents. Another used EMR alerts to notify its pharmacist when its recommendations had been reviewed and acted upon.

Resident and Caregiver Engagement
Before starting this project, the six nursing homes already had processes in place to speak with residents and contact their caregivers when medication changes were indicated. The facilities had anticipated resident and caregiver concerns and preferences as a potential barrier to deprescribing, so how they engaged them was very important. Through its collaborative learning sessions, faculty coaching, and other resources, UHF guided the nursing homes in communicating potential risks versus benefits and in making medication changes in a way that was respectful of the residents’ and caregivers’ wishes and goals of care. This meant that—even though educating residents about risks versus benefits of medications is crucial—the resident and their caregiver should ultimately agree with the decision to make any adjustments. The facilities’ education efforts utilized the FRAME Communication Map, a step-by-step, evidence-based deprescribing model that was co-developed by one of the faculty members and focuses on the following components to build trust and align goals with residents:

- Form or Fortify Relationship
- Recognize Willingness to Deprescribe
- Align Recommendations to Goals
- Manage Cognitive Dissonance
- Empower to Continue Deprescribing

One facility decided to send an educational letter to families and caregivers about the deprescribing initiative, explaining the rationale for choosing specific medications as candidates for deprescribing.

Deprescribing Algorithms
The initiative encouraged facilities to use deprescribing algorithms for their selected medications. The Bruyère Research Institute and the Ontario Pharmacy Research Collaboration offer evidence-based deprescribing algorithms for all the targeted medication categories, except antihypertensives. In addition to the providers’ own clinical judgment and their knowledge of individual residents and the residents’ preferences, these algorithms can help them make the decision-making process more effective. For instance, algorithms can help providers consider a resident’s condition, the medication’s indication, how to change or continue the dose, how to monitor for adverse effects, and what to do if symptoms reoccur. For antihypertensives, the learning collaborative’s faculty experts developed a tool based on the most recent and commonly accepted prescribing guidelines and literature. While not peer-reviewed or validated, it served as a decision-making aid to be used in addition to the providers’ own clinical judgment. You can find the antihypertensive algorithm in Appendix D.

Most of the facilities reported using the deprescribing algorithms throughout their project. The nursing homes shared them with their teams as part of the deprescribing education process. The team leads from these nursing homes all reported that using these algorithms helped their projects immensely, especially at the beginning, by building confidence in deprescribing and securing buy-in from other providers.
Vitals and Symptom Monitoring

A key part of the deprescribing process is continuing to monitor residents following any dose reduction or the discontinuation of a medication to watch for any adverse events or reemergence of symptoms. Each facility incorporated monitoring into their interventions but approached it differently depending on the targeted medications. For example, one facility that was working on cholinesterase inhibitors chose to do all their deprescribing through gradual dose reductions and monitored residents for behavioral and cognitive changes for a month following any reduction, before further dose reductions or full discontinuation. In addressing antihypertensives, all the nursing homes conducted additional blood pressure checks multiple times a week to ensure that each resident’s blood pressure was staying within a safe range. One nursing home hired an additional certified nurse assistant (CNA) to primarily focus on the monitoring for its antihypertensive patients. Another took time during morning reports each day for a week to discuss each resident who had their target medications reduced or discontinued.

Data Collection and Results

UHF defined a set of measures to evaluate the success of the interventions described above. Facilities were asked to collect and submit data for each measure, using their EMR to do so. UHF developed a data collection template and definition sheet. Before beginning their interventions, the nursing homes were asked to submit a baseline for the measures reflecting the prior four-month period. The intervention period was also four months long, and data was submitted to UHF after each month.

The selection of measures was based on a review of the existing literature, the feasibility of collection for the nursing homes, and input from our project faculty and other expert advisors in the field. The goal of collecting this data was to assess changes in the following areas: overall prescribing practices across each facility; prescribing of the medication categories that each facility selected; and the frequency of medication reviews for the medication categories that each facility selected.

To assess any changes in overall prescribing practices across a facility, the following measures were used:

1. The proportion of long-term care residents who are prescribed 10+ scheduled medications.
2. Average number of scheduled medications prescribed per long-term care resident.

To assess any changes in frequency of medication reviews for the medication categories that each facility selected, the following measures were used:

1. The proportion of long-term care residents whose dosage of the selected medication category was changed (increased or decreased) or discontinued.
2. The proportion of long-term care residents whose dosage of the selected medication category AND whose dosage decreased or discontinued.
Results

Overall Prescribing

FIGURE 1. RESIDENTS PRESCRIBED 10+ MEDICATIONS

The proportion of residents prescribed 10+ medications showed a decrease from 61% at baseline to 51% in the final month.

FIGURE 2. MEDICATIONS PRESCRIBED PER RESIDENT

The average number of medications prescribed per resident showed a decrease from 10.7 in the baseline to 8.7. Conducting a paired T-test for the average number of medications per resident, this change from the baseline to end of the intervention period was found to be significant (p=0.034).

Medication Category Prescribing

FIGURE 3. RESIDENTS PRESCRIBED PPIS

PPIs (selected by 5 facilities) decreased from 18% of residents at baseline to 11% by the end of the project.
FIGURE 4. RESIDENTS PRESCRIBED CHOLINESTERASE INHIBITORS

Cholinesterase inhibitors (AChE Inhibitors) (selected by 3 facilities) decreased from 23% of residents at baseline to 13% by the end of the project.

FIGURE 5. RESIDENTS PRESCRIBED BENZODIAZEPINES AND Z-DRUGS

Benzodiazepines and Z-drugs (selected by 1 facility) decreased from 11% of residents at baseline to 6% by the end of the project.

FIGURE 6. RESIDENTS PRESCRIBED ANTIHYPERTENSIVES

Antihypertensives (selected by 3 facilities) decreased from 66% of residents at baseline to 36% by the end of the project.

FIGURE 7. RESIDENTS PRESCRIBED MULTIVITAMINS

Multivitamins (selected by 2 facilities) decreased from 31% of residents at baseline to 12% by the end of the project.
FIGURE 8. RESIDENTS WHOSE DOSAGE CHANGED OR DISCONTINUED; PPIs

Of residents on PPIs, 24% saw their dosage change or be discontinued during the baseline. In comparison, the intervention periods ranged from 20%-41% of residents experiencing a dosage change or discontinuation.

FIGURE 9. RESIDENTS WHOSE DOSAGE CHANGED OR DISCONTINUED; CHOLINESTERASE INHIBITORS

For cholinesterase inhibitors, just 2% of residents experienced dosage changes or discontinuations during the baseline, with a range of 24%-34% experiencing changes during the intervention periods.

FIGURE 10. RESIDENTS WHOSE DOSAGE CHANGED OR DISCONTINUED; BENZODIAZEPINES AND Z-DRUGS

There were no changes in dosage or discontinuations of benzodiazepines during the baseline period, but we saw a range of 32%-58% of residents experiencing dosage changes or discontinuations during the intervention periods.
FIGURE 11. RESIDENTS WHOSE DOSAGE CHANGED OR DISCONTINUED; ANTIHYPERTENSIVES

For antihypertensives, 12% of residents experienced changes to their dosage or discontinuations during the baseline; during the intervention periods, we saw a range of 8%-23% of residents with dosage changes or discontinuations.

FIGURE 12. RESIDENTS WHOSE DOSAGE CHANGED OR DISCONTINUED; MULTIVITAMINS

In the baseline, 2% of residents on multivitamins experienced changes in dosage or discontinuations and a range of 11%-43% experienced changes in dose or discontinuations during the intervention periods.

FIGURE 13. PROPORTION OF DOSAGE CHANGES THAT WERE DECREASES OR DISCONTINUATIONS

During intervention months 2 through 4, most changes made to our targeted medication categories were decreases or discontinuations rather than increases. Across all drug categories and intervention months, 82-100% of changes in medications were decreases in dosage or discontinuations.
Discussion

Overall Prescribing

The overall prescribing measures of residents on 10 or more medications and the average number of medications per resident both showed decreases from our pre-intervention baseline to the end of the intervention period (Figures 1-2). This indicates success in the goal to decrease the total number of medications among participants’ residents.

There is no clear consensus on how to best define and measure polypharmacy within a population. We chose to measure 10 or more medications per resident because this metric has been used in other studies, reflects the high number of medications prescribed in nursing homes, and is aligned with the baseline data that participants provided prior to their interventions.

One limitation of these two measures is that they do not reflect that for many patients there may be appropriate indications for the usage of many of their medications. Another is that although the collaborative was about deprescribing, medication optimization is also extremely important and may result in dose reduction as opposed to drug discontinuation. The data do not indicate the amount of gradual dose reductions that took place and may thus lead to an underestimation of the overall benefit of the deprescribing efforts among participants.

Both overall prescribing measures show potential in the ability for nursing homes to begin deprescribing quickly and to maintain those changes over some time. The slight increase during intervention month three for both measures is believed to be partially due to a COVID-19 resurgence in one facility which may have resulted in additional prescribing.

Medication Category Prescribing

For the measures on the proportions of residents prescribed the selected medication categories (Figures 3-5), we observed decreases across the board from the baseline to the final intervention period. This demonstrates success in our project’s goal to reduce the amount of these targeted medication categories per resident.

There was some variation between the different medication categories in terms of level of success and when the decreases were achieved. Some, like PPIs, were relatively stable for most of the intervention months, while others, like cholinesterase inhibitors, saw more gradual declines. One of the reasons for these differences may be that there was greater potential for some medications to be deprescribed earlier on in the project; others may have taken longer due to resident and caregiver engagement, the need to involve specialists, necessary gradual dose reductions, and additional monitoring needs. For example, the facilities that were focused on deprescribing PPIs and multivitamins were often able to discontinue them relatively quickly whenever an inappropriate indication was identified. On the other hand, one facility working on addressing cholinesterase inhibitors reported needing much more time and effort in engaging caregivers and other providers in the decision and typically used a gradual dose reduction method that took longer to adjust.

There are other potential reasons why the decreases may have occurred the way that they did. For example, most facilities reported staffing challenges at various points during this time, including, in some cases, members of their project teams leaving their facilities. Some facilities continued to manage COVID-19 outbreaks during the project as well as onsite visits by surveyors.
from the New York State Department of Health. During these situations, it was often reported that there was not sufficient time or resources to consistently focus on this initiative.

**Medication Category Dosage Changes**

The results measuring the percentage of residents whose dosage changed or was discontinued in the targeted categories (Figures 6-8) indicated that there was typically more activity adjusting residents’ medications during the project than during the baseline period before the interventions started. For example, cholinesterase inhibitors started with a baseline of 2% but had a range of 24-34% during the intervention periods (Figure 6). These results demonstrate that the nursing homes continued to review medications and find opportunities to adjust throughout all months of the project.

These measures for the selected medication categories assess the regularity in which medications were being reviewed and adjusted when appropriate. These included discontinuations and any dosage changes (dose reductions and increases). The aim was to capture the extent of these types of changes because we view them as equally important in the process of medication optimization. For certain medications and patient-related factors, it is frequently medically appropriate and safer to reduce a dose rather than discontinue a medication. In addition, when there are adverse effects to deprescribing, we would expect providers to appropriately reintroduce medications or increase dosage as needed.

One limitation to these measures was that they did not distinguish whether the changes were increases or decreases. However, the UHF team and faculty reconsidered this approach. Starting in the second intervention period, we began to ask the nursing homes to separate the data to determine how many dosage changes were increases versus decreases. Overwhelmingly, the changes were much more likely to be decreases than increases (Figure 9). This indicates the facilities’ success in deprescribing and suggests few recurrences of symptoms or adverse events that would require a dosage increase.

**Results Summary**

The prescribing data collected over the course of the learning collaborative suggests that participating nursing homes were successful in addressing polypharmacy in each of their facilities. Most notably, the proportion of residents prescribed each medication group that was tackled decreased over the course of the intervention period.

In addition, these encouraging trends in prescribing practices were not only observed in the four medication groups that participants chose to focus on; the number of all medications prescribed in the nursing homes decreased, as did the number of residents prescribed 10+ medications. Note that PRN medications were excluded.

These observations suggest that, while the interventions implemented during this learning collaborative were successful in reducing inappropriate prescribing of their target medications, nursing homes’ participation in a structured deprescribing learning effort also had an impact on the overall prescribing practices at their facilities. This may be due to a change in staff’s awareness, knowledge, and confidence in deprescribing, as well as overall culture change.
Impact Stories

The overall goal of our initiative was to decrease medication overload, thus positively affecting resident quality of life. Over the course of the year, participants shared stories of the impact of their interventions on their facilities and residents. These are summarized below.

Impact on Residents

One resident was slowly deprescribed a benzodiazepine and became less sleepy during the day, meaning he could participate in recreational activities with greater enthusiasm.

Another resident had been taking dementia medication and simultaneously had concerning weight loss, though the two were not thought to be connected. After successfully deprescribing the medication, his appetite improved and he gained weight, which was appreciated by concerned staff and family.

One resident’s family found her to be less angry after deprescribing the benzodiazepine she had been taking and felt that their visits were of better quality.

Impact on nursing home staffing and costs

While our initiative did not collect data on cost reduction or impact on staff associated with deprescribing, there were some anecdotal reports from participants about a positive impact on cost reduction and staff resources.

One nursing home had saved $40,000 in pharmacy bills within 7 weeks of launching their intervention.

Others had nursing staff who reported less onerous medication dispensing tasks. For example, one facility’s medical director reported nursing staff’s increased satisfaction and the positive impact on the efficiency of their work after the task of dispensing of PPIs at 6:30 a.m., before breakfast, was eliminated.
Lessons Learned

1. **Leadership and education are crucial to implementing a deprescribing initiative**

As with most improvement initiatives, leadership was a key component of the collaborative. Each nursing home’s intervention was guided by the medical director and, to varying degrees, the lead pharmacist, who had the support of the organization’s administrator at the outset of the project. The medical director and, frequently the pharmacist, would attend collaborative meetings, lead the design and implementation of the interventions, and educate and direct team members about the project.

Staff education is also important. Although nursing homes reported that their staff were open to deprescribing and understood the importance of it, in many cases staff had questions about how to best reduce or discontinue medications, particularly in complex patients. Clinical guidelines, case studies, and deprescribing algorithms were all important staff education tools that contributed to the success of this collaborative. Providing feedback to staff using data on their own prescribing was also helpful in reinforcing this education and translating it into action.

2. **In deprescribing, every member of the care team has a role to play**

While prescribing staff are ultimately responsible for medication-related decisions, the deprescribing interventions in this collaborative benefited from collaboration between multiple disciplines. In most nursing homes, pharmacy colleagues lent their expertise in identifying possible candidates for deprescribing, whether through the monthly medication review process or through additional review and reporting. They discussed their recommendations with prescribers to decide whether to deprescribe for each resident. The nursing homes who achieved this level of medical-pharmacy partnership were not limited to those with in-house pharmacy staff.

Nursing staff were other crucial members of the care team, playing an important role in monitoring any signs of adverse events related to deprescribing and alerting prescribers. In some cases, this led to residents having their dosage restored. Monitoring by nurses is an important component of deprescribing.

For other nursing homes, recreational staff played a big role in the intervention’s success. For instance, the nursing home focusing on benzodiazepines proactively engaged residents whose medications were being deprescribed in activities such as art sessions and other events organized by the recreation team. These activities engaged residents and decreased anxiety. This was particularly important during periods when events and visits were limited due to COVID outbreaks and precautions.

It is well known that workforce shortages and high staff turnover are problems in nursing homes. For some participants, there was not enough staff capacity to form a truly interdisciplinary team, therefore placing high reliance on the medical director to drive the initiative. Though this did yield successful results in deprescribing, it risked the ultimate sustainability of the intervention beyond the length of the collaborative.
3. Engaging residents and families is key

A key component of the nursing homes’ interventions was engaging residents and their families in decisions about changes in medications. In general, they found that residents and families were more open to deprescribing than anticipated by participants.

Participants took different approaches to engaging family members. Methods included sending letters about the organization-wide initiative, making individual phone calls, or having face-to-face conversations. A common theme was to leverage the trusting relationships between the staff and residents and their family members. This often meant identifying a member of the care team who had the strongest rapport with the individual and tapping that person to convey information about adjusting medications. For some participants, this person was the medical director; for others it was the resident’s nursing home physician.

4. Analyzing and monitoring prescribing data is essential

Monitoring prescribing data was a key part of our collaborative. The measures collected were helpful for both UHF and participants in monitoring changing practices; they offered insight into both the prescribing practices and the medication review processes occurring over time. The measures could also be of use to other nursing homes wishing to tackle polypharmacy at an organizational level.

Nursing homes agreed that the ongoing collection of data will be crucial to sustaining improvement after the collaborative ends. Some nursing homes plan to continue collecting and monitoring the data to maintain visibility of their prescribing practices. They have described different monitoring plans, including reviewing the data regularly at their Quality Assurance and Performance Improvement meetings; presenting data to staff at quarterly medical staff meetings; and providing data at the prescriber-level to prescribers, so that they can be benchmarked across the staff and high performers can be publicly rewarded or congratulated.

5. A quality improvement approach facilitates organization-wide deprescribing

During this collaborative, nursing homes used tools and processes which are typical to quality improvement (QI) projects. For instance, they each completed a QI project plan adapted from the Institute for Healthcare Improvement (see Appendix C), used plan-do-study-act (PDSA) cycles to review progress and adjust their approach throughout the intervention period, identified drivers of polypharmacy within their facility, collected and monitored data, and identified and assembled a project team. These activities are some of the key tenets of quality improvement methodology. The nursing homes in this collaborative expressed to UHF that having the improvement tools, milestones, and structure to design and implement their interventions was integral to their success. They also indicated that their previous—and less successful—attempts to deprescribe lacked this structure. Therefore, for nursing homes wishing to deprescribe medications at an organizational level, using quality improvement methods can be a helpful approach to take.
Conclusion

The nursing homes that participated in the collaborative were all successful in implementing deprescribing interventions. Despite differences in size, staffing, and resources, they were all able to engage the medical and pharmacy leadership, create an interdisciplinary team, and communicate with residents and families—all of which yielded positive results in decreasing the use of potentially inappropriate medications. We believe that the tools, resources, and approaches referenced in this report can be successfully implemented at other nursing homes. On a broader level, this report also demonstrates that overall public awareness regarding the risks of polypharmacy in older adults, attention to medication reconciliation across all care settings, and ongoing resident and family engagement are required to decrease the widespread use of potentially inappropriate medications.

Recommendations

• Create greater awareness of the risks associated with polypharmacy in older adults across the continuum of care to prevent the use of potentially inappropriate medications.

• Enhance medication reconciliation across settings and collaboration among providers to avoid ongoing use of medications that may be potentially inappropriate.

• Educate providers on the use of shared decision-making approaches and algorithms to assist in clinical decision-making to support deprescribing.
Appendix A.

Learning Sessions Educational Content

Learning Session 1 – March 2022

• Dr. Jennifer Pruskowski – Introduction to Polypharmacy, Deprescribing and Developing a Deprescribing-Focused QAPI Project
• Dr. T.S. Dharmarajan – Polypharmacy and The Role for Deprescribing

Learning Session 2 – May 2022

• Dr. Jennifer Pruskowski – Designing Your Deprescribing Intervention and Deprescribing Communication Techniques
• Dr. T.S. Dharmarajan – The Deprescribing Approach: And Case Studies

Learning Session 3 – September 2022

• Chad Worz – Medication Management in SNFs: Best Practices in a Changing Environment
• Dr. T.S. Dharmarajan – Deprescribing: Case Studies
• Dr. Jennifer Pruskowski – Reflecting on Project Results and Changing Prescribing Culture

Learning Session 4 – December 2022

• Dr. Jennifer Pruskowski – Sustaining Deprescribing Reminders and New Perspectives
Appendix B.

Resource Library for Addressing Polypharmacy in Long-Term Care

These resources were provided to participants on a private website during the project; they are also now available on UHF’s public website, here: https://uhfnyc.org/our-work/initiatives/quality-institute/polypharmacy/resources/

General Deprescribing Resources

IHI – Reducing Inappropriate Medication Use by Implementing Deprescribing Guidelines: Implementation Guide & Case Study
https://www.ihi.org/resources/Pages/Publications/Evidence-Based-Medication-Deprescribing-Innovation-Case-Study.aspx

Lown Institute – Prescription Checkup Guide
https://lowninstitute.org/reports/medication-overload-implement-prescription-checkups/

AGS 2019 Updated AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults

STOPP-START v.2 Toolkit Supporting Medication Review
https://www.cgakit.com/m-2-stopp-start

The Peter Lamy Center on Drug Therapy and Aging - Optimizing Medication Management during the COVID-19 Pandemic: Implementation Guide for Post-Acute and Long-Term Care

Dharmarajan – Deprescribing as a Clinical Improvement Focus

Reeve, Thompson & Ferrell – Deprescribing: A narrative review of the evidence and practical recommendations for recognizing opportunities and taking action

AMDA – Drive 2 Deprescribe
https://paltc.org/d2d-meeting-archives

US Deprescribing Research Network
https://deprescribingresearch.org/
Medication-Specific Resources

**Antihypertensives**

Vu, Et al. – Antihypertensive Deprescribing in Older Adult Veterans at End of Life Admitted to Veteran Affairs Nursing Homes  

Sheppard, Et al. – Effect of Antihypertensive Medication Reduction vs Usual Care on Short-term Blood Pressure Control in Patients With Hypertension Aged 80 Years and Older: The OPTIMISE Randomized Clinical Trial  

Gulla, Et al. – Deprescribing antihypertensive treatment in nursing home patients and the effect on blood pressure  

American College of Cardiology – 2017 Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults  
[https://www.ahajournals.org/doi/10.1161/HYP.0000000000000065](https://www.ahajournals.org/doi/10.1161/HYP.0000000000000065)

**Benzodiazepines and z-drugs**

Deprescribing algorithm, guidelines, and resources for patients and providers  
[https://deprescribing.org/resources/deprescribing-guidelines-algorithms/](https://deprescribing.org/resources/deprescribing-guidelines-algorithms/)

Farrell, Eisener-Parsche & Dalton – Turning over the rocks: role of anticholinergics and benzodiazepines in cognitive decline and falls  

Canadian Deprescribing Network – Patient Guides and Tools  
[https://www.deprescribingnetwork.ca/useful-resources](https://www.deprescribingnetwork.ca/useful-resources)

Pottie, Et al. – Deprescribing benzodiazepine receptor agonists: Evidence-based clinical practice guideline  

**Cholinesterase Inhibitors (ChEIs) and Memantine**

Niznik, Et al. – Risk for Health Events After Deprescribing Acetylcholinesterase Inhibitors in Nursing Home Residents With Severe Dementia  
[https://agsjournals.onlinelibrary.wiley.com/doi/full/10.1111/jgs.16241?casa_token=r0mnbO-OOXEAAAAA%3AFNw0F6yfvChAcxgodcK_olDuQYH4jhb_6naALwxsdINcetyXhDuCK78Fj6khOY325GKsbCPAGE01Rws](https://agsjournals.onlinelibrary.wiley.com/doi/full/10.1111/jgs.16241?casa_token=r0mnbO-OOXEAAAAA%3AFNw0F6yfvChAcxgodcK_olDuQYH4jhb_6naALwxsdINcetyXhDuCK78Fj6khOY325GKsbCPAGE01Rws)

Deprescribing algorithm and guidelines  
[https://deprescribing.org/resources/deprescribing-guidelines-algorithms/](https://deprescribing.org/resources/deprescribing-guidelines-algorithms/)
Proton Pump Inhibitors

Dharmarajan – The Use and Misuse of Proton Pump Inhibitors: An Opportunity for Deprescribing

Deprescribing algorithm, guidelines, and resources for patients and providers
https://deprescribing.org/resources/deprescribing-guidelines-algorithms/

Canadian Deprescribing Network – Patient Guides and Tools
https://www.deprescribingnetwork.ca/useful-resources

Multivitamins & Supplements

Pitkala, Et al. – Herbal medications and other dietary supplements. A clinical review for physicians caring for older people

Johns Hopkins Medicine – Is There Really Any Benefit to Multivitamins?
https://www.hopkinsmedicine.org/health/wellness-and-prevention/is-there-really-any-benefit-to-multivitamins

Quality Improvement Tools

Institute for Healthcare Improvement – Plan Do Study Act (PDSA) Worksheet
https://www.ihi.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx

Institute for Healthcare Improvement – Cause & Effect Diagram
https://www.ihi.org/resources/Pages/Tools/CauseandEffectDiagram.aspx
Appendix C.

Polypharmacy Learning Collaborative Project Plan

Collaborative Goal
The overall goal of the collaborative is to design and implement new processes and practices to reduce polypharmacy among long-term care residents in nursing homes.

Completing your Project Plan
This template will assist you in planning the project you will be working on during the Polypharmacy Learning Collaborative.

Please send your completed template to Alice Ehrlich (aehrlich@uhfnyc.org) by Friday, June 3rd. If you have any questions, please contact us.

Project Plan Template
1. What is the name of your organization?

2. What is the problem you are going to focus on? Please describe.
   Sample answer: we will focus on the problem of medication burden due to over-use of antihypertensive medications and PPI medications. These medications are prescribed to 50% and 35% of our residents, respectively, and, in some cases, risks may outweigh the benefits.

3. Please write your Aim Statement/s (also known as SMART goal/s). For more guidance, please review the Appendix of this template.
   Sample answer:
   Goal 1: Within 3 months, we aim to have changed dosage of or discontinued at least one antihypertensive medication in 80% of LTC residents who are currently prescribed them.

   Goal 2: Within 3 months, we aim to have discontinued PPIs in at least 25% of LTC residents who are currently prescribed them.
4. Will all LTC residents in your facility be targeted in your intervention, or will you be focusing on a smaller cohort? If you are focusing on a smaller cohort (e.g., selected units or diagnosis), please specify.

Sample answer: We will focus on residents on the 4th floor of our facility.

5. For each of the medications you have selected, what have you identified as the top driver/s of polypharmacy and medication burden in your facility?

Note: if you have completed a fishbone diagram, please paste it under the completed table.

<table>
<thead>
<tr>
<th>Driver Number</th>
<th>Driver Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>Family members do not understand that antihypertensive medications can have risks which outweigh their benefit.</td>
</tr>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

(Add more rows if necessary)
6. To design your PDSA cycle, please complete the table below. You will need to describe each intervention/action that you will test to address the drivers you identified in the previous question. Please be specific.

*Note: Each intervention/action must address at least one of the drivers you identified in the previous question.*

<table>
<thead>
<tr>
<th>Intervention/Action</th>
<th>Driver/s addressed by the intervention – These should be the same drivers you described in the previous question.</th>
<th>Staff Involved</th>
<th>Target Completion Date</th>
<th>Tasks to prepare for intervention launch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample answer: Call relevant family member of eligible residents to provide information about deprescribing. Follow up the call by sending printed educational material.</td>
<td>Family Understanding</td>
<td>NPs</td>
<td>July 1st</td>
<td>Train the NPs on using the FRAME tool (see Learning Session 2). Collect relevant printed materials and make edits to suit our facility.</td>
</tr>
</tbody>
</table>

(Add more rows if necessary)
7. Early/Mid-Course Corrections. How will you assess the need to make early or mid-course corrections?

Sample answer: At our team meeting every two weeks, we will review data, discuss challenges and progress, and agree on adjustments as necessary.

8. How will you engage residents and family/care givers in your intervention/s?

Sample answer: The intervention engages family through outreach and education.

9. Please list the team members working on the project, including names and titles.

Note: If the team has not changed since you submitted your application to join our collaborative, you may write ‘See application’.

10. Measures. Will you be collecting data for your intervention above and beyond the data collection that UHF has asked you to collect? If so, please describe the data you will collect and the frequency.

Sample answer:
We will monitor the following during the intervention period:
1. % eligible residents whose family member has been contacted (review every 2 weeks)
2. % staff trained in using FRAME tool (review every 2 weeks)

11. Additional Considerations. Include your thoughts on anticipated barriers and how you will address them.
Writing Aim Statements/SMART Goals

1. Tips
   - State your Aim clearly (i.e., describe specifically what you will improve)
   - Include numbers (i.e., how much you will improve by)
   - Include a timeframe (i.e., when you will have achieved your goal)
   - Be ambitious (but not unrealistic)
   - Be prepared to refocus the Aim if your team finds it is unrealistic. Make it manageable and consider focusing on a smaller part of issue, if necessary.

2. Examples (not related to polypharmacy)
   - “Reduce waiting time to see a urologist by 50 percent within 9 months.”
   - “Offer all patients same-day access to their primary care physician within 9 months.”
   - “Reduce waiting time to see a physician to less than 15 minutes within 9 months.”

Reference

Science of Improvement: Tips for Setting Aims | IHI - Institute for Healthcare Improvement
Appendix D.

A Suggested Antihypertensive Deprescribing Algorithm for LTC Residents

Jennifer Pruskowski, Pharm D, MS
T. S. Dharmarajan, MD
Last Updated May 2022

Why is the patient taking antihypertensives?
If patient is receiving for >1 reason, choose the most important or relevant diagnosis

Essential or Secondary Hypertension

Patient’s recent average blood pressures (BP)
Minimum 3 readings within 3 months

<130/80 mmHg

≥140/90 mmHg

Consider Deprescribing
Based on comorbidity, frailty, orthostasis and life expectancy

• Reduce or stop loop diuretics, unless given for HF or CKD
• Reduce or stop alpha blockers, unless given for BPH
• Reduce or stop direct vasodilators (e.g. hydralazine)
• Reduce or stop mineralocorticoid antagonists
• Reduce or stop Calcium Channel Blockers
• Reduce or stop Beta blockers, with slow taper
• Reduce or stop thiazide diuretics (e.g. HCTZ, chlorthalidone)
• Reduce or stop ACEIs or ARBs

• Hypertension + history of myocardial infarction, heart failure, atrial fibrillation or stroke
• Coexisting T2 Diabetes, CKD, cardiomyopathy

• Hypertension + frailty, recurrent falls and/or limited life expectancy
• If yes, consider deprescribing

Continue Current Regimen
Or seek consult for deprescribing, if warranted

Explanatory Notes

• This algorithm is intended to aid decision-making when attempting to deprescribe antihypertensive medications in LTC settings. This is not a published algorithm and has not been validated.
• Providers should consider the individual patient’s goals; comorbidities, including frailty and presence of orthostasis; life expectancy; and beliefs and values.

• The literature supporting deprescribing in antihypertensive medications is not conclusive in terms of the BP threshold at which deprescribing should be attempted. Therefore, while this tool offers <130/80 mmHg as a threshold for considering deprescribing, and >140/90 mmHg as unsuitable for deprescribing (based on the available evidence), anyone using the tool must apply their clinical judgement in making deprescribing decisions for a patient. This is especially true for residents with a BP reading between the two given values.

• The literature also is not conclusive as to what order antihypertensive medications should be deprescribed. Providers using this tool must apply their clinical judgement in making these decisions.