Eliminating Medication Overload: A National Action Plan

JANUARY 2020

LOWN INSTITUTE

About the Lown Institute action plan

The Lown Institute convened 22 experts in medication use and polypharmacy into a working group to develop *Eliminating medication overload: A national action plan*. From July 2018 to July 2019, the working group convened on monthly phone calls to develop this comprehensive action plan.

The creation of this action plan, including research, analysis, and writing, was supported by the Gordon and Betty Moore Foundation. We are grateful to our GBMF program officers, Beth Metcalf and Julie Lawrence, without whose guidance and support this initiative would not have been possible.

The Lown Institute is a nonprofit think tank advocating bold ideas for a just and caring system for health. www.lowninstitute.org.

Eliminating Medication Overload: A National Action Plan

Working Group on Medication Overload
Judith Garber, *writer*
Shannon Brownlee and Karen Kahn, *editors*

The Lown Institute
This work was supported by a grant from the Gordon and Betty Moore Foundation (#6954)

Suggested citation:
Eliminating medication overload: A national action plan. Working Group on Medication Overload. Brookline, MA: The Lown Institute, 2020.

Endorsing Organizations

ACHP
ALLIANCE OF COMMUNITY HEALTH PLANS

AGS Geriatrics Healthcare Professionals
Leading Change. Improving Care for Older Adults.

ADS AMERICAN DELIRIUM SOCIETY

INSTITUT DE RECHERCHE Bruyère RESEARCH INSTITUTE

Canadian Deprescribing Network

COMMUNITY CATALYST

deprescribing.org

Geropsychiatric Nursing Collaborative

Institute *for* Healthcare Improvement

International Group for Reducing Inappropriate Medication Use & Polypharmacy (IGRIMUP)

The John A. Hartford Foundation

KAISER PERMANENTE®

NICHE™
NURSES IMPROVING CARE FOR HEALTHSYSTEM ELDERS

PEER PATIENTS EXPERIENCE EVIDENCE RESEARCH

PQA
Pharmacy Quality Alliance

THERAPEUTICS INITIATIVE Independent Healthcare Evidence

* The American Geriatrics Society (AGS) affirms the value of this document. Affirmation of value means that AGS supports the general principles in this document and believes it is of general benefit to its membership.

Working group members

Poppy Arford
Patient Advocate

Cynthia Boyd, MD, MPH
Professor of Medicine,
Johns Hopkins University
Co-Principal Investigator,
U.S. Deprescribing Research Network

Theresa Brown, BSN, RN, FAAN
University of Pittsburgh
School of Nursing
Faculty and Author

Alan Cassels
Communications Director,
Therapeutics Initiative,
University of British Columbia

Megan Chock, MD, MPH
Geriatric Medicine, Kaiser Permanente,
Hawaii

Brandon Combs, MD
Associate Professor of Medicine,
University of Colorado School of Medicine

Lynn Deguzman, PharmD, BCGP
Regional Clinical Operations Manager,
Kaiser Permanente, Northern California

Maisha Draves, MD, MPH
Medical Director of Pharmacy,
The Permanente Medical Group
Family Medicine Physician

Gayle Banner Esposito
Patient Safety Advocate,
Mothers Against Medical Error

Helen Haskell, MA
President, Mothers Against Medical Error

Corinne M. Hohl, MD
Associate Professor, Emergency Medicine,
University of British Columbia

Holly Holmes, MD, MS
Division Director, Associate Professor,
Geriatric and Palliative Medicine,
McGovern Medical School

Todd C. Lee, MD, MPH
Associate Professor of Medicine,
McGill University Health Centre

Sharon Levine, MD
Board of Directors, School of Medicine,
Kaiser Permanente

Amy Linsky, MD, MSc
Assistant Professor of Medicine,
Boston University; Physician,
VA Boston Healthcare System

James McCormack, BSc (Pharm), PharmD
Professor, Faculty of Pharmaceutical
Sciences, University of British Columbia

Emily G. McDonald, MD, MSc
Assistant Professor of Medicine,
McGill University Health Centre

Joseph S. Ross, MD, MHS
Professor of Medicine and of Public Health,
Yale University

James Rudolph, MD
Professor of Medicine, Brown University

Nilay Shah, PhD
Associate Professor of Health Services
Research, Mayo Clinic

Kristin Zimmerman, PharmD, BCACP, BCGP
Associate Professor,
Virginia Commonwealth University

Andrew Zullo, PharmD, ScM, PhD
Assistant Professor, Brown University

Advisory committee members

Anthony Barrueta, JD
Senior Vice President, Government
Relations, Kaiser Permanente

John Bulger, DO, MBA
Chief Medical Officer, Geisinger Health Plan

John Devlin, PharmD, FCCM, FCCP
Professor of Pharmacy,
Northeastern University

Donna Marie Fick, PhD, RN, FGSA, FAAN
Professor and Director of the Center
of Geriatric Nursing Excellence,
Penn State College of Nursing

Terry Fulmer, PhD, RN, FAAN
President, the John A. Hartford Foundation

James F. Graumlich, MD
Governor, American College of Physicians

Leigh Purvis, MPA
Director, Health Services Research, AARP

Gordon Schiff, MD
Associate Director, Brigham and Women's
Center for Patient Safety Research and
Practice; Associate Professor of Medicine,
Harvard Medical School

Michael Steinman, MD
Professor of Medicine,
University of California, San Francisco
Co-Principal Investigator,
U.S. Deprescribing Research Network

Johanna Trimble
Patient Champion,
Patients for Patient Safety Canada

Jeff Williamson, MD, MHS
Chief of Geriatric Medicine and Professor
of Internal Medicine and Epidemiology,
Wake Forest School of Medicine

Lown Institute project staff

Shannon Brownlee, MSc, Senior Vice President
Project lead and editor

Vikas Saini, MD, President
Project advisor

Judith Garber, MPP, Health Policy and Communications Fellow
Writer, action plan

Julia Healey, Assistant of Programs and Operations
Writer, issue briefs

Carissa Fu, MSc, Director of Program Operations
Project manager

Aaron Toleos, Vice President of Communications
Communications lead

Consultants

Karen Kahn
Editing and media relations

Nicole Caddell
Designer, action plan and issue briefs

Table of Contents

Introduction

Every day, 750 older people living in the United States (age 65 and older) are hospitalized due to serious side effects from one or more medications. Over the last decade, older people sought medical treatment more than 35 million times for adverse drug events (ADEs) and were hospitalized more than 2 million times due to ADEs.[1]

These numbers point to an emerging threat: the epidemic of medication overload among older Americans. In a 2019 report, "Medication Overload: America's Other Drug Problem," the Lown Institute found that multiple medication use among older adults is widespread, growing, and causes significant harm. More than 40 percent of older adults take five or more prescription medications a day, a 200 percent rise over the past 20 years. When over-the-counter drugs and supplements are included, two-thirds of older Americans take five or more medications.

Medication overload: Scope, harms, and drivers

While drugs provide benefits to many people, taking multiple medications (called "polypharmacy" in the scientific literature) also increases the risk of serious, even life-threatening side effects. Older people are especially vulnerable to delirium, internal bleeding, dementia, and falling. Other ADEs can include strokes, heart attacks, infections, and death. For every additional medication, a person's risk of suffering an ADE increases by 7-10 percent.[2-4]

Numerous forces and incentives in the U.S. health care system make it easy for clinicians to prescribe medications and difficult to scale back the dosage or deprescribe (stop a medication). Among the many drivers of medication overload, the Lown Institute's report identified three overarching themes:

1. Both patients and clinicians are steeped in a **culture of prescribing**, which promotes a "pill for every ill." Direct-to-consumer drug advertising, the increasing medicalization of normal aging, the hurried pace of medical care, and the urge among doctors and other clinicians to "do something" about medical conditions all contribute to the culture of prescribing.
2. Clinicians struggle to prescribe and deprescribe appropriately in the face of significant **information and knowledge gaps**. Medical education and training often lack sufficient discussion and skill building around appropriate prescribing and deprescribing. Moreover, clinical practice guidelines offer little information about how to guide prescribing for older patients with multiple chronic conditions or how to safely stop a drug.[5,6]
2. The U.S. has a **highly fragmented health care system**, which leads to individuals receiving prescriptions from many different providers in various care settings. Too often, no single clinician or team is coordinating care and keeping track of all of the medications a patient has been prescribed.

What is medication overload?

Medication overload is the use of multiple medications that pose a greater risk of harm than benefit. There is no strict cutoff for when the number of medications becomes harmful, but the more a person is taking, the greater their likelihood of experiencing harm, including serious, even life-threatening adverse drug events.

The need for a national action plan

Without swift action to curtail overprescribing and reduce medication overload, the harm from adverse drug events will only worsen. The Lown Institute estimates that adverse drug events will be responsible for at least 4.6 million hospitalizations of older people in the U.S. and as many as 150,000 premature deaths over the next decade. Medical care to treat ADEs will cost taxpayers, patients, and families an estimated $62 billion.[1]

Despite the enormity of this problem, the issue of medication overload is invisible to the vast majority of families and patients, most policymakers, and even many health care professionals. While some clinicians are trying to reduce the burden of medications on their individual patients, and several organizations have made significant efforts in the area of polypharmacy, no health care professional group, public organization, or government agency to date has formal responsibility for addressing this national problem. The U.S. has only recently started to form a deprescribing research network, following the leads of Canada, Australia, and the U.K.[7-9]

To catalyze action on this critical issue, the Lown Institute convened a working group of 22 experts in medication use and polypharmacy, including patient advocates, physicians, nurses, pharmacists, and researchers, to develop a national action plan to eliminate medication overload (11 other experts served on our advisory committee for the project and offered periodic feedback). From July 2018 to July 2019, the working group convened on monthly phone calls to develop this comprehensive action plan.

Recommendations to eliminate medication overload

We made 11 recommendations to address the main drivers of medication overload, including both upstream, or preventive, interventions, and downstream interventions once patients are already on too many medications. Our recommendations, described below, span five high-level categories: implement prescription checkups; raise awareness about medication overload; improve information at the point of care; educate and train health professionals; and reduce industry influence. The following are brief descriptions of these categories and the recommendations each encompasses.

Implement prescription checkups

Patients and clinicians need designated time to review all the medications a patient is taking, and discuss which medications can be reduced in dose or eliminated. While existing medication reviews have made some progress in optimizing medications in certain settings, these reviews are not explicitly designed to reduce medication overload. Our goal is to build on the success of previous initiatives, while refocusing medication reviews toward deprescribing for patients who need it.

Recommendation: Implement regular *Prescription Checkups*—medication reviews designed especially for the purpose of relieving medication overload.

Raise awareness about medication overload

Despite the well-documented harm caused by medication overload, most policymakers, health care leaders, and health care consumers are unaware of the scope and severity of the problem. The goal of increasing awareness is to spark action by policymakers and clinical leaders, and to foster conversations between patients and clinicians about medications. We believe clinicians will be more likely to address medication overload if patients and families start "asking their doctor" about how to avoid excess prescriptions and stop unnecessary medications, in the same way they respond to requests for heavily marketed medications.

Recommendations: Create campaigns to increase awareness of medication overload among the general public, patients, and health care professionals.

Improve information at the point of care

To avoid inappropriate prescribing and facilitate deprescribing when necessary, clinicians and patients need clear, accurate, up-to-date information on the benefits and harms of medications when making treatment decisions. Clinical guidelines often recommend prescribing medications as the first line of treatment but rarely provide information on how long drugs should be continued, when doses should be lowered, and how drugs should be deprescribed. Inadequate reporting of adverse drug events to the U.S. Food and Drug Administration (FDA) gives clinicians and patients an incomplete picture of the potential risks and benefits of medications when making treatment decisions. Additionally, information about how to deprescribe medications is often not available to clinicians while making treatment decisions, which is when they most need it.

Recommendation: Create and disseminate deprescribing guidelines, improve the ADE reporting system, and revise clinical guidelines.

Educate and train health professionals to reduce medication overload

From undergraduate clinical training through post-graduate training and continuing education, nowhere is learning about the harms of medication overload a mandated part of the curriculum for the vast majority of clinicians. The crucial skills of how to analyze the potential harms and benefits of medications before prescribing; proactively monitoring for and avoiding medication overload; and knowing how and when to pause or stop (deprescribe) medications are not adequately emphasized in most clinical curricula or after graduation. As a result, clinicians may overprescribe for older patients and often feel unprepared or unqualified to discontinue medications once medication overload has occurred.

Recommendation: Enhance health professions school curricula and incorporate patient-centered prescribing and deprescribing into continuing education content.

Reduce industry influence

Pharmaceutical industry marketing plays a powerful role in driving medication overload. Direct-to-consumer advertising, on which drug companies spend an estimated $6 billion a year, is perhaps the most obvious way the industry helps create the idea of a "pill for every ill." The drug industry also markets heavily to health care professionals, spending more than $20 billion a year on face-to-face promotion, free samples, promotional meetings, and other marketing activities, which increases unnecessary and inappropriate prescribing.[10]

Recommendation: Stop or limit pharmaceutical industry marketing to clinicians and direct-to-consumer drug advertising to patients.

For each recommendation, we include existing background evidence supporting the recommendation; key actors and partners, funding, changes in technology, and research needed to advance the recommendation; and potential first steps to implementation.

Considerations for research and technology are woven throughout the recommendations. However, we've also included sections specifically addressing the need for improvements in electronic health records (EHRs) and research priorities that are necessary to eliminate medication overload. *You can find our EHR recommendations on page 48 and research recommendations in Appendix A.*

Recommendations to eliminate medication overload

Category	Recommendation	Impact	Resource Need	Level of Implementation	Key Actors
Implement prescription checkups	Implement prescription checkups	High	High	Institutional, state, or national	Governmental agencies, health care institutions and organizations, patient organizations
Raise awareness about medication overload	Create a public awareness campaign to increase awareness of the potential harms of medication overload	High	High	Local or national	Public health organizations, senior organizations, patient organizations, professional organizations, professional societies
	Create prescriber-focused awareness campaigns to promote understanding of medication overload	High	Moderate	Institutional	Health care institutions and organizations, professional organizations, professional societies
	Create patient-focused awareness campaigns that provide information about the potential harms of specific selected medications	High	Moderate	Institutional	Health care institutions and organizations, deprescribing networks, professional organizations, professional societies
Improve information at the point of care	Ensure that clinical practice guidelines include information necessary for patient-centered prescribing	High	High	National	Professional societies and health care institutions
	Create and disseminate deprescribing guidelines	High	Moderate	Institutional	Research community, health care institutions and organizations
	Develop a more comprehensive, accurate, and timely adverse drug event reporting system	Moderate	High	National	Government organizations, health care institutions, patient organizations
Educate and train health professionals	Enhance health professions school curricula to teach clinical trainees proficiency in prescribing and deprescribing	High	High	Institutional or national	Health professional schools, clinician organizations, student organizations
	Incorporate patient-centered prescribing and deprescribing into continuing education curricula	Moderate	Moderate	Local	Professional societies and clinician organizations
Reduce industry influence	Stop or limit pharmaceutical industry marketing to clinicians	High	High	Institutional, local, or national	Legislators, government agencies, health care institutions and organizations
	Regulate direct-to-consumer advertising of pharmaceuticals	High	High	Local or national	Legislators, government and public health agencies and organizations, consumer and patient organizations

CATEGORY 1:

Implement Prescription Checkups

To reduce medication overload and prevent adverse drug events, patients and clinicians need dedicated time to discuss the patient's medications and decide which medications are candidates for dose reduction or discontinuation. This process involves reviewing each medication; discussing the potential benefits and harms of each medication in the context of the patient's values, preferences, and conditions; and adjusting doses or deprescribing as needed.[11,12]

There are multiple barriers to patients and their caregivers engaging with clinicians in such a process. In many settings, time to review patients' increasingly complex medication regimens is limited.[11,13,14] In the hospital and primary care settings, where clinicians are often under strict time constraints, clinicians generally prioritize addressing patients' immediate medical problems, leaving little time for reducing medication burden.[13] In long-term care settings, discussing medications often takes a back seat to addressing other everyday needs for residents.[13,15,16]

Even when time allows for a conversation about medications, social barriers to communication remain. Patients and caregivers often are uncomfortable asking questions about medications and rarely know when to ask questions or express concerns.[17] Additionally, clinicians may fear bringing up the possibility of deprescribing because they anticipate a negative reaction from patients, caregivers, or the specialist who initially prescribed the medication.[18,19]

These and other barriers—including clinicians not having full information about all the medications patients are taking and fragmentation of care due to multiple prescribers—have hindered efforts to reduce medication overload, despite the existence of several types of medication reviews. For example, medication therapy management, comprehensive medication management, and medication reconciliation have encouraged better prescribing and optimizing medications, and can lead to deprescribing. However, these reviews are not explicitly designed to relieve medication overload. Building on these previous initiatives, we developed guiding principles for a ***prescription checkup***—a medication review for the purpose of relieving medication overload—to refocus medication reviews toward deprescribing for patients who need it.

Key takeaways for implementing prescription checkups

- A prescription checkup is a medication review that makes *relieving medication overload* its primary focus and uses a shared decision making process.
- Prescription checkups differ from other types of medication reviews because they are explicitly designed to reduce dosages or eliminate harmful medications. They are conducted by trusted members of the care team and can be performed over the course of more than one visit, and sometimes over the phone or video.
- Prescription checkups have four main steps: Inventory, Inquiry, Intervention, and Follow-up.
- A prescription checkup results in an optimized medication list for patients that reduces medication burden and risk of harm. Following the prescription checkup, patients and family/caregivers should understand the benefit of each medication they are taking, and, for those who struggled with taking all prescribed medicines, adherence should improve.
- Physicians, pharmacists, physician assistants, nurse practitioners, and other clinicians may all play a role in conducting prescription checkups, depending on the patient's preferences and the care setting.
- Changes in payment, benefit design, technology, and quality measurement may be needed to implement prescription checkups.

We recommend that clinicians conducting medication reviews incorporate the guiding principles of a prescription checkup into their practice to facilitate shared decision making and appropriate deprescribing. Where medication reviews are not standard practice, we recommend implementing regular prescription checkups to relieve medication overload. Fully implementing prescription checkups into regular practice for patients taking multiple medications, especially in the primary care setting, may require changes in workflow, payments, scheduling, staff training, and flow of information, to ensure that clinicians have the time and information they need to act as effective partners with their patients in reducing the harm of medication overload.

Basics of a prescription checkup

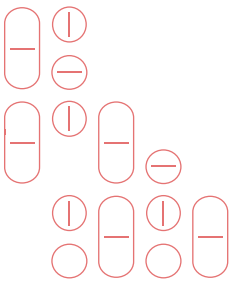
A prescription checkup is a review of the patient's full list of medications and a discussion of the patient-specific potential benefits and harms of these medications. The purpose of the prescription checkup is to eliminate or lower doses of unnecessary or harmful medications for patients who need it, in the context of an established, trusting relationship and an atmosphere free of fear for both the clinician and the patient.

Much effort has been made to implement medication reviews aimed at optimizing patients' medications; however, these interventions have not resulted in widespread deprescribing. Prescription checkups differ from other types of medication reviews in that they are explicitly designed to reduce dosages or eliminate non-beneficial or harmful medications, using a shared decision making process. A prescription checkup may be undertaken as a preventive measure to identify potential medications for deprescribing before the patient is at risk of being overloaded.

A prescription checkup consists of four main steps: Inventory, Inquiry, Intervention, and Follow-up *(see Appendix C for more details)*. First, the clinician and patient and family/caregiver take inventory of all the medications the patient is taking, including over-the-counter medications and supplements. Next, the clinician has a conversation with the patient about their life and what matters to them, to better understand the patient's values, preferences, and goals. The clinician then reviews each medication in the context of these values and goals. Next, the clinician and patient and family/caregiver create a plan of action for medication use and necessary followup. The clinician communicates any medication changes to other clinicians involved in the patient's care, and gives the patient and family/caregiver a roadmap for planned interventions and an updated medication list.

Prescription checkups differ from other types of medication reviews because they are explicitly designed to reduce dosages or eliminate harmful medications and they use a shared decision making process.

Primary care physicians, pharmacists, nurse practitioners, physician assistants, and other clinicians may all play a role in conducting prescription checkups, depending on the patient's preferences and the care setting. For example, at a community clinic, a nurse or medical assistant could conduct the inventory of medications with the patient, while patients and their caregivers may be more comfortable conducting the inquiry phase with their primary care clinician. Pharmacists can also play a key role in identifying medications that should be deprescribed and coordinating necessary changes with the patient's care team.[20-24] However, to be effective providers of prescription checkups as part of the clinical care team, pharmacists must be recognized by payers as health providers who can be reimbursed for their clinical services.



"Any time you interface with the medical system in these moments of vulnerability, the likelihood of a medication being added is high."

— **Gayle Esposito**
Patient safety advocate, Mothers Against Medical Error

Meet Irene. She is 82 years old and lives in Miami. She is taking 12 medications to manage her chronic conditions, but is having trouble keeping track of her meds and is experiencing some side effects.

A **prescription checkup** is a medication review designed to facilitate deprescribing, using shared decision making.

Dr. Patel is Irene's primary care physician. She is familiar with Irene's medical history and has training in deprescribing medications.

1. Inventory

Dr. Patel makes a list of all of the medications Irene is taking, including prescriptions, over-the-counter medications, and supplements. Irene brings all of her pill bottles to the visit, so Dr. Patel knows exactly what medications she is taking.

2. Inquiry

Dr. Patel and Irene have a conversation about Irene's values and health goals. Then they discuss the benefits and harms of each medication in the context of these goals. For example, Irene values playing with her grandchildren and taking walks, but the fatigue and lightheadedness from her blood pressure medication make these activities difficult.

3. Intervention

Irene and Dr. Patel create a plan to reduce Irene's pill burden and side effects. Dr. Patel will discontinue one of her blood pressure medications, two supplements, and an insomnia medication that was prescribed in the hospital six months ago but never discontinued.

4. Follow-up

Dr. Patel schedules a follow-up appointment to make any necessary adjustments to the medication regimen, and makes a plan to check in with Irene regularly to monitor any withdrawal symptoms. Dr. Patel calls Irene's pharmacy and cardiologist and lets them know about the medication changes. She also gives Irene a copy of the medication plan.

Irene feels confident that she understands what medications she is taking, what they are for, and that the benefit of these medications outweigh the harms. Irene stops feeling lightheaded, has more energy, and is able to play with her grandchildren and take walks again.

Guiding principles of a prescription checkup

These guiding principles provide a framework for how to conduct a prescription checkup. Clinicians currently conducting medication reviews should seek to incorporate these guiding principles into the process. For more details on how to conduct a prescription checkup step by step, *see Appendix C.*

1) The central goal of a prescription checkup is to eliminate medication overload and reduce the risk of harm.
2) To the extent possible, all medication decisions are guided by the principles of shared decision making *(see **What is shared decision making?** on page. 16)*.
3) All medication decisions (be it starting or stopping) are informed by the best available evidence.
4) Medications that are causing harm should be stopped whenever possible.
5) Medications for symptom control that are not meant for long-term use, such as proton pump inhibitors, should be considered for discontinuation.
6) Medications for prevention, such as statins for primary prevention of cardiac events, should be considered for discontinuation if they have little chance of benefit over the patient's lifetime, if they increase the risk of harm for patients, or are duplicating drugs that have already been prescribed.
7) Prescription checkups should be available to all patients who request it, but should be standard practice for patients taking five or more medications, patients who have had an adverse drug event, and patients who are having trouble managing their medications.
8) Patients who are taking five or more medications—particularly those age 65 and over or patients with multiple chronic conditions—should have a prescription checkup at least once a year.
9) A prescription checkup is good practice at moments of vulnerability such as care transitions between the home, hospitals, and rehab or long-term care; death of a spouse; sudden functional decline; or diagnosis of a life-threatening illness. Each such event changes a person's risk profile, making it a crucial time to reevaluate the patient's medication regimen.
10) A prescription checkup requires coordination and communication among the treating clinicians and with the patient and their family/caregiver.
11) A successful prescription checkup should result in an optimized medication list for that patient that reduces medication burden and risk of harm. Patients will understand the benefit of each medication they are taking, and, for those who struggled with taking all prescribed medicines, adherence should improve.

What is shared decision making?

In recent years, clinicians and patients have embraced shared decision making as a critical element of a trusting clinician-patient relationship. In this process, clinicians engage patients or caregivers in a conversation about their lives to better understand their goals and priorities; make sure patients or caregivers recognize the potential benefits and level of risk posed by various treatment options, using language they understand; and invite patients or caregivers to be active participants in their health care decisions.[25] Research has shown that conducting medication reviews focused on patients' goals rather than clinical guidelines can reduce medication burden and improve patients' quality of life.[26,27]

In most circumstances, shared decision making calls for health care providers to offer medications as a treatment option rather than immediately prescribing them. Clinicians can help patients understand the potential benefits and harms of treatment options using "patient decision aids." These can be cards, brochures, videos, and other means of conveying, in simple, clear terms, the essential information patients need to be able to make an informed decision.

In the context of a prescription checkup, shared decision making means that patients understand the potential outcomes of their various treatment choices; that a patient's life context, values, preferences, and health goals are incorporated into care decisions; and that those values, preferences, and goals are part of finding the balance between the potential benefits and potential harms of any medication treatment. The individualized approach means that two patients in identical life circumstances and with identical conditions may choose to continue or discontinue different drugs. The degree to which shared decision making enters the conversation must always take into account a patient's decision-making capacity and desired level of involvement.

Existing types of medication interventions

Existing medication interventions, such as medication reconciliation, or "med rec," medication therapy management (MTM), and comprehensive medication management (CMM), have made some progress in optimizing medications in certain settings. Studies of these interventions find that they can be successful in reducing the number of unnecessary or potentially harmful medication in the hospital[20,28,29] and nursing home[30-32] settings.

However, meta-analyses examining medication reviews find that overall, they have little effect on reducing inappropriate prescribing and patient outcomes, and that implementation in the community setting is especially difficult.[13,33-35] In fact, medication reviews often result in patients taking more medications, because clinicians are adhering to individual treatment guidelines for the patient's various conditions.[36,37] The following paragraphs and chart compare the prescription checkup to prior medication interventions.

Medication reconciliation

Medication reconciliation, a process of documenting a complete list of patients' medications during a doctor's visit or care transitions, has not been shown to reduce ADEs or readmissions in randomized trials. In some cases, medication reconciliation is reduced to a "checking the box" exercise without the clinician critically examining patients' medications.[38,39]

Medication therapy management (MTM)

Medication therapy management (MTM), a benefit provided by Medicare Part D to eligible patients, includes a comprehensive medication review to identify, prioritize, and address medication-related problems at least once a year and targeted medication reviews as needed with the goal of increasing adherence and identifying medication problems. A pharmacist usually conducts these reviews, and then provides the beneficiary and their primary care clinician with a summary of recommended interventions and a medication list. According to a systematic review of MTM outcomes in outpatient care, MTMs have improved medication appropriateness and medication adherence; however, there is not enough evidence to determine the effect of MTMs on ADEs, patient harms, or mortality.[34]

Comprehensive medication management (CMM)

Comprehensive medication management (CMM) is a pharmacist-led intervention targeted at high-risk, chronically ill patients to provide an individualized treatment plan. Similar to MTM, CMM involves a comprehensive medication review and creation of a care plan. Notably, CMM takes a holistic approach to medication review and includes an assessment of the patient's clinical status for each of their medications and health problems (for example, measuring the patient's blood pressure before prescribing or deprescribing a blood pressure medication).[41] Studies of CMM initiatives have shown improved outcomes such as reductions in hospital and emergency department admissions.[42] However, like MTM, discontinuing medications is not an explicit focus of CMM.[43]

The experience of working group members suggests that institutions can incorporate the principles of prescription checkups within the structure of MTM and CMM. For example, at Kaiser Permanente, use of MTM with a focus on deprescribing for certain patients with diabetes led to lower risk of hypoglycemia (low blood sugar) and lower all-cause mortality *(see Prescription checkups at Kaiser Permanente)*.[40] Institutions already performing medication reviews need not reinvent the wheel, but should explicitly prioritize deprescribing and shared decision making within their medication review process.

Prescription checkups at Kaiser Permanente

Lynn Deguzman and Maisha Draves | Kaiser Permanente, Northern California

Kaiser Permanente's mission is to provide high-quality and affordable health care to our members and the communities that we serve. In Kaiser Northern California's MTM program, we provide comprehensive medication management—including medication review, disease state medication management, planning, and follow-up—to optimize patients' medications. Clinical pharmacists review patients' medications, evaluate appropriateness and dosing, identify high-risk drugs, and make changes to medications or dosing as needed—all in partnership with the patients' primary care physicians. This work has become a natural progression to deprescribing; since our program's inception, our team has been able to successfully stop or reduce a drug dose for 4,000 patients.

Beginning in late 2016, we created an initiative focused on deprescribing diabetes and blood pressure medications in the elderly population. This required collaboration between several departments, including pharmacy, multiple physician specialties, quality, health education, and research. Collaboration between clinical pharmacists and physicians from multiple specialties was essential to identify areas for deprescribing, develop protocols, and identify patients appropriate for deprescribing. We found that discontinuing diabetes medications reduced the risk of low blood sugar in elderly patients with well-controlled type 2 diabetes after one year.[40] We also found that this program increased adherence for patients' other medications, and improved provider well-being, as our team members found it rewarding to help simplify our patients' medications.

Comparison of medication interventions

Medication Reconciliation	Medication Therapy Management	Comprehensive Medication Management	Prescription Checkup
Targeted at patients transitioning between care settings or providers	Targeted at Medicare beneficiaries with multiple chronic conditions, taking multiple medications, and likely to incur annual medication costs exceeding a certain level	Targeted at patients with chronic conditions at high risk of adverse drug events	Targeted at older adults taking multiple medications and patients admitted to the hospital with an ADE, or available on request. Prescription checkups can occur in the outpatient, long-term care, or hospital settings.
Focused on preventing prescribing errors at care transitions	Focused on medication adherence, prevention of cardiovascular disease, using generic drugs instead of expensive brand-name drugs, and removing inappropriate medications	Focused on optimizing medication use and improving patient health outcomes, using a whole-person approach	Focused on preventing or relieving medication overload. The primary goal is to identify when patients are having trouble managing their medications, or are at risk of a serious side effect, and optimize their medications to reduce the risk of future harm.
Occurs during admission and/or discharge from hospital, or during other transitions between care settings. May also occur in outpatient settings	A comprehensive medication review is conducted once a year during a single encounter, either on the phone or in person. Other targeted medication reviews may be conducted throughout the year.	Occurs at least once a year and during care transitions	Occurs at least once a year and during care transitions. Prescription checkups can be conducted over multiple visits/encounters.
Conducted by a pharmacist and/or clinician in hospital and generally not a person with whom the patient has a prior relationship	Conducted by a pharmacist who is often unknown to the patient	Conducted by a pharmacist who works in collaboration with the patient's primary care team	Conducted by a clinician or member of the care team with whom the patient has an established, trusting relationship. This can be a physician, pharmacist, nurse, or another member of the care team.
The receiving care provider (where the patient is transitioning) may conduct a follow-up. Changes to the patient's medications are not always communicated to the patient's primary care provider.	The clinician conducting the review follows up with the patient to monitor symptoms and make necessary adjustments to their medications. The clinician conducting the checkup communicates medication changes to the patient's primary care provider.	The clinician conducting the review follows up with the patient symptoms and makes necessary adjustments to their medications. The clinician conducting the checkup communicates any medication changes with the patient, family, and patient's care team.	The clinician conducting the review follows up with the patient to monitor symptoms and make necessary adjustments to their medications. The clinician conducting the checkup communicates any medication changes with the patient, family, and patient's care team, including the pharmacy.
Drugs are prescribed or deprescribed based on the patient's previous medication list.	Drugs are prescribed or deprescribed based on explicit guidelines such as clinical practice guidelines and the AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults.	Drugs are prescribed or deprescribed based on the medication's indication, effectiveness, safety, and patient adherence. Patient's conditions are also considered.	Drugs are deprescribed based on the patient's values, preferences, and health goals, and on which medications are the most harmful. The AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults and other resources for identifying problematic medications may be used.
Coordinated by clinic, LTC facility, or hospital administration	Coordinated by health plans	Coordinated by health plans	Coordinated by the patient's primary care physician or hospital care team

Implementing prescription checkups

For hospitals, long-term care facilities, and clinics to implement prescription checkups, clinicians need support, information, and guidance. Payers, clinician organizations, and quality improvement organizations must provide clinicians with adequate time, training, and reimbursement to conduct prescription checkups. Gaining support for prescription checkups will also require more evidence of its effectiveness, impact, and feasibility. Launching and evaluating targeted pilot programs would provide the opportunity to collect further evidence necessary for successful spread and uptake.

Research priorities

A growing body of research shows that deprescribing is feasible, desirable, and safe for many drug classes, including proton pump inhibitors, blood pressure medications, diabetes medications, psychotropic drugs, and benzodiazepines (when tapered slowly).[32,44-47] Deprescribing trials have also demonstrated that medication reviews for deprescribing reduce mortality within 15 months by as much as 38 percent.[47]

The components of the prescription checkup model pull from existing validated deprescribing guides and frameworks. Taking an inventory of a patient's medications is crucial to setting the stage for deprescribing.[22,48-50] Inquiring about patient values and goals in medication reviews and basing treatment decisions on these preferences has been shown to improve patient outcomes.[26,48,51] Involving interdisciplinary team members in the medication review process—particularly clinical pharmacists—has proven a successful and feasible option in many deprescribing trials.[20-24] Research also supports the participation of nurses and palliative care specialists in the deprescribing process.[23,52] And lastly, researchers confirm that communication between patients, family members/caregivers, and members of the care team is essential in the follow-up stage after changes to the patient's medication regimen have occurred.[22,44,48,49]

Despite existing research supporting deprescribing, more research would be helpful to support implementation of prescription checkups. More randomized controlled trials of deprescribing are needed to demonstrate the benefits of deprescribing in general as well as deprescribing for certain drug classes.[45] Outcomes such as frequency of adverse drug events, hospitalizations, all-cause mortality, falls, medication adherence, patient-reported quality of life, and financial savings should be considered in deprescribing studies.[53,54]

We also need more research on the implementation of prescription checkups, including how EHR improvements could facilitate prescription checkups, patient and family/caregiver attitudes toward deprescribing and prescription checkups, and how prescription checkups should be appropriately tailored for different care settings and patient populations. As the principles of prescription checkups are incorporated into medication reviews, evaluating the effectiveness, feasibility, and outcomes of this intervention will help to improve the prescription checkup and reduce medication overload.

PRESCRIPTION CHECKUP PILOT

A first step to implementing prescription checkups (or principles of prescription checkups within existing medication reviews) will be to evaluate the effectiveness and feasibility of prescription checkups in pilot studies. Prescription checkups should be evaluated for effectiveness in reducing the number of adverse drug events, reducing pill burden for patients, and improving patients' quality of life, compared to the current standard of care at the institution.

Prescription checkups should be validated in outpatient, long-term care, and acute care settings, with modifications made for each setting as necessary. Ideally, a prescription checkup pilot would be accompanied by a targeted public awareness campaign, letting patients and caregivers at a specific clinic, long-term care facility, or hospital know that they can "ask their doctor for a prescription checkup" if they are concerned about the number of medications they are taking or the side effects of these medications.

Establishing a centralized list of every patient's medications and making EHRs interoperable would facilitate prescription checkups.

Filling information gaps

The Inventory step of the prescription checkup, in which the clinician documents all of the medications the patient is taking, is common to all medication reviews, and seems like the easiest step to complete. However, without complete information about a patient's medications, this step becomes laborious and can even be a barrier to completing the checkup. Many older patients have multiple providers who prescribe medications, not all of whom are within the same health system or use the same electronic health record (EHR). Establishing a centralized list of every patient's medications, or improving the usability and accuracy of EHRs and making them interoperable across health systems, would ease the creation of a comprehensive medication list for patients *(see How electronic health records could dramatically reduce medication overload, page 48)*.

It is important that the clinician conducting the prescription checkup know the condition for which each medication was prescribed. However, this information may not be available or accurate in the EHR, and patients or family members may not recall why certain medications were prescribed. Printing the indication on pill bottles when medications are prescribed could aid in filling this information gap. Clinicians should consider including the indication for medications on the prescription and requesting that pharmacies include the indication on the pill bottle, to help facilitate more accurate and efficient prescription checkups.

Policy and payment changes

It takes time for clinicians to conduct prescription checkups—to build a complete medication list, have shared decision making conversations with patients, and communicate medication adjustments with patients and other clinicians. Clinicians should not be expected to conduct prescription checkups without appropriate reimbursement.

We recommend that public and private payers develop pathways to reimburse clinicians for prescription checkups, including the following:

- Create a billing code for prescription checkups that clinicians could use to receive Medicare and Medicaid reimbursement for their time conducting prescription checkups. Payers should recognize pharmacists as health providers who can bill for their clinical services, so pharmacists can conduct prescription checkups as part of a clinical care team.
- Allow primary care clinicians to "bundle" a prescription checkup with the annual Medicare Wellness Visit, potentially through a modifier billing code.
- Encourage development of value-based payment models that reward clinicians for reducing adverse drug events in older patients, or for reducing doses with the greatest potential for harm in older patients, to incentivize preventive prescription checkups.

Clinicians currently conducting MTMs can already bill for their time for eligible patients. However, as previously mentioned, MTMs often do not engage patients in shared decision making or result in deprescribing. CMS and private payers could implement quality measures into MTMs that incorporate the core principles of prescription checkups. As another method to encourage deprescribing in MTMs, plans and public and private payers could provide risk-adjusted reports to clinicians about the number of medications their patients are taking compared to their peers.[55]

None of this will be easy. Previous efforts to encourage shared decision making through quality measures—such as shared decision making before lung cancer screening, stents for stable angina, and other tests and procedures—have proven largely ineffective.[56,57] Improving shared decision making in medication decisions will be a long-term process that will take not only support from payers, but also broad changes in medical education, post-graduate continuing education, and public awareness and empowerment.

Key actors

Clinicians, patients, caregivers, researchers, health plans, and health care institutions all have important roles to play in implementing prescription checkups. Clinician and patient groups invested in deprescribing, medication safety issues, and health issues affecting older patients will be important allies in advocating for prescription checkups, on both the clinician and patient sides. Payers will also have a central role to play, as will organizations that set standards for quality of care. In order to implement principles of prescription checkups at health care institutions, advocates for prescription checkups will need to reach out

to clinicians and administrators at clinics, hospitals, long-term care facilities, and other health institutions. Potential allies in the effort to implement prescription checkups include:

- Senior citizens groups such as AARP;
- Research organizations such as the Agency for Healthcare Research and Quality and the U.S. Deprescribing Research Network, funded by the National Institute on Aging;
- Quality improvement organizations, such as the Institute for Healthcare Improvement and the Center for Medicare and Medicaid Innovation;
- Patient safety organizations and consumer groups;
- Primary care, geriatrics, pharmacy, nursing, physician assistant, and other specialty and professional organizations; and
- Payers, such as the Centers for Medicare and Medicaid Services (CMS) and private plans.

Incorporating the principles of prescription checkups into existing MTM programs will require partnering with CMS as well as early adopters of MTM such as Kaiser Permanente. The pharmaceutical and biotechnology industries might have a role to play in promoting prescription checkups, but there is a danger that this could allow industry influence to co-opt this effort or dilute its impact on medication overload. Similarly, partnerships with groups advocating for other types of medication reviews may be helpful, but advocates should be aware of financial conflicts of interest within these groups before partnering.

Conclusion

Establishing regular prescription checkups is a crucial step toward promoting appropriate deprescribing and eliminating medication overload. Each of the recommendations in this action plan is intended to reduce the likelihood that excess prescribing occurs, or help to set the stage for deprescribing, through building awareness, educating clinicians and empowering patients, providing deprescribing tools, and more. However, it is the prescription checkup that creates the actual opportunity for deprescribing to prevent and reduce medication overload.

Government agencies and health care institutions have taken significant steps to improve medication use for patients, through promoting and implementing medication reviews and medication therapy management. By incorporating an explicit focus on reducing medication overload, and using a shared decision making approach, these reviews will more often lead to appropriate deprescribing, decreasing the medication burden for patients. Through the principles of the prescription checkup, our goal is to shift the focus of medication reviews toward appropriate deprescribing, and make deprescribing a regular activity in all health care settings.

CATEGORY 2:

Raise Awareness About Medication Overload

Despite the well-documented harm caused by medication overload, most policymakers, health care leaders, and health care consumers are unaware of the scope and severity of the problem.[18,58,59] Our "culture of prescribing" is a key driver of medication overload and increasing awareness of the scope and harms of medication overload as a key step toward eliminating it. The goal of increasing awareness is to foster conversations between patients and clinicians that focus on avoiding unnecessary prescriptions and facilitating deprescribing when appropriate. We believe clinicians will be more likely to address medication overload if patients and families start asking how to avoid excess prescriptions and stop unnecessary medications.[21,59,60] Medication overload does not need to be an inescapable part of being an older person.

The following recommendations, based on research demonstrating the effectiveness of targeted informational campaigns, are intended to increase awareness of the risks of medication overload in order to facilitate prescription checkups.[59,60,62,63]

Key takeaways for raising awareness of medication overload

- To have the greatest impact, awareness campaigns should target clinicians, patients, and families/caregivers with messages about medication overload and deprescribing.
- Campaigns should use multiple modes of communication to ensure message saturation.
- Campaigns should create a sense of urgency about medication overload and provide the target audience with clear steps for action in awareness campaign messaging.
- More research is necessary to develop and test additional messaging strategies and determine the most cost-effective level of resource allocation.

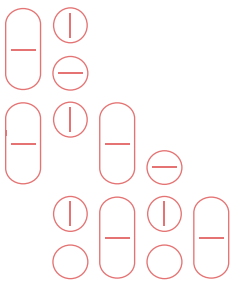
Recommendation: Create a public awareness campaign to increase visibility of the potential harms of medication overload and to promote prescription checkups

We recommend the creation of a public awareness campaign to increase understanding among the general public about the risks of medication overload and strategies to prevent it. Such a campaign can be modeled after successful public health campaigns such as those around tobacco use, heart disease prevention, road safety, and sudden infant death syndrome.[64-66] Effective public awareness campaigns require securing funding, creating partnerships, identifying the target audience, developing messaging and branding, using multiple channels of communication, and testing and continually evaluating the campaign to further refine it for greater effectiveness. The Centers for Disease Control and Prevention (CDC) would be a natural leader in the organization and funding of this campaign, while partnerships with clinician specialty groups and patient advocacy groups would be helpful for developing materials and disseminating key messages.

Background

Public awareness of the harms of medication overload is lacking. According to a 2019 survey of older adults conducted by the John A. Hartford Foundation, 40 percent of respondents did not know that some medications can increase confusion or increase the risk of falling, and half of respondents did not know that certain medications should be avoided in older adults.[67] Building public awareness is essential to reducing medication overload because our beliefs and attitudes about medications can be key facilitators of, or barriers to, deprescribing. Qualitative research finds that physicians see patients' desire to stay on drugs as a major barrier to deprescribing.[68] Harnessing that dynamic between clinician and patient could have a substantial effect on physicians' prescribing behavior. If patients and families started "asking their

> "Ask your doctor if this pill is wrong for you."
>
> — **Dr. Derelie (Dee) Mangin**
> Professor, Department of Family Medicine, McMaster University [61]



doctor" about deprescribing the way they currently ask about medications promoted in advertisements, there is strong evidence to suggest they would start conversations that could reduce medication overload.[17,21,60]

Target and messaging

The target audience of this campaign would be adults age 65 and older and those who care for them and assist in making medication decisions. Many individuals younger than 65 may also benefit from greater awareness of the potential harm from medication overload, as they too may experience medication-related harm. Although clinicians are not the main target of a public awareness campaign, it is critical that messaging neither blame nor alienate them, as their support and engagement is necessary for prescription checkups and deprescribing to occur.

The public awareness campaign should have the twin goals of 1) increasing awareness among the target audience that multiple medication use may be harmful; and 2) encouraging members of the target audience to start conversations with clinicians about prescription checkups and deprescribing. In initial focus groups, using the terms "medication overload" to describe harm from multiple medication use and "prescription checkup" to describe conversations about medications were well received by patients. However, finding the most effective phrases and messages will require additional research and focus groups with older adults from a representative national sample.[59,71]

Awareness campaign messaging best practices

- Patient testimonials about loss and harm from medication overload can help raise awareness about the potential consequences of too many medications.[69]
- Including confidence- and capacity-building information, such as "Questions to ask your doctor," can encourage patients to take action.[17]
- Having relatable spokespeople or testimonials from members of the target population is helpful for message saturation.[70]
- Public campaign messaging must use plain language and avoid health jargon.
- Positive images of cooperation between clinicians and patients should be included, as well as aspirational messages, such as "Talking with my doctor about medication overload helped make my regimen more manageable." Campaigns should avoid messages that alienate or blame clinicians.
- Using the concept of "optimizing" or "right-sizing" medication lists can help focus the overall message on improving health, and avoid the idea that deprescribing will "take something away" from patients.
- All messaging should emphasize starting a conversation with clinicians about medications to express concerns, as there is potential for unintended negative consequences if patients stop taking medications without first consulting a clinician.

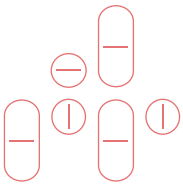
Case study: Messaging in "The Heart Truth" campaign

In 2002, the U.S. government sponsored the first national campaign to increase awareness among women of their risk of heart disease. The campaign, called "The Heart Truth," led to a 23% increase in awareness of heart disease as the leading cause of death in women, and an increase in actions to reduce heart disease risk.

Focus groups of the target audience (women age 40–60) showed that women were not aware of how common heart disease is, and often thought of it as a "man's disease." Organizers recognized that the campaign must include a "wake-up call" to women that heart disease is a leading cause of death; a "hard-hitting" description of the consequences of heart disease to convey urgency; a "sense of hope" that women can lower their risk; and a "call to action" for women to talk to their doctor about lowering their risk of heart disease. They used the symbol of a red dress, designed to emphasize that heart disease is not just a "man's disease." The campaign included testimonials from women wearing red dresses about their struggles with heart disease, to make the condition more personal.

The twin messaging strategies of conveying urgency ("Heart disease is the #1 killer of women") and giving a call to action ("Talk to your doctor about reducing your risk of heart disease") contributed to the success of the campaign.

Source: Long T, Taubenheim A, Wayman J, Temple S, Ruoff B. "The Heart Truth:" Using the Power of Branding and Social Marketing to Increase Awareness of Heart Disease in Women. Social Marketing Quarterly 2008; 14(3): 3-29.



Communication channels

Effective public awareness campaigns use multiple modes of communication—broadcast media, social media, newspapers, posters and flyers, and more—in order to create maximum exposure to the message.[64-66] The following communication channels could all play a role in a comprehensive awareness campaign to reduce the burden of medication overload:

- Broadcast and audiovisual media, including television, radio, movies, YouTube videos, and podcasts. Television is an especially effective method for reaching older adults. In addition to advertising, sponsored content, such as promotion of key messages within television shows or movies about medicine, hospitals, or families in general could be effective;
- Print media, including flyers, mailers, and advertisements in newspapers and magazines; these could be reinforced by billboards carrying campaign messages;
- Social media and mobile apps, such as Twitter, Facebook, Instagram, and other social media platforms, which are important for reaching younger family members and caregivers;
- A website with shareable flyers, fact sheets, memes, and other content. A QR code on print materials could direct readers to the website with more detailed information;
- Brochures, posters, and flyers in health care settings such as hospitals, clinics, and doctors' offices, as well as public spaces such as libraries, senior centers, beauty salons, and barbershops;
- Booths at farmers' markets and community health fairs; and
- Poster sessions at public health meetings and other conferences with large patient advocacy audiences.

Key actors

As the nation's health protection agency, the Centers for Disease Control and Prevention (CDC) conducts campaigns to raise awareness about public health issues such as infectious diseases, natural disaster preparedness, mental health, tobacco usage, and more. The CDC has conducted several campaigns to raise public awareness about the harms of inappropriate medication use, making the agency a natural leader for raising awareness about the more general and widespread problem of medication overload. The CDC could organize focus groups and development of materials, and manage the testing and evaluation of the campaign.

Seniors' organizations such as AARP, physician and nursing specialty organizations, and patient safety organizations all have an interest in reducing medication overload, and would be vital partners for a successful public awareness campaign. Clinician and patient groups will be helpful for developing materials targeted at clinicians and patients, as well as disseminating key messages to their networks. Alliances with other organizations will be helpful, including:

- Professional medical societies for physicians, nurses, pharmacists, and other clinicians who prescribe medications;
- Institutions that care for older adults or patients at the end of life, such as hospitals, skilled nursing facilities, long-term care facilities, and hospice;
- Deprescribing and overuse initiatives such as the Canadian Deprescribing Network, Choosing Wisely, and the upcoming U.S. Deprescribing Research Network funded by the National Institute on Aging;
- Membership organizations that focus on the health and well-being of the target population, such as AARP, the American Seniors Organization, the Association of Mature American Citizens, and others;
- Health care quality and safety groups such as the National Patient Safety Foundation, the Leapfrog Group, and quality improvement organizations;
- Not-for-profit, independent health care advocacy organizations and groups;
- Public health agencies such as local and state health departments, and the Surgeon General;
- Watchdog groups like Public Citizen and Consumer Reports;
- National and local newspapers, magazines, health care journals, and other media organizations; and
- Payers and purchasers, including health plans and employer coalitions.

A national public health awareness campaign will require significant time and financial resources to be successful. Anti-tobacco national campaigns have cost at least $12 million per year for smaller campaigns, and hundreds of millions have been invested in larger campaigns.[72] Generally, the more money invested in the campaign, the more exposure the target audience will get to the campaign message. Television advertisements, though expensive, are crucial for reaching the older American audience.

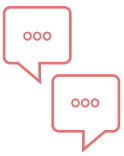
Potential funders include government organizations, such as the CDC, and private foundations with an interest in aging, health, or patient safety. With limited funds, no campaign should be launched without conducting a cost-benefit analysis to determine the best way to fund and scale the effort for the greatest impact for each dollar spent. Research may show that smaller, more targeted campaigns that rely on partnerships may be more cost-effective than a large national campaign that relies heavily on expensive broadcast media.

First steps of implementation

A national public awareness campaign is a long-term project, but steps could be taken immediately to pilot an intervention and begin developing a messaging strategy.

EXPANDED FOCUS GROUPS

Effective messaging is critical for a successful public awareness campaign. The Lown Institute conducted two focus groups with a total of 16 people in New York City to better understand their attitudes toward medications, clinicians, and terminology of medication overload and deprescribing.[71] The focus groups included a multi-ethnic group of patients age 50–75, with most taking five or more medications per month. We found that many patients feel that there is little or no opportunity for them to ask their physician questions about their medications. The participants were extremely receptive to the idea of a "prescription checkup," a regular conversation with a clinician about all the drugs they are taking, with the goal of reducing medication burden.



The focus groups found that many patients feel that there is little or no opportunity for them to ask their physician questions about medications.

However, these focus groups represent only a small segment of patients in one city, and the results may not be generalizable to other regions or the nation as a whole. Qualitative studies, such as the McMaster University TAPER project, which identified the conflicting messages about medications older adults are exposed to, will be essential.[73] As part of research for a public awareness campaign, many more focus groups should be conducted in diverse communities around the country—targeting patients age 65 and over when possible—to find out more about what is important to older adults and their caregivers about their medications, and find messages that most effectively convey the very real risks of medication overload and promote conversations in which patients ask their providers about their medications.

PILOT AWARENESS CAMPAIGN

Proof of principle could be obtained through a pilot campaign within a single neighborhood or city. A candidate community to pilot this campaign would be one in which there is a significant population of older adults, existing health care infrastructure with a history of collaboration within the community, and existing patient advocacy groups for potential partnerships. Awareness of which patient advocacy groups are heavily funded by pharmaceutical companies will be useful in choosing potential partners, as industry funding may make a group less eager to engage on the topic of medication overload, or may lead to the campaign getting co-opted by industry.

The goals of the campaign are two-fold: to increase awareness among community members that taking multiple medications may increase risk of harm for older adults; and to encourage older adults who take multiple medications to start a conversation with their clinicians about the need for and importance of each prescription drug. Local patient advocacy groups, senior membership organizations, and health care institutions will be critical partners in spreading key messages, using the multiple communication channels mentioned previously. A pilot intervention would require post-intervention surveys of public opinion to assess the impact of the effort, with the potential for surveying a comparable community as a control group. It will be critical to engage and educate clinicians in the community so they are prepared when patients ask questions about their medications and the potential for deprescribing.

Recommendation: Create patient-focused awareness campaigns that provide information about the potential harms of specific medications and the opportunity for deprescribing

We recommend implementing a large-scale awareness campaign focused specifically on patients at high risk of medication overload. This campaign would be modeled after previous successful patient-targeted campaigns such as EMPOWER and D-PRESCRIBE.[21,60] Government organizations, as well as foundations interested in aging and patient safety, could take the lead on funding and organizing such a campaign. Partnerships with health care institutions, physician specialty organizations, patient advocate groups, and deprescribing research networks would also be key for engaging prescribers and evaluating the intervention.[21,62]

This intervention would involve identifying patients taking a specific class of drugs and developing informational brochures outlining the specific harms of that drug class. The brochures or other means of communicating with patients could be disseminated through mail, email, patient portals, or social media. Including a concurrent awareness campaign and partnership with local clinicians in community practice and hospitals would be helpful to remove barriers to deprescribing and facilitate conversations about medications. [21,62]

Background

Providers often fail to initiate deprescribing because they believe their patients will resist deprescribing, but research shows that most patients would agree to stopping a medication if their doctor said it was possible.[19] Just as patient requests for brand-name drugs often results in a prescription, patients expressing the desire to discontinue a medication can be an effective catalyst for conversations about deprescribing.

Previous campaigns targeting patients taking potentially inappropriate and harmful medications have been shown to reduce medication overload in the targeted population. For example, the EMPOWER trial (Eliminating Medications Through Patient Ownership of End Results) in Quebec, Canada, found that sending informational brochures to older adults taking benzodiazepines (anxiety medications) led to a large reduction in benzodiazepine use.[60] Compared to a control group who did not

receive brochures, 22 percent more patients tapered off and ultimately discontinued benzodiazepines and an additional 11 percent were able to lower their dose. Sixty-two percent of participants in the intervention group initiated a conversation about deprescribing with a clinician.

A subsequent randomized controlled trial in Quebec, Canada, called D-PRESCRIBE (Developing Pharmacist-Led Research to Educate and Sensitize Community Residents to the Inappropriate Prescriptions Burden in the Elderly) demonstrated that targeting both patients and primary care physicians with educational materials can be even more effective in encouraging deprescribing than targeting patients alone, and that pharmacists can play a key role in the process.[62] When community pharmacists sent evidence-based deprescribing recommendations to physicians as well as brochures to their patients, 31 percent more patients discontinued an inappropriate medication after six months, compared to patients who received no intervention. The success of these trials justifies continued investment in spreading and scaling up patient-targeted, drug-specific deprescribing interventions.

Compared to a control group who did not receive brochures, 22 percent more patients discontinued anxiety medications and an additional 11 percent lowered their dose.

Similar patient-focused awareness campaigns are needed for several classes of drugs that are commonly overprescribed in older patients and cause significant harm. In addition to drugs with potential psychotropic effects such as benzodiazepines, antipsychotics, and antidepressants, there are many classes of drugs that could be targets for deprescribing campaigns, including certain diabetes drugs, "Z-drugs" and other sleep medications, analgesics, anticoagulants, antihypertensives and antiplatelets, anticholinergic drugs, and proton pump inhibitors. Such initiatives could replicate and expand the EMPOWER and D-PRESCRIBE trials, which have shown to be effective in targeting patients at risk of harm and encouraging them to start conversations with their clinician about deprescribing.[60]

Target and messaging

This effort should target older patients (age 65 and up) in a specific community who are at increased risk of harm from medication overload, and the family caregivers supporting these patients. An important first step is developing criteria for a risk threshold to determine who is in the target audience based on the classes of drugs prescribed.[60]

The EMPOWER and D-PRESCRIBE brochures may be useful models for developing messaging strategies for patient-targeted campaigns. As with the general public awareness campaign, the goals for messaging in a patient-targeted campaign should be to 1) motivate patients (and their caregivers) to learn more; 2) build patients' capacity to take action by giving them information about specific medications; and 3) give patients an opportunity to act with a clear path to action (e.g. "Talk to your doctor about deprescribing").[17]

Multiple stakeholders—patients, geriatricians, physicians, pharmacists, and other clinicians, as well as seniors' groups or other consumer advocacy groups—should have input in the design and messaging of these brochures. The materials should be focus-group tested with older patients, available in multiple languages, and at a reading level that ensures that the message is broadly accessible. Clarity and ease of comprehension is key. Including an interactive component, such as a quiz or questionnaire, as well as testimonials from older patients, has been shown to increase patient engagement. [17,59]

Unlike the broader public awareness campaign, this initiative would be designed to target specific patients taking certain classes of medications. Once a target patient cohort is identified, they will be provided with information through modalities determined to be most effective. Brochures could also be made available in other venues, including libraries, senior centers, doctors' offices, pharmacy counters, and hospital waiting rooms, although these communication methods are less direct. Social media platforms, especially Facebook, are potential channels of communication for the vast numbers of seniors who use them.

Key actors

Government organizations such as the Center for Medicare and Medicaid Innovation (CMMI) or the Agency for Healthcare Research and Quality, are well positioned to fund and organize a patient-targeted campaign. Foundations interested in aging and patient safety could also take the lead on funding and organizing such a campaign. Health plans, insurers, and health systems might also be interested in funding such a campaign, to avoid unnecessary hospitalizations and morbidity associated with adverse drug events. The cost for this campaign would likely be much less than the cost of a broader public awareness campaign.

Partnering with community pharmacies, local health care institutions, local employers and health plans, pharmacy benefit managers, the Centers for Medicare and Medicaid Services (CMS), and possibly public and private agencies that have prescription drug and patient data will be necessary to identify the target patient population based on the risk criteria. Involving pharmacists in these interventions to get clinicians on board also significantly improves the rate of deprescribing, as shown in the D-PRESCRIBE trial.[62] Clinical expertise from geriatricians and pharmacists will be essential for developing materials and conducting initial research. Patient groups and seniors' organizations must be involved in the campaign at the outset to co-create materials.[60]

The Canadian Deprescribing Network has a wealth of knowledge and experience from the EMPOWER study and other efforts. International partnerships with the Australian and English Deprescribing Networks will be helpful, as well as with the National Institute on Aging's U.S. Deprescribing Research Network. Other supporters may include health plans, employers, patient safety organizations, and primary care organizations, initiatives like the American Board of Internal Medicine's Choosing Wisely campaign, and the Patient Safety Action Network (formerly Consumer Reports Safe Patient Project).

First steps of implementation

The EMPOWER trial and other pilot projects have demonstrated that direct-to-patient information can encourage patients to ask their doctors about deprescribing. The success of these efforts supports continued investment in testing such patient-targeted deprescribing campaigns in the U.S. and, if successful, scaling up this intervention.

The first step in this process would be for CMMI to partner with other funders, pharmacies, government agencies, health plans, and health care provider institutions in a limited number of communities to pilot dissemination of an information product such as a brochure. First, the target patient population would need to be identified, as well as the target medication(s). The next steps would be to recruit patients for focus groups to refine messaging strategies and develop a corresponding prescriber-facing communication for primary care clinicians and/or specialists in the community, depending on the targeted drugs chosen.

Once these pilot projects have been completed, we recommend that CMMI, in partnership with private health insurers, fund the convening of a task group, whose goal would be to create a detailed plan for a nationwide project.

Recommendation: Create prescriber-focused awareness campaigns to promote understanding of medication overload and the need for deprescribing

We recommend the creation of initiatives aimed at clinicians, to educate prescribers about the scope and harms of medication overload. Government agencies, health care institutions, private insurers, and foundations are all potential funders of such a campaign, while clinician specialty organizations will be crucial partners for creating and disseminating messages. Prescriber-targeted awareness campaigns could be developed using any number of tools: peer comparisons, case studies, social media, and so on. Prescriber awareness campaigns would require developing messaging and branding, using multiple channels to disseminate messages, creating partnerships, and testing and evaluating the effectiveness of campaigns.

Background

While greater public awareness is essential, raising awareness among prescribers is also necessary. The widespread view among prescribers that drugs "appear to work with few side effects" is commonly cited as a barrier to deprescribing.[68] Previous deprescribing interventions show that targeting prescribers at the same time as patients is important because patients seek information about medications from their health care professionals and lack of provider support from them can be a barrier to deprescribing.[17,60,63,74,75] While policies may encourage clinicians to prescribe conservatively, institutional culture and habits often prevail; there is an urgent need to catalyze culture change.

Target and messaging

Clinician awareness campaigns should target all clinicians who prescribe or monitor medications, such as physicians, nurses, clinical pharmacists, nurse practitioners, physician assistants, and pharmacy technicians.

Research on provider-targeted interventions to reduce overuse of health care services shows several effective methods for changing the behavior of health professionals:

- Unblinded peer comparison reports have been shown to reduce overprescribing, by showing clinicians how they are prescribing compared to comparably situated peers, and appealing to their competitive nature.[55,76,77]
- Communications to prescribers describing harm to patients from inappropriate prescribing has also been shown to be effective at reducing overprescribing.[78]
- Encouraging conversations among clinicians about the harm caused by overuse, by creating a safe environment for discussion while providing educational materials, has been proven to reduce unnecessary tests and procedures.[79]

Although demonstrating the harm from medication overload is important, an overly negative message might alienate clinicians. Clinicians are understandably wary of campaigns that ignore the clinical complexities and challenges associated with prescribing, such as efforts to make clinicians prescribe blood pressure medications to all patients above a certain target, or forced tapering of opioids for all patients on a certain dose. Campaigns that show clinicians as potential "champions" for their patients, rather than blame them or impose new mandates, are likely to be more effective. Most previous efforts to reduce overprescribing have focused on certain drug classes, rather than on deprescribing in general. More research is needed to determine what messages could be effective in promoting general deprescribing in older adults.

Clinician awareness campaigns in hospital and residential care settings

Efforts to raise awareness among clinicians about harm from medication overload and to promote prescription checkups will be different across different care settings. In acute care settings, campaigns often focus on the discharge process—encouraging physicians to involve pharmacists in the discharge process; raising awareness about the importance of conducting a prescription checkup at discharge; and encouraging communication with patients and their primary care providers about any medication changes. In hospitals and other acute care settings, these points can be communicated through case conferences, hospital rounds, printed materials, and continuing education courses. Conducting these campaigns within the hospital generally requires buy-in from institutional leadership, and success may depend on clinicians' willingness to learn about deprescribing.

In residential care settings, such as skilled nursing facilities and long-term care facilities, awareness campaigns may focus on recognizing unnecessary or inappropriate drug use in the very old and frail adult population; prescribing and deprescribing based on the goals of care set by patients and families; and identifying "low-hanging fruit" for deprescribing. These awareness campaigns can be communicated through printed materials, one-on-one academic detailing, and educational sessions or continuing education series offered within the residential care facility.

Communication channels

As with other public awareness campaigns, exposing the target audience to the campaign message as many times as possible is key, and will require using multiple communication channels. Accommodating different learning styles through interactive methods will also engage more clinicians. In skilled nursing facilities, long-term care, hospitals, and other "closed systems," spreading the message throughout the institution will likely be easier than in the broader community.[13]

Methods of communication may include:

- Posters and brochures in clinics, hospitals, long-term care facilities, and other health care settings;
- Curated lectures and slides for presentations at medical conferences;
- Online modules and webinars, which can be used for continuing education credit;
- Journal articles and op-eds in health care media;
- Social media campaigns and advertising on platforms such as Twitter, Facebook, and LinkedIn;
- Podcasting promoting deprescribing in existing popular medical podcasts and developing new podcasts and new content focused on medication overload and deprescribing; and
- Case studies and stories to highlight potential harm from medication overload and benefits of deprescribing.

Appropriate materials could be bundled into an easily downloadable and shareable "toolkit" for dissemination. This toolkit could be used by clinician leaders who are motivated to increase their own knowledge of medication overload, and may also be used in clinician training and continuing education *(see Category 4 for more on interventions in clinician training, page 52)*. The toolkit could contain slides for presentations at meetings, teaching modules, webinars, case examples, guidelines for addressing and reducing medication overload, and so on.

Methods of communication should also seek to reach clinicians in an academic setting, through journal articles and medical conferences, to make it clear that there is a solid research base to support deprescribing. However, articles in journals and medical lectures rarely inspire action in the same way as stories from social media and word of mouth. Varied messaging is needed not only to create legitimacy for deprescribing and make it a common part of the medical lexicon, but also to create a sense of urgency among clinicians to examine their prescribing habits.

Key actors

Government agencies, health care institutions, private insurers, professional organizations, and foundations are all potential organizers and funders of provider-facing campaigns. These campaigns could be conducted on an institutional level or on a larger scale, targeting clinicians within a certain region or specialty. Targeting clinicians on an institutional level is a potentially cost-effective way to raise awareness of medication overload, and has proven to reduce overuse in previous campaigns.[55,80] The demonstrated return on investment from fewer unnecessary hospitalizations and lower drug costs could be valuable for convincing other institutions to conduct campaigns of their own.

While some materials for deprescribing awareness exist, new tools are needed as well. Organizations developing deprescribing materials should get input from both specialists and primary care clinicians, as each field of clinicians will have insight on which deprescribing messages will be most effective within their specialty.

Organizers of a prescriber-targeted campaign will need to work with hospital administration, chief medical officers, or the leadership of any institution in which the campaign will be implemented. Partnerships with specialty societies and journals will be important for helping disseminate key messages, especially through continuing education. Getting universities and societies that run medical conferences on board is extremely important for spreading the message of deprescribing in settings where clinicians and trainees gather to learn. Creating a broad base of support will be important to counter the influence of the pharmaceutical industry.

Health professionals and specialty organizations will be crucial partners for creating and disseminating messages. Potential partners for a clinician-targeted campaign include:

- Clinician organizations such as the American Medical Association, American Nurses Association, American Pharmacists Association, and American College of Physicians;
- Primary care and geriatrician organizations, such as the American Geriatrics Society, Society of General Internal Medicine, American Association of Family Physicians, American Medical Directors Association, and American Public Health Association;
- Specialty pharmacist organizations, such as the American Society of Health Systems Pharmacists, American College of Clinical Pharmacy, American Society of Consultant Pharmacists, Association of Managed Care Pharmacists, and National Community Pharmacists Association.

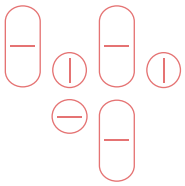
First steps of implementation

"DEPRESCRIBING CHAMPIONS" PROJECT

Changing institutional culture on a large scale is difficult, but having a few dedicated champions can make a significant impact on prescribing within institutions such as teaching hospitals and nursing homes. A first step would be an effort to identify potential "deprescribing champions," who are enthusiastic about raising awareness about deprescribing within their institutions. Having clinician leaders who are passionate about deprescribing has an influence on colleagues and trainees, and creates a positive feedback loop.

This project would identify interested individuals and provide them with support in terms of materials (such as the deprescribing "toolkit" mentioned previously) and opportunities for mentorship. The NICHE (Nurses Improving Care for Healthsystem Elders) Leadership Training program, which provides education for nurses to improve geriatric care, and the Lown Right Care Educators program, which gave chief residents resources to reduce overuse at their institutions, are examples of successful programs after which a "deprescribing champions" program could be modeled.[81,82]

> "When I come on service, my residents order fewer unnecessary blood tests and they do a medication review, because they know that I care about these things. Residents get to know the practice of the attending physician and they adapt."
>
> — **Dr. Emily McDonald**
> McGill University Health Centre



SOCIAL MEDIA CAMPAIGN

Many clinicians are now active on social media and listen to podcasts, and use these platforms to gain information on a regular basis. Creating a social media campaign to raise awareness of medication overload, focusing specifically on Twitter and the most popular medical podcasts, has the potential to reach tens of thousands of physicians at a lower cost than traditional broadcast media. A podcast series raising awareness about medication overload and deprescribing would be a good first step in this social media campaign. Reaching an audience of younger clinicians with the message of appropriate prescribing has the added benefit of a long-term return on investment from building good prescribing habits early.

Conclusion

Existing research on medication overload and deprescribing initiatives shows the importance of raising awareness among patients, clinicians, and members of the general public about the harms of medication overload, and the potential positive impact of awareness campaigns on deprescribing. While we have divided awareness initiatives into three recommendations based on the target audience, conducting awareness campaigns that target patients, clinicians, and families/caregivers at the same time is essential for having the greatest impact on medication overload. Significant resources and institutional and government partnerships will be necessary to carry out these campaigns to reach a wide audience. At the same time, there are also actionable first steps which can be pursued in the immediate future and build on previous successful campaigns.

CATEGORY 3:

Improve Information at the Point of Care

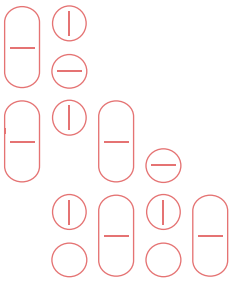
Information available to clinicians at the point of care (when clinicians and patients are making treatment decisions) makes it easy for them to prescribe but difficult to deprescribe. Clinical practice guidelines, which doctors and other prescribers rely on to make treatment decisions, include plenty of information about how to prescribe medications, but rarely provide information comparing benefits and harms of drugs, how long drugs should be continued, when doses should be lowered, and how medications should be deprescribed.[5,83] Step-by-step guidelines explaining how to deprescribe medications are often not available to clinicians at the time they most need it: during visits with patients.[18]

Inadequate reporting of adverse drug events to the U.S. Food and Drug Administration (FDA) gives clinicians and patients a skewed picture of the potential risks and benefits of medications, making it impossible for them to make truly informed decisions.[84] Additionally, electronic health record (EHR) systems allow for easy prescribing and prescription refills, but make it difficult to view all of the medications patients are taking and rarely include guidance for stopping medications.

The following recommendations address these key information gaps that lead to overprescribing and failure to deprescribe. Although knowledge gaps are commonly cited as a barrier to deprescribing, just providing information to clinicians is not sufficient to change prescribing norms. Better knowledge will translate into better prescribing and deprescribing only with corresponding efforts to raise awareness about the importance of reducing medication overload and system changes to coordinate care and give clinicians time to deprescribe.

Key takeaways for improving information at the point of care

- Creating and disseminating deprescribing guidelines is an effective and feasible way to overcome clinician knowledge gaps and facilitate deprescribing.
- Updating clinical practice guidelines to include information on careful prescribing and deprescribing is a top priority, but will require buy-in from clinician specialty groups.
- Aligning key stakeholders and reaching consensus on necessary guideline changes is an important first step toward updating clinical guidelines.
- Improvements in adverse drug event reporting would help prescribers make informed medication decisions. These changes will require government agency buy-in and broad support from health care professionals, patient advocates, and nonprofits.
- Making electronic health records interoperable and user friendly would help facilitate deprescribing.



Recommendation: Create and disseminate deprescribing guidelines to help clinicians learn how to safely deprescribe

We recommend creating new deprescribing guidelines and sharing existing deprescribing guidelines widely in hospitals, clinics, and all other health care settings to fill knowledge gaps and reduce barriers to deprescribing. Members of deprescribing networks as well as other researchers should be engaged in developing new guidelines, while government agencies and foundations could provide the funding necessary to create and disseminate guidelines.

Background

Even when clinicians want to reduce medication overload for their patients, a lack of information on how to deprescribe can be a barrier to action.[18,68] Without explicit guidance on when and how to deprescribe, clinicians may be fearful of causing harm by discontinuing a drug, tapering too quickly, or not choosing the right drugs to deprescribe first.[13,18,68] Providing clinicians with deprescribing guidelines and algorithms can help them overcome these fears and knowledge gaps, giving them greater confidence to counsel their patients, and develop and implement deprescribing plans.[85] Additionally, deprescribing guidelines can help reduce adverse events caused by discontinuing or tapering drugs too quickly, and can help clinicians better recognize and address withdrawal symptoms.

Key actors

Any groups developing new deprescribing guidelines should build on existing work, such as that of the Bruyère Research Institute in Ottawa, Ontario. The Bruyère Institute has developed a method and instruction manual for creating new deprescribing guidelines, and will be an important partner in this process. The Institute for Healthcare Improvement (IHI) and the Commonwealth Fund have previously partnered successfully with Canadian researchers to implement deprescribing initiatives in various health care settings, including deprescribing guidelines.[86] The World Health Organization (WHO), which launched a major initiative on Medications Without Harm, would also be a useful partner in developing and disseminating deprescribing guidelines internationally.

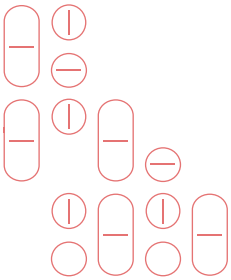
Estimates range from about $130,000 to $200,000 to create a deprescribing guideline for a particular medication, depending on the length of the process.[87] Government agencies, such as the Agency for Healthcare Research and Quality (AHRQ), and foundations interested in aging and patient safety could provide the funding necessary to undertake high-quality evidence reviews that could be used to create and disseminate guidelines. The International Program for U.S. Health Care System Innovation, created by the Commonwealth Fund and IHI, previously supported the creation of deprescribing guidelines as an "innovation case study."[86] The Commonwealth Fund, IHI, and other quality improvement or research organizations may be interested in continuing to support the creation and dissemination of guidelines.

Support from health care institutions and researchers will also be crucial for disseminating the guidelines, including:

- Clinical associations and professional societies such as the American Hospital Association, American Nurses Association, American Association of Nurse Practitioners, American Academy of Physician Assistants, American Medical Association, American Geriatrics Society, American Association of Family Physicians, and American College of Physicians;
- Deprescribing networks, such as the Canadian Deprescribing Network, Australian Deprescribing Network, and U.S. Deprescribing Research Network, as well as initiatives dedicated to reducing overuse, such as Choosing Wisely;
- Academic institutions, researchers, and thought leaders who work in the deprescribing field, such as those at the Bruyére Research Institute;
- Patient advocacy groups and patient safety groups;
- Medical schools and teaching hospitals;
- Hospitals, clinics, long-term care facilities, and other health care institutions that are interested in reducing medication overload;
- Public health agencies, such as WHO and the Centers for Disease Control and Prevention;
- Integrated health systems, such as Kaiser Permanente, which are developing innovations in medication management and care coordination.

Disseminating deprescribing guidelines

Several organizations have developed deprescribing guidelines that provide information on how to discontinue specific drug classes or deprescribe in specific patient populations. Existing deprescribing guidelines should be widely promoted to American clinicians, health care institutions, patients, caregivers, students and trainees, and anyone else who manages medications *(see Existing deprescribing guidelines and guidances)*. Clinicians should be able to access one-page deprescribing algorithms (the most popular form of guidelines) easily through electronic health records and/or readily available printed versions at their clinics and hospitals.[101]



Further steps toward making deprescribing guidelines more easily available would be reinstituting the National Guidelines Clearinghouse, or creating a similar repository of deprescribing guidelines online. Creation of an app that contains deprescribing guidelines would also be extremely useful for both clinicians and patients or caregivers, to take them through the deprescribing process step by step. Social media may also be an effective way to distribute deprescribing guidelines to clinicians.

Existing deprescribing guidelines and guidances

- The Bruyère Research Institute in Ottawa, Ontario has developed several guidelines for deprescribing certain medications, including proton pump inhibitors, benzodiazepines, antipsychotics, and diabetes medications.[88]
- The University of Sydney, in partnership with the Cognitive Decline Partnership Center and the Bruyére Institute, created a deprescribing guideline for cholinesterase inhibitors (often used to treat dementia).[88,89]
- The Scottish government's polypharmacy working group has developed guidelines for deprescribing benzodiazepines, antipsychotics in patients with dementia, and "z-drugs" (sleep medications).[90]
- Australian researchers created a guideline for deprescribing in advanced cancer patients to help reduce potentially inappropriate prescribing in advanced cancer patients.[91]
- The Veterans Affairs National Quality Scholars Fellowship Program and the Institute of Mental Health in Singapore have both developed several deprescribing guides for patients with mental illness.[92-94]
- The American Diabetes Association's Standard of Care for older adults includes deprescribing information.[95]
- The American Geriatrics Society and the UK's National Institute for Healthcare Excellence have developed guidelines for caring for older adults with chronic conditions, including information on prescribing and deprescribing.[96-98]
- The Oregon Geriatrics Society, with Kaiser Permanente, developed guidelines for deprescribing.[99]
- The CDC developed a guideline for deprescribing opioids for chronic pain.[100]

> "Clinicians have access to easy-to-use point-of-care guidance about how to prescribe medications. We should aim for similarly useful, easily accessible, and easy-to-use tools for deprescribing."
>
> — **Michael Steinman**
> Professor of Medicine, University of California, San Francisco

Creating new deprescribing guidelines

Although many existing deprescribing guidelines are available, more deprescribing guidelines for different classes of drugs are needed. No deprescribing guidelines are available for numerous drug classes, several of which should be high priorities for deprescribing. Examples include statins, urinary anticholinergic drugs, antidepressants, beta blockers and other antihypertensives, muscle relaxants, non-opioid pain medications, atypical antipsychotics, and antiplatelets.[102] Additionally, deprescribing guidelines for specific settings and patient groups, such as palliative care patients and older patients with limited life expectancy, are needed. Although supplements and vitamins may be lower priorities for deprescribing, these medications are potential "low-hanging fruit" for deprescribing to help relieve pill burden and drug costs; having a deprescribing guideline for supplements could facilitate this.

Additional research is needed for crafting new deprescribing guidelines for other drug classes. While a strong body of evidence shows that certain classes of drugs can be deprescribed safely and can even improve outcomes, more randomized controlled trials studying the outcomes of deprescribing would further reduce fear of deprescribing and empower clinicians to discontinue inappropriate medications.[44,101,103] For example, Kaiser Permanente has conducted deprescribing trials of diabetes drugs for older patients and made this data available to demonstrate the outcomes of deprescribing in this population.[40] However, the need for more research on deprescribing should not delay the development and publication of new guideline content.

The Bruyère Research Institute offers a step-by-step instruction manual for creating new deprescribing guidelines using the Grading of Recommendations Assessment Development and Evaluation (GRADE) system, which ensures a high level of rigor to the guideline evidence.[87,104] Guideline creators should also collaborate with institutions currently conducting research on deprescribing specific medication classes, to make sure they have the best available evidence when crafting the guideline.[101]

Customizing deprescribing guidelines for different care settings

There are unique opportunities and challenges involved in implementing deprescribing guidelines in different care settings. Most deprescribing tools are targeted at community-dwelling adults, but few have been validated within the primary care setting.[94] In pilot tests of guidelines, some primary care sites found it challenging to implement guidelines because of competing clinician priorities and limited time with patients during visits.[86] However, primary care clinicians often have strong long-term relationships with patients, which creates opportunities for deprescribing in this setting.

Tests of deprescribing guidelines have been found to be more successful in long-term care (LTC) facilities than in community clinics, because all members of the care team are within the same institution, the patient's full medication list can be obtained, and patients can be monitored to ensure that medication changes have actually been implemented.[86] Additionally, tools to discontinue medications specifically for those in residential care are available.[15,30,31,105]

In the hospital setting, members of the care team are all within one institution, and can coordinate care together, which should make implementing deprescribing guidelines easier. However, within a hospital setting, solving the patient's acute problems is often a higher priority than reviewing their medication lists, and thus care teams do not always have time to engage in the deprescribing process. Successful programs to implement deprescribing generally occur in specific situations in the hospital setting, such as when a patient is admitted for a fall, or upon discharge to an LTC facility.[28,106,107]

First steps of implementation

SPECIALTY GUIDELINE DATABASE

For maximum impact, funders and researchers could focus on deprescribing guidelines for medicines within a specialty or class of medication (cardiac medications, diabetes drugs, or psychiatric drugs, for example). This would involve compiling guidelines that currently exist for drugs in that specialty and creating additional guidelines. Engaging specialists and primary care clinicians through the guideline creation and compilation process is essential to 1) ensure buy-in from colleagues for the guideline results; 2) support in disseminating these guidelines, and 3) develop lasting relationships with specialists and primary care clinicians in the larger deprescribing movement.

These guidelines could be advertised and promoted through professional societies, journals, and conferences, as a targeted approach to reach the clinicians who prescribe these drugs regularly—and should be deprescribing them. Deprescribing guidelines should be part of the larger effort to reduce medication overload, including educational initiatives around geriatric care and shared decision making, and providing tools for better communication across the care team and care settings.

Recommendation: Ensure that clinical practice guidelines include information necessary for patient-centered prescribing and deprescribing

We recommend that existing and future clinical practice guidelines be evaluated and edited to ensure that they promote careful prescribing, shared decision making, and avoiding medication overload for older adults. This will require buy-in from professional societies and other guideline creators, as well as those organizations that publish or disseminate guidelines.

Background

When clinicians look for information to help them with treatment decisions, they are faced with a barrage of clinical practice guidelines. Professional societies, research organizations, and government agencies all develop guidelines for treating various medical conditions, and sometimes their recommendations conflict. While many high-quality clinical practice guidelines are available, others are based on low-quality evidence, or no clinical trial evidence at all, and are plagued by financial conflicts of interest among the guideline creators.[108,109] Clinical practice guidelines present an opportunity to address medication overload.[110] Existing guidelines often exacerbate medication overload in a variety of ways:[5,18,83,111]

- Guidelines often recommend medication rather than nonpharmacological options as the first line of treatment;
- Many guideline recommendations are based on clinical trials that did not include older patients with multiple chronic conditions, although these guidelines are often applied to these patients;
- Guidelines do not generally include information on when and how drugs should be discontinued, or how to reduce doses gradually.

Following guidelines often results in clinicians prescribing multiple different drugs to treat a single condition, without any clinician taking into account patients' other conditions and medications or taking responsibility to ensure that doses are correct for older patients.[111]

Health care professionals may feel compelled to follow guidelines, even when they know the guidelines are not appropriate for the individual patient. Insurers use clinical targets in guidelines, such as optimal blood pressure readings or blood sugar levels, to set performance standards for physicians and other prescribers.[112] These performance standards are linked to payment and can push health care professionals to prescribe additional drugs, or higher doses, to achieve the clinical goal—even when that goal runs counter to that patient's quality of life, safety, or preferences.[113] In some cases, efforts to improve medication adherence based on guidelines can get in the way of deprescribing, even when deprescribing would be better for the patient. For example, health plans or pharmacy benefit managers may send automatic refills of medications to patients even after they have been deprescribed, based on the health plan's medication adherence goals.

Adding deprescribing information to clinical practice guidelines and alternative recommendations, particularly for older patients, could have a significant impact on how clinicians practice and what they view as the standard of care.

Guideline content changes

The following content should be included in clinical practice guidelines whenever appropriate:[5,101,111,114]

- More nuanced treatment recommendations for older patients (age 65 and over), for frail older adults, and for those with multiple chronic conditions. This may include alternative clinical targets or thresholds for conditions, such as blood sugar, blood pressure, and other key indicators;
- Recommendations for shared decision making and a full discussion of the magnitude of both benefits and harms of medications;
- Lower starting doses than typically recommended by manufacturers for medications, or alternative medications that are less likely to cause adverse drug events;
- Clear warnings about potential side effects of medications, as well as potential drug-drug interactions and drug-disease interactions;
- Consideration of the total burden of multiple medications when evaluating the benefits and harms of each medication;
- Information on the drug's "life cycle"—when stopping a drug should be considered, or when its benefits and harms should be reevaluated for an individual patient;
- Information on how to deprescribe or taper a drug safely, and how to monitor patients during discontinuation;
- Warnings when a medication has not been tested for long-term effectiveness and safety, or when a medication has not been tested in a certain age group; and
- Information about non-pharmacological treatments.

All content added to guidelines should be based on the best evidence available. Where clinical trial evidence does not exist, such as for the long-term effectiveness of some medications or safety in older adults, comments should be included to highlight the lack of research on this subject. As professional societies begin the process of amending guidelines, academic institutions and research organizations such as the National Institutes of Health should conduct research to fill in these evidence gaps.

Key actors

Specialty and primary care societies and other clinical organizations must be involved in addressing the current state of guidelines and could potentially fund efforts to improve prescribing through better guidelines. Support from clinical organizations has led to some positive changes in guideline development; for example, the American Diabetes Association added an addendum to their guidelines outlining recommendations specifically for older people with diabetes.[95] Buy-in from leading independent researchers, clinicians, and academics is also important for changing clinical guidelines.

Other institutions and organizations should encourage professional societies to adjust or add to their guidelines. Journals that publish guidelines could facilitate changes by requiring guidelines they publish to include essential information for careful prescribing and deprescribing.[101]

Patient advocacy groups, specifically those interested in aging and patient safety, could lobby specialty groups to consider changes.

Organizations that measure quality based on adherence to guidelines, such as the Centers for Medicare and Medicaid Services (CMS), the National Committee for Quality Assurance (NCQA), and AHRQ, should support guidelines that advocate an individualized approach to deprescribing and recognize harm from medication overload. For example, CMS is planning to add new measures of polypharmacy to its star rating system that would reduce hospitals' star ratings for high rates of "polypharmacy of anticholinergic drugs" and "polypharmacy of central nervous system medications." The two polypharmacy measures were developed by the Pharmacy Quality Alliance. These measures could spur professional societies and health plans to adjust clinical practice guidelines to avoid medication overload.[115]

Involving primary care clinicians as well as patient groups in specialty guideline development will be essential for ensuring that guideline recommendations fit a model of holistic, patient-centered care.

Primary care clinicians do not always have input in the content of guidelines developed by professional societies, although they are often expected to follow these guidelines. Involving primary care clinicians as well as patient groups in specialty guideline development will be essential for ensuring that guideline recommendations fit a model of holistic, patient-centered care. Primary care guidelines also play a key role in primary care practice.[98] Additionally, research to fill in evidence gaps in guideline content will be critical, as will efforts to reduce the biasing effect of conflicts of interest among guideline creators.[116,117]

First steps of implementation

CONVENING OF SPECIALTY SOCIETY LEADERS

A first step to receiving support from professional societies could be to convene leaders of key specialty societies to discuss what content should be modified within clinical practice guidelines to reduce medication overload. The meeting would be both educational, to present specialists with information on why this content is necessary, and interactive, including group discussions about priorities for this content. Although the meeting would be targeted at specialty society leaders, other stakeholders such as primary care physicians, geriatricians, and patient groups should be involved in planning the meeting and invited to attend, to offer their perspective on guidelines.

This convening would also be an opportunity to identify further research needed for guideline content on appropriate prescribing and deprescribing. Organizations such as CMS, NCQA, and AHRQ would have an interest in the outcomes of such a meeting, so they could be sources of funding for an initial gathering. Requiring that attendees have no financial conflicts of interest would be optimal to help overcome pharmaceutical industry influence on guideline committees.

DELPHI SURVEY TO SOLIDIFY GUIDELINE CHANGES

In addition to an in-person meeting, a virtual survey could be sent to stakeholders across the country to identify the top priorities for guideline changes to avoid medication overload. This survey should target primary care clinicians, geriatricians, patients, and caregivers, whose voices are rarely heard in the guideline creation process. This

How electronic health records could dramatically reduce medication overload

Electronic health records (EHRs) have the potential for providing information that could help to reduce medication overload. Unfortunately, rather than improve the situation, EHRs have contributed to the problem and hindered efforts to remedy it. Electronic prescription ordering systems, particularly in the outpatient setting, are prone to multiple failures that often lead to inappropriate prescribing, and make it difficult for clinicians to deprescribe.

EHRs currently promote inappropriate or unsafe prescribing in three principal ways: First, they contribute to the fragmentation of care. A clinician writing a new prescription for a patient frequently duplicates a drug prescribed by another clinician. This occurs because EHR platforms do not communicate (they are not "interoperable"), and thus prescribers are unaware that the patient is already taking one or more medications from the same drug class.[118] Second, few systems make it easy for clinicians to include the indication in the order (the condition the patient has and the reason for the prescription), leaving clinicians to guess why a drug was ordered in the first place. Third, when a drug has been deprescribed, that information is rarely conveyed to the patient's pharmacy. Many pharmacists automatically refill prescriptions and call the patient to pick them up, leading patients to restart medications that were deprescribed—even when the medication has already caused an adverse drug event.

In addition, EHRs also hinder effective prescription checkups and deprescribing. With no unified medication list, clinicians may not recognize duplications or excessive dosages, or see a need to reduce medication overload.[119] As Harvard Medical School professor Gordon Schiff and colleagues write, "The absence of a single unified 'source of truth' about patients' current medications causes errors and inefficiencies, with reported discrepancy rates of 25–70 percent."[120]

Some of the ways in which EHRs promote medication overload and hinder effective deprescribing will be ameliorated by standardizing software applications, as the Department of Health and Human Services has mandated for all Medicare providers by 2020. Even without full interoperability, a single, shared medication list, which would reside in a national, protected database, would ease the enormous effort involved for clinicians to reconcile medication lists. A shared list would also allow patients to know what drugs they are on, and why they were prescribed. While there will inevitably be concerns about data privacy, a single, secure site could provide considerably more protection than current fragmented, underfunded efforts to store medication data.

Until there is full interoperability or a centralized, shared medication list, other refinements to existing EHRs would reduce medication overload. For example, information that a prescription has been discontinued can be conveyed automatically to a patient's pharmacy through such programs as CancelRx, an electronic messaging system that communicates when a medication has been stopped. EHRs can readily be reconfigured to allow clinicians to include the indication with the prescription order. This would not only reduce duplication of drugs and promote effective deprescribing, it would also improve medication adherence, as patients are more likely to continue taking a drug when they know what it is for.[120]

In the future, "clinical decision support" features in EHRs could help reduce medication errors by checking for allergies and duplication of drugs, and providing advanced dosing guidance.[121,122] EHRs could also help clinicians recommend non-drug alternatives, such as changes in diet, physical therapy, and cognitive behavioral therapy. Above all, EHRs could help clinicians use the essential principles of conservative prescribing, such as starting treatment with only one drug at a time, and watching for effects, and considering the long-term impact of each new medication.[123] While there have been several task forces and calls for recommendations to make EHRs safer and more usable, political barriers to action remain.[122,124] Without these modifications, EHRs will continue to contribute to the burden of medications borne by older patients. For more information about how improved EHRs could reduce medication overload, see References #118–124.

research would build on previous Delphi surveys that have measured clinicians' deprescribing priorities for new deprescribing guidelines[102] and outcomes that matter most for patients with multiple chronic conditions and their caregivers.[111]

Government organizations, patient advocacy groups, and deprescribing groups (such as the new U.S. Deprescribing Research Network) could provide funding for this survey. Such a project would also demonstrate support among primary care clinicians and geriatricians for guideline changes, which would put pressure on professional societies to make these changes.

Recommendation: Develop a more comprehensive, accurate, and timely adverse drug event reporting system

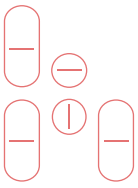
We recommend creating initiatives to address the pressing problems with adverse drug event (ADE) reporting, including low reporting rates, data variability, and low accessibility. This will take coordinated action by government agencies that manage ADE reporting databases, clinician professional societies, and patient groups. An important first step to changing the adverse drug event reporting system is for the U.S. Food and Drug Administration (FDA), which monitors ADEs, to partner with a nonprofit convening and research institution such as the National Academy of Medicine (formerly the Institute of Medicine) to revisit issues in the ADE reporting system and create a new plan of action.

Background

The lack of accurate information about drug side effects (especially for newly approved drugs) contributes to medication overload. Neither clinicians nor patients have enough information at the point of care to assess the risk of drug side effects, in part because the ADE reporting is flawed and incomplete. The FDA's increased use of fast-track approval for new drugs exacerbates this problem, because potential safety issues are not often detected in clinical trials before approval.[125]

Low rates of ADE reporting make it more difficult to prevent future ADEs. Without accurate discharge information and coding, patients can be represcribed the same culprit drug when out of the hospital. In a Canadian study that tracked ADEs at three hospitals, one-third of the adverse drug events they tracked were repeat ADEs.[126] Without accurate reporting, the extent of these events is unknown, making it harder to address the problem.

> "Fixing our adverse drug event reporting system would reduce the 'detective work' clinicians and patients have to do to find out what could be causing certain side effects."
>
> — **Sharon Levine, MD**
> Board of Directors, School of Medicine, Kaiser Permanente



The FDA keeps track of adverse drug events through the Federal Adverse Event Reporting System (FAERS). Health care professionals and patients may report adverse drug events to the FDA or to the manufacturer. While adverse drug event reporting is voluntary for clinicians and patients, manufacturers are required to share reports they receive with the FDA. The FDA issues regular updates and uses FAERS to look for new safety concerns and publish safety alerts.[127]

Only 1 percent of suspected serious adverse drug events in the U.S. are reported to the FDA.

The rate at which adverse drug events are reported is notoriously low. Worldwide, it is estimated that only 6 percent of ADEs that occur are reported.[128] Studies of voluntary reporting by health professionals estimate that only 1 percent of suspected serious ADEs in the U.S. are reported to the FDA.[129] Another study found that pharmaceutical companies fail to report about 10 percent of all serious ADEs to the FDA within the 15-day required time period.[128-130]

A few of the reasons why reporting rates of ADEs are low among health care professionals are: clinicians cannot always determine what caused an ADE (especially in the case of polypharmacy) and do not often have the time to report them; reporting systems are not integrated into electronic health records; and the process for reporting ADEs is not well known.[129] While patients are motivated to report ADEs, they may not be aware of how and where to do so.[131]

The FDA's Sentinel initiative is a new program designed to identify potential safety issues with approved medications, by proactively analyzing administrative data and insurance claims. Sentinel was launched in 2007 to bring together data from multiple health care systems into one place, and was fully implemented in 2016. Over the next five years, the FDA is taking steps to expand Sentinel to use even more real-world data, enhance the program's analytic capabilities, and make Sentinel a sustainable national resource for monitoring medication safety. However, the FDA acknowledges that it has limited resources to achieve these goals.[132]

Key actors

The FDA is central to improving ADE reporting. Any policy or program changes at the agency will require proactive FDA leadership, and, likely, additional funding from Congress or industry. Other organizations involved in efforts to improve collection of ADEs include:

- The World Health Organization, which has already conducted international initiatives to improve ADE reporting;
- National Coordinating Council for Medication Error Reporting and Prevention;
- Institute for Safe Medication Practices;
- Safe Use Initiative; and
- Quality improvement organizations.

Clinician specialty groups and patient advocacy groups can also play an important role in raising awareness about the importance of ADE reporting. Additionally, electronic health record (EHR) vendors and innovators must be involved in streamlining the reporting process.

First steps of implementation

The current inadequacies of the ADE reporting system are well known; however, a clear path to addressing these systemic problems remains elusive. A first step could be creating a group of interested clinicians, researchers, and patients to partner with the FDA and a nonprofit convening and research institution such as the National Academy of Medicine to address gaps in the ADE reporting system. In 2005, the NAM held a workshop to discuss issues in adverse drug event reporting, including recommendations for consumer outreach, drug labeling, and research to improve ADE reporting.[133]

Given the increase in ADEs over the past decade, as well as developments in the FDA's reporting systems such as Sentinel, it is critical to return to this issue with a new, independent or federally funded panel. This convening should bring together multiple stakeholders, including government agencies, quality improvement organizations, EHR vendors, and clinician and patient groups, to identify top priorities for change in ADE reporting and create a plan of action to address them.

Conclusion

Clinicians and patients often lack information at the point of care necessary to make informed decisions to prescribe, or deprescribe, medications. Some of the information gaps are more easily filled than others; for example, deprescribing guidelines for certain drug classes are already available and only need to be disseminated, while deciphering side effect risks from our incomplete and confusing ADE reporting system will take years to fix. For all of these recommendations, stakeholder engagement is key. To change existing clinical practice guidelines, professional societies and clinicians who develop the guidelines must be involved. Federal agency buy-in will be necessary for changes to ADE reporting to ensure more accurate, complete, and timely information about ADEs. Deprescribing networks, which have valuable information about how to move from developing deprescribing guidelines to actual deprescribing, must also be engaged.

CATEGORY 4:

Educate and Train Health Professionals to Reduce Medication Overload

From undergraduate training, through residencies and continuing education (CE), nowhere is learning about the harms of medication overload a mandated part of the curriculum for most clinicians. The crucial skills of how to analyze and evaluate drug research trials, assess the harms and benefits of medications before prescribing, proactively monitor for and avoid medication overload, and determine how and when to pause or stop medications are not adequately emphasized in most health professional curricula or after graduation.

With the exception of geriatric medicine rotations, students and trainees get little instruction in how to adjust treatment for the needs of older adults—for example, using lower doses or watching for side effects that can masquerade as disease symptoms. As a result, clinicians may overprescribe for older patients, or indeed any patient with multiple chronic illnesses, and once that has occurred they often feel unprepared or unqualified to discontinue medications.[12,134,135]

Making careful prescribing and deprescribing a greater priority in medical education and training will be essential for reducing medication overload in the long term. These recommendations address needed changes to undergraduate, graduate (residency), and post-graduate/continuing education for health professionals.

Key takeaways for education and training

- Health professions training programs should put more emphasis on geriatric care, critical thinking around medication use, the importance of shared decision making, recognizing medication overload, and how to safely deprescribe medications.
- Changes need to be made in all health professional schools where the prescribing and monitoring of medications is an important part of the curriculum.
- Case-based learning and experiential training are important methods for students to learn prescribing and deprescribing skills.
- Continuing education on careful prescribing and deprescribing in the form of in-person seminars, case conferences, online modules, academic detailing, and podcasts should be made available to all health professions who prescribe or recommend medications.

Recommendation: Enhance health professions school curricula to teach clinical trainees proficiency in careful prescribing and deprescribing

We recommend enhancing clinical and allied health professions school curricula to include more information about patient-centered prescribing and deprescribing. To successfully implement these changes, educational institutions, senior clinicians and instructors, accreditation organizations, licensing and testing organizations will need to participate. To design the necessary changes and persuade teaching institutions to adopt them, it is important to partner with the Association of American Medical Colleges, student organizations, and professional societies. While the process of changing curriculum standards nationally is challenging, piloting programs at individual institutions can validate curricula and evaluate these changes for scalability.

Background

In most health professional schools in the U.S., education and training around avoiding medication overload and deprescribing is inadequate.[101] For medical, physician assistant, pharmacy, and nursing students, prescribing is often taught as a technical skill (how to apply guidelines) rather than a process that involves tailoring prescribing to the unique circumstances of individual patients.[135] Students learn that there are "good drugs" and "bad drugs," not that a certain drug may be appropriate for some patients at some point in their lives but not at other times, or that non-pharmacological treatments may be the preferred option.[135] The potential risks of medications (especially over-the-counter medications, which are often seen by patients as harmless), when drugs should be stopped, and the process of deprescribing are underemphasized in most clinical training. Students also need grounding in how drug research is conducted and applied.

Pharmacy students, though they may have much more education around the appropriate use and side effects of medications, do not receive sufficient training in how to have conversations with patients about prescribing and communicating when a drug should be stopped.[135] All health trainees who will one day prescribe medications must be trained to recognize the importance of careful prescribing and deprescribing.

Curricula changes

We recommend that the following key topics be added to health professional curricula to improve trainees' knowledge and skills around prescribing. Trainees should demonstrate that they know how to:

- Find and use trustworthy assessments of clinical evidence around medication benefits and harms (e.g., absolute risk, number needed to treat, and more);
- Understand the prevalence and magnitude of side effects associated with commonly prescribed medications;
- Deliver age-friendly health care incorporating the 4Ms of age-friendly health systems: Medication, Mentation, Mobility, and what Matters to the patient. This includes being able to have shared decision making conversations with patients and family members about medications;[136]
- Communicate concerns regarding another physician's prescription with their patient and with the prescribing physician;
- Conduct prescription checkups and discontinue drugs when appropriate;
- Identify low-value medications that may not add benefit for patients and medications that are more likely to cause harm in certain populations;
- Recognize the need for different prescribing and dosing for older patients with multiple chronic conditions;
- Recognize medications that once provided benefit to the patient and may no longer provide benefit;
- Offer non-medication treatments when appropriate;
- Access deprescribing tools and guidelines; and
- Recognize and report adverse drug events, drug-drug interactions, and drug-disease interactions.

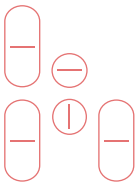
> Students need opportunities to learn prescribing and deprescribing skills in real-world settings.

Case-based learning is an important educational tool, which instructors can use to illustrate common scenarios in which medication overload could be avoided. Schools could partner with patient advocates to have them share their stories as an introduction to deprescribing. Hearing patients relate their experiences with medication overload and deprescribing can help trainees make an emotional connection to the topic, identify ways in which they can prevent medication overload, and recognize when they should consider deprescribing.

Much of health professional training is experiential, or taught through doing. Most schools now incorporate clinical experience from the beginning of undergraduate education to allow students to use what they have learned in a clinical setting. There should be opportunities for students to learn prescribing and deprescribing skills "in the real world."[135] For example, the Yale Initiative to Minimize Pharmaceutical Risk in Older Veterans (IMPROVE) polypharmacy clinic improved prescribing knowledge and skills in residents and nurse practitioners through a combination of lectures and clinic visits.[137]

Similarly, the University of British Columbia Faculty of Pharmaceutical Sciences runs a pharmacy clinic for pharmacy students. Much of this work involves medication overload cases, teaching students both the deprescribing process and how to communicate with patients.[138] Medical, physician assistant, nursing, and pharmacy schools should assess students on their understanding of the topics mentioned above, to emphasize their importance.

> "Learning how to approach another physician regarding overprescribing of their common patient without putting that professional on the defensive is a difficult skill, but so very necessary."
>
> **—Gayle Esposito**
> Patient Safety Advocate, Mothers Against Medical Error



Key actors

Implementing these changes will require support from educational institutions and organizations, including:

- The Association of American Medical Colleges, which oversees undergraduate medical education curricula and institutions;
- Organizations representing medical students and other health professionals in training, such as the American Medical Student Association, Academy of Student Pharmacists, Committee of Interns and Residents, and National Student Nurses' Association;
- Accreditation Council for Graduate Medical Education, which evaluates medical residency and internship programs;
- The Federation of State Medical Boards, which supports America's state medical boards in licensing, disciplining, and regulating physicians and other health care professionals;
- The National Board of Medical Examiners, which creates and administers the medical licensing exam;
- Accreditation and education groups for other health professionals, such as the American Association of Colleges of Nursing and Accreditation Council for Pharmacy Education;
- The Advisory Committee on Interdisciplinary, Community-Based Linkages, which developed recommendations for integrating interprofessional, age-friendly care into health professions curricula; and
- Quality education initiatives such as the Quality and Safety Education for Nurses Institute, which proposes targets for nursing education programs and leads curriculum pilot programs that focus on safety and quality competencies.

Support from clinician groups, specialty organizations, and deprescribing networks will also be critical for making the case to educational institutions for updating curricula.

First steps of implementation

DEPRESCRIBING CURRICULUM PILOT

The first steps for implementing the recommended changes will be to develop a framework for incorporating patient-centered prescribing and deprescribing competencies into curricula, and then to pilot this framework at institutions interested in including these competencies. Piloting new prescribing and deprescribing curricula would demonstrate the benefits of teaching these skills in school, identify best practices for teaching these topics, and troubleshoot potential challenges in implementation. Clinical schools that focus on experiential learning, shared decision making, and interprofessional teamwork would be ideal for piloting curriculum changes.

PHARMACY SCHOOL DEPRESCRIBING CONCENTRATION

Many students use school as an opportunity to learn about different specialties, and consider which specialty might be right for them. While appropriate prescribing and deprescribing are competencies that all clinicians must master, offering pharmacy students the opportunity to "specialize" in geriatric polypharmacy would cultivate more interest in the topic of deprescribing and give it more prestige, while providing students with the substantial knowledge and experience it takes to become an expert. A deprescribing "concentration" or "specialty" would also be an attractive option for pharmacy students who want to work in geriatric or primary care clinical settings.

Recommendation: Incorporate patient-centered prescribing and deprescribing into continuing education (CE) curricula and develop new CE content

We recommend integrating information on appropriate prescribing and deprescribing into continuing education (CE) curricula, and, when necessary, developing new CE content in the form of in-person seminars, case conferences, online modules, academic detailing, and podcasts. Support from the Accreditation Council for Continuing Medical Education, the American Nurses Credentialing Center, the Accreditation Council for Pharmacy Education, and other accreditation bodies for health professionals will be required to create new CE content and programs. Buy-in from professional societies and state licensing boards will also be important for disseminating these materials.

Background

CE updates clinicians on the latest research and sharpens their skills. All clinicians must spend a certain number of hours per year (or two) on CE to maintain their licenses (the number of credits required varies by state). For practicing clinicians, who likely did not receive training in deprescribing skills in school, CE is an opportunity to learn. In recent years, some organizations have begun developing and disseminating CE content about careful prescribing and deprescribing, indicating a promising trend in continuing education.

Types of continuing education and key actors

CE activities can take many different forms, including in-person seminars and case conferences, training and information available online, and more. Research has shown that information presented through multiple methods and multiple exposures is often necessary for retention, and learning is enhanced when the education is interactive.[139] Educational information on appropriate prescribing and deprescribing should be incorporated into existing CE activities related to medication use.

New CE activities may also need to be created, particularly in cases where existing CE is pharma-funded. Development of any new CE activities will require accreditation from various bodies, such as the Accreditation Council for Continuing Medical Education. Other important partnerships will depend on the type of CE being created.

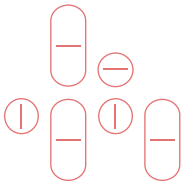
Some of the most important types of CE to consider are:

COURSES

CE courses are typically in-person seminars or training, including conferences. In 2018, about 85,000 in-person CE courses were available for health care professionals, making them the most popular form of CE.[140] Developing CE seminars for conferences will require partnerships with the professional societies that run these conferences. In-person training outside of conferences will require working with health care institutions to create and implement the curricula. Patient advocates who have experienced harm from medication overload should be included as participants to share their stories. Any seminars or trainings should be interactive and expose participants to key messages in multiple ways.

And crucially, CE events must be free of pharmaceutical industry funding, to prevent industry from co-opting the message of careful prescribing. PharmedOUT, a Georgetown University Medical Center initiative that provides pharma-free CE content and other teaching tools, could be a key partner for disseminating CE on careful prescribing.

> "Any continuing education event funded by pharma is a marketing event, not an educational event."
>
> **—Alan Cassels**
> Communications Director, Therapeutics Initiative
> University of British Columbia



ONLINE MEETINGS AND MATERIALS

Although in-person courses are still the most popular form of CE, online CE activities are rapidly growing. In 2018, 54,000 CE activities could be found online, including live webinars, online modules, podcasts, and more.[140] Research has shown that CE delivered online is effective at promoting evidence-based decision making for clinicians, especially if the material is interactive.[139,141] Clinicians also value the convenience and cost-effectiveness of CE available online. Some clinical journals, such as the *American Family Physician* (*AFP*), have created online modules on deprescribing for CE; early adopters such as *AFP* would make good partners for dissemination. Partnerships with clinician thought leaders, particularly those active on social media, will also be helpful in disseminating online CE.

SCHEDULED SERIES

Scheduled series are in-person courses planned in multiple ongoing sessions, such as Grand Rounds or Morbidity and Mortality conferences. In 2018, institutions sponsored about 24,000 of these CE activities.[140] Scheduled series are convenient for clinicians because they occur within their institution; they are in-person and interactive, which helps retention; and they occur regularly, which gives clinicians multiple exposures to the information. Case-based learning creates an emotional connection through patient stories. These types of events would allow clinicians to identify ways in which they can prevent medication overload and become more proficient in deprescribing. These CE activities are generally conducted on an institutional level, so developing scheduled series will require partnering with health care institutions or clinician leaders.

In-person courses are the most popular form of continuing education, followed by online courses and scheduled series.

ACADEMIC DETAILING

Academic detailing is a program in which a representative from a public health agency or academic institution visits clinicians in person to discuss new research and provide educational materials. This educational intervention has been shown to reduce inappropriate prescribing.[142] In one study of academic detailing intended to reduce prescribing of three drug groups, physicians who received personal educational visits by clinical pharmacists along with a series of mailed materials reduced their prescribing of the target drugs by 14 percent, compared to pharmacists in a control group.[143]

However, evaluating the cost-effectiveness of academic detailing has had mixed results. Academic detailing has been shown to reduce overprescribing of expensive medications, but one-on-one meetings with clinicians are costly, and multiple visits are often needed to send a strong message.[144,145] Implementing academic detailing will require partnerships with public health agencies and academic institutions to secure funding and hire teachers.

First steps of implementation

The first steps toward incorporating new content into CE or implementing a new CE program will be to partner with clinicians and researchers to develop content, test the modules, and have them approved or accredited by the appropriate bodies. Next steps will be partnering with health care institutions, professional societies, or clinician thought leaders to make this CE available at conferences, health care institutions, and online. The following are examples of new CE projects that could be implemented within a relatively short timeline.

DEPRESCRIBING "GRAND ROUNDS"

Grand Rounds are regular lectures that take place regularly at hospitals and other health care institutions. Many health care institutions use Grand Rounds to highlight a systemic issue within the health care system more broadly, such as overuse, misdiagnosis, or health reform. Grand Rounds are also an opportunity for clinicians to leave their specialty and professional silos and interact around a common problem. Some schools, such as the Dell Medical School at the University of Texas, have successfully conducted Grand Rounds explicitly focused on deprescribing.[146]

PODCAST SERIES ON DEPRESCRIBING

Podcasts have become an increasingly popular form of education for clinicians. A podcast series that delves into the details of how to deprescribe classes of medications would be a valuable tool. Such a series could include discussions between clinicians and patients about how to overcome communication barriers to deprescribing. Developing this series as part of an existing health care podcast would ensure a high level of listenership. Collaborating with thought leaders in the space would increase dissemination as well.

Conclusion

Clinical education and continuing education have historically not provided sufficient training for students and clinicians to learn how to prescribe carefully and deprescribe. More emphasis should be placed on geriatric care and the potential harms of medication overload, while giving students and clinicians real-world opportunities to practice shared decision making conversations about medications. These educational opportunities can come in many forms, including case-based learning, experiential learning, conference seminars, and online modules and social media. Giving clinicians and students greater competency in patient-centered prescribing, shared decision making, communicating uncertainty, and deprescribing will strengthen their ability to recognize medication overload, enhance their skills as clinicians and caregivers, and enable them to serve their patients by avoiding the harms associated with medication overload and adverse drug events.

CATEGORY 5:

Reduce Industry Influence

Pharmaceutical industry marketing plays a powerful role in driving medication overload. Direct-to-consumer advertising (DTCA), on which drug companies spend an estimated $6 billion a year, is perhaps the most obvious way the industry perpetuates the idea of a "pill for every ill."[10] These advertisements heavily promote the benefits of costly medications while downplaying harms by using long, fast-spoken (or small-print) descriptions of side effects. In one study of drug advertisements aired on television in 2015 and 2016, none included a quantitative presentation of the risks of harm.[147] While many drug advertisements highlight specific drugs, others redefine normal conditions as illnesses requiring medical treatment, a practice known as "medicalization," or "disease mongering."[148]

The drug industry markets even more heavily to health care professionals, spending more than $20 billion a year on face-to-face promotion, free samples, promotional meetings, continuing medical education, promoting expensive branded products over cheaper generics, and other marketing activities. Research demonstrates that this marketing increases unnecessary and inappropriate prescribing.[149] In addition, the industry influences what clinicians and patients know about drugs through funding of clinical trials, the results of which are often biased in favor of a sponsor's product.[150] Finally, clinical practice guidelines, which doctors and other prescribers turn to for guidance in treatment decisions, are often written by experts with financial ties to industry.[116]

This category of the action plan details recommendations to counter directly the negative influence of pharmaceutical marketing on quality medication use. However, it should be noted that the pharmaceutical industry influences nearly every other category as well, from public awareness to clinical practice guidelines to medical education. Changing America's culture of prescribing will require efforts to reduce the pharmaceutical industry's influence on clinicians, patients, and families.

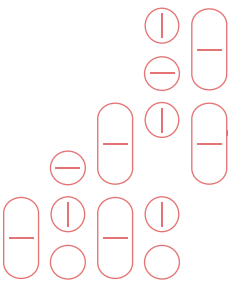
Key takeaways for reducing industry influence

- To reduce the impact of pharmaceutical sales rep visits, we recommend policies to limit pharmaceutical industry detailing on an institutional level, eliminate the drug samples loophole from the Physician Sunshine Act, require better regulation of drug samples, and use peer pressure to limit drug rep visits.
- To counter the influence of direct-to-consumer advertising, we recommend legislation to ban direct-to-consumer advertising (DTCA) or remove the DTCA federal tax break, implementation of stricter content requirements to include more useful effectiveness and safety information in ads, and public campaigns demanding that regulators remove particularly misleading ads.

Recommendation: Stop or limit pharmaceutical industry marketing to clinicians

"Detailing" refers to visits from pharmaceutical sales representatives (or "reps"), who provide clinicians and other staff with information about medications. These visits often include free samples of medications and a meal for the office or branded merchandise (pens, coffee mugs, etc.). Although these gifts seem small, a large body of research shows that visits from drug reps significantly influence prescribing.[151] Doctors who receive drug samples are more likely to prescribe expensive brand-name drugs, even when cheaper options are available in generic form or over the counter.[152]

Drug samples are particularly effective in changing clinicians' prescribing habits. According to self-reported surveys, doctors regularly provide patients with samples, most commonly to avoid cost to uninsured patients, even when the drug sample differs from the clinician's first choice for treatment.[153] Free drug samples almost always lead to a full prescription of the new, expensive brand-name drug, which can, in the long run, increase patients' out-of-pocket costs and expose them to medications whose side effects are not yet well characterized.[154,155]



> "The sense of obligation incurred by receipt of even such small gifts likely cements the pseudo-social bond between physicians and pharmaceutical industry representatives. The power of this bond should not be underestimated."
>
> **—Dr. Timothy Lahey**
> Professor and Clinical Ethics Committee Chair
> Dartmouth-Hitchcock Medical Center[154]

While a nationwide ban on pharmaceutical industry sales rep visits would likely have the most impact, it is also unlikely to survive court challenges. However, other, easier-to-implement institutional and government policies could counter the effect of drug representatives to reduce medication overload.

Limit pharmaceutical detailing on an institutional level

While visits from pharmaceutical sales reps are widely accepted in the medical community, some health care institutions have placed limits on these visits by banning gifts or drug samples from drug reps and restricting their access to facilities at certain times or locations. Other institutions have adopted strict "no-see" policies, banning detailing entirely. Notably, the Veterans Health Administration (VA) has denied sales reps access to all "patient care areas" and requires reps to make appointments in advance, rather than giving them unrestricted access. Drug reps are also prohibited from providing food to VA clinicians and staff.[156]

Reducing sales rep access to clinicians has a positive effect on reducing unnecessary prescribing. In a study of academic medical centers, researchers found a small (1.67 percentage point) reduction in prescribing of detailed drugs in centers that restricted sales rep visits as compared to centers that did not.[157] Centers with the most stringent policies, such as salesperson registration and training requirements, had the greatest reductions in prescriptions of drugs detailed by sales reps. Another study found that restrictions on detailing at academic medical centers was associated with reductions in off-label prescribing of antidepressants and antipsychotics by pediatricians.[158]

An important factor driving detailing restrictions at academic medical centers was the 2014 update of the American Medical Student Association's Conflict of Interest Scorecard.[159] Following recommendations from the Association of American Medical Colleges, the scorecard was updated to include more stringent criteria, including limits on gifts from industry and detailing visits.[159]

Professional groups such as nursing unions, activist groups such as Doctors for America and the Right Care Alliance, and patient safety organizations such as the Institute for Healthcare Improvement could similarly pressure non-academic medical centers. We recommend creating a task force to develop a scorecard to rate clinics and hospitals based on their conflict-of-interest policies. Conflict-of-interest scores could also be incorporated into hospital and academic rankings.

Promote transparency through legislation

Drug samples have been shown to influence clinician prescribing habits, yet drug samples are not subject to the same transparency requirements as other gifts. The Physician Payments Sunshine Act requires all pharmaceutical and medical device companies to report payments and gifts they give to doctors, including meals, research payments, consulting fees, and speaking and travel fees. These payments are made available to the public on the CMS website so patients can see

how much their doctors have received from drug and device companies. While manufacturers are required to submit information to the FDA on the quantity of drug samples requested and distributed, this information is not included in the public database, where patients and watchdogs look to find data on payments to doctors.[160,161]

Closing the loophole for drug samples in the Sunshine Act would put pressure on clinicians not to accept drug rep visits or free samples. This legislative change would require considerable support from patient organizations and other advocacy groups to overcome the power of pharmaceutical lobbying and compel congressional action. Coalitions to unite patient and clinician groups against pharmaceutical lobbying must take each group's funding source into account, as many groups receive funding from the pharmaceutical industry themselves.[162,163]

Require better regulation of drug samples

Current regulations make it very easy for prescribers to accept drug samples. Not only are most prescribers exempt from public scrutiny for accepting samples, but the requirements for storing and dispensing samples are lax. Clinicians often dispense samples without screening patients for potential drug interactions or allergies, and without an independent check by another clinician.[164]

Most samples in clinical practices are kept in a "sample closet," which may not comply with safe drug storage practices. A qualitative study of clinical practices found considerable variation in drug sample protocol, with only a minority of practices having formal strategies and policies for how to dispense and organize samples.[165] In some practices, the sample closet has been described as an "overfilled, disorganized stack of shelves," where "staff spent vast amounts of time searching for the appropriate sample."[165] In a 2012 inventory of drug sample closets, researchers found that 14 percent of medications were expired, wasting an estimated $2.2 billion each year.[166]

The National Coordinating Council for Medication Error Reporting and Prevention recommends that "all drug sample storage areas should comply with safe storage practices, and be evaluated and inspected by appropriately trained staff for the potential for medication errors."[167] Both patient advocacy organizations and professional medical societies have endorsed this recommendation; the next step is rigorous enforcement. Many physicians and institutions find that the easiest way to comply with these regulations is not to accept drug samples at all, which has the added benefit of saving time that clinicians would have spent in meetings with pharmaceutical sales reps.

Accreditation agencies or state pharmacy boards should make drug sample protocol compliance a requirement for accepting samples and enforce this requirement through regular office checks. These stakeholders should also require that before dispensing samples to older patients, clinicians inform patients if the medication has not been tested in older patients. Enforcing standardized drug sample organization and dispensing protocols not only will keep patients safer,

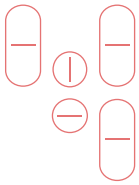
but will also add a barrier to drug sample acceptance and force some clinics to reevaluate whether receiving drug samples is indeed best for their patients and practice.

Promote cultural change through patient advocacy and peer pressure

Pressure from professional societies and government agencies to limit detailing and regulate drug samples could be effective for reducing pharmaceutical industry influence. However, changing this commonplace practice also requires a broad shift in the attitudes of clinicians and patients around the ethics of accepting calls from sales reps and the drug samples they deliver.

Most clinicians view drug rep visits as a positive, helpful source of information.[149,168] The ubiquity of lunches and gifts from drug reps has made them seem normal and deserved—a harmless "perk" for overworked clinicians and staff. Not surprisingly, the more gifts physicians receive from industry, the more likely they are to believe incorrectly that interactions with industry do not influence their prescribing behavior.[149]

Patients also have a positive attitude toward free drug samples, which are generally seen as gifts from health care providers, not as gateways to more expensive prescriptions.[169] Many patients are not even aware that heath care providers are allowed to accept gifts from pharmaceutical companies.[170]



"Getting your drug information from industry should be a source of deep embarrassment, but it's not."

—**Alan Cassels**
Communications Director
Therapeutics Initiative, University of British Columbia

"We need to debunk the idea that drug samples are charitable on the part of industry or a gift for patients. Free samples need to be recognized for what they are—marketing vehicles for expensive brand drugs."

—**Dr. Sharon Levine**
Board of Directors, School of Medicine, Kaiser Permanente

Medical professional societies and patient groups must disabuse clinicians and patients of the idea that samples are a "free gift," and begin a movement for pharma-free facilities. Media attention could help drive such a movement. Clinicians who do not accept visits or gifts from industry could display their "pharma-free" status in their clinics and online, or health professionals who accept industry gifts or visits could be required to indicate as such on signs in their office or on their professional online profile.

Community clinics, private practices, and health care institutions could also partner with the American Medical Student Association and incorporate their language of "Just Medicine" to indicate no industry involvement.[171] Patient organizations could highlight non-conflicted clinicians on their website, to set the expectation of "pharma-free" or "Just Medicine" facilities. A large-scale campaign of this type could accomplish the goals stated above with a small, but highly visible, group of committed physicians, pharmacists, nurses, professional societies, students, and independent patient organizations.

A similar campaign could be conducted on a smaller scale, targeting clinicians and patients at a few institutions to display signs indicating that they do not accept visits from sales reps and explaining why. Even a small campaign could spark conversations between patients and clinicians about industry influence, and help spread the expectation that medical offices, clinics, and hospitals should not accept visits from drug reps.

Recommendation: Increase regulation of direct-to-consumer advertising (DTCA) of pharmaceuticals

Direct-to-consumer advertising (DTCA) of pharmaceuticals is banned in almost all countries, but in the U.S., pharmaceutical companies spend an estimated $6 billion a year on television, radio, online, and print advertisements for medications directed at patients.[10] DTCA accelerated rapidly in 1997 when the U.S. Food and Drug Administration (FDA) eased regulations on broadcast advertising of medications. The FDA's new guidance allowed drug companies to air ads without complete information about the drug's harms and benefits, as long as the ad referred consumers to another source of comprehensive information about the drug.[172] Over the past few decades, spending on DTCA in the U.S. has grown more than four-fold, with a recent increase in online and social media marketing.[10,173] Much of this advertising is targeted toward older adults, aired on television during commercial breaks in dramas and news shows.[174]

While DTCA may have some benefits, such as getting patients more involved in their health care and reducing undertreatment of certain conditions (for example, encouraging patients at risk of HIV to take preventive medications), substantial evidence confirms that under-regulation of DTCA is leading to patient harm.[175] Drug advertisements regularly mislead consumers about the benefits and harms of medications, leading to unnecessary prescribing, increased spending on medications, and adverse drug events.[147,176,177] The FDA oversees prescription drug advertising, but does not vet consumer-directed

ads before they are aired or published, only sending a warning letter to companies after a misleading ad has already been disseminated.[178] Increased bureaucratic roadblocks, the sharp increase in number of advertisements, and understaffing have significantly curtailed the FDA's ability to effectively regulate DTCA.[177,179,180]

Federal and state policymakers, government agencies, and patient advocate organizations can improve the regulation of DTCA. We recommend four avenues for action below:

Partial bans on direct-to-consumer drug advertising

Some patient advocacy groups and clinician specialty organizations, including the American Medical Association, have called for a ban on DTCA. Despite this grassroots support, efforts to ban DTCA face massive political and legal hurdles. Legislation is unlikely given the political influence of the pharmaceutical lobby, and even if it were to pass would likely be challenged in court as a violation of free speech.[176,181]

However, it may be feasible to ban DTCA on a state or local level, or for certain drugs. For example, Maine state senator Ben Chipman has introduced legislation aimed at banning DTCA statewide.[182] In 2007, the Institute of Medicine (now the National Academy of Medicine) recommended a ban on DTCA for new drugs for two years after they are approved, so that any safety concerns can be identified before the drugs are broadly advertised to the public.[181,183] As a result, Bristol-Myers Squibb and Pfizer have implemented waiting periods for DTCA voluntarily.[181] Mandatory waiting periods may be a more politically feasible option than outright bans.

Remove the tax deduction for direct-to-consumer drug advertising

Under U.S. tax law, pharmaceutical companies are allowed to deduct the cost of advertising expenses, including direct-to-consumer advertising, from their gross income as a business expense. Removing or limiting the allowable amount of this deduction would reduce the incentive for drug companies to spend money on producing and disseminating DTCA.

Although it would take considerable political capital to enact legislation to limit or remove the deduction, such legislation is not without precedent. Recently, Senator Jeanne Shaheen (D-NH) introduced legislation to remove the deduction from the federal tax code in January 2019.[184] Public support for this or similar legislation is likely—though consumers may see benefits in DTCA, they don't necessarily support taxpayers funding these advertisements. Independent patient advocacy groups and watchdog groups such as Public Citizen, Truth in Advertising, and Consumer Reports could be key partners in an effort to limit this tax incentive.

Create new content requirements for direct-to-consumer advertisements

The FDA requires certain content to be present in DTCA, including: at least one approved use for the drug; the generic name of the drug; and all the potential harms of using the drug (or the most important risks, in certain cases).[178] The FDA, however, does not require advertisements

to include information that would put the harm and benefit information in context for consumers. This leads to claims in drug advertisements that are technically true but misleading.

For example, a 2018 ad for brand-name anticoagulant Eliquis claimed that "Almost 98% of patients on Eliquis didn't experience another pulmonary embolism."[185] This makes it seem like Eliquis is an incredibly effective treatment. However, the ad did not include information comparing Eliquis to other treatments. In a clinical trial comparing Eliquis to Warfarin, an older anticoagulant, almost 97% of patients taking Warfarin avoided a pulmonary embolism, compared to 98% taking Eliquis.[186]

Requiring the following content in DTCA would vastly improve the accuracy of drug advertisements, and help patients make informed decisions about medications:

- How many patients taking this drug experience a benefit, compared to the current standard of care (also known as the "number needed to treat")?
- For those who experience a benefit from taking this drug, how large is the benefit, compared to existing treatment options (in absolute, not relative, terms)? Was the drug's effectiveness tested against the standard of care or a lower standard?
- How many people taking this drug will experience side effects (also known as the "number needed to harm")?
- Has this drug been tested on patients over age 65, or patients with multiple chronic conditions?
- Is there a similar drug with fewer or different risks that could improve outcomes for this condition?
- Are there lifestyle or behavioral changes that would improve outcomes at a similar or greater rate than this drug?

Considering that older Americans are at the greatest risk for adverse drug events and are most often targeted for drug advertisements, it is especially important that advertisements for drugs that put older people at a high risk of adverse events—such as benzodiazepines or anticholinergic drugs—include an explicit warning of this risk for older people within the ad. Similarly, drugs that have not been tested in people over 65 should have a clear warning to that effect.

For print or online advertisements, a proven and easy way to convey this information is through the Drug Facts Box, a single-page, standardized format for conveying drug effectiveness and harm, modeled after the FDA's "Nutrition Facts" boxes *(see page 68)*.[187,188] The Drug Facts Box was conceptualized and developed by researchers at the Dartmouth Institute for Health Policy and Clinical Practice. These boxes could be written by independent FDA reviewers and required in print advertisements, on medication websites, or shown in TV ads.[187]

Requiring additional content would be politically difficult but not impossible, as it is well within the FDA's authority to regulate the content of prescription drug advertisements. However, this would require significant resources and support from independent patient and clinician groups. Pharmaceutical companies would also likely mount legal challenges to proposed changes to content regulations, similar to their recent efforts to challenge requirements to include drug prices in advertisements.[189]

Drug Facts Box LUNESTA (ESZOCLOPINE) versus placebo for insomnia

What is this drug for?	To reduce the symptoms of insomnia—trouble falling or staying asleep—experienced by adults for at least one month
Who might consider taking it?	Adults age 18 and older with insomnia
Recommended monitoring	No blood tests, watch out for abnormal behavior
Other things to consider doing	Reduce caffeine intake (especially at night), increase exercise, establish regular bedtime, avoid daytime naps

LUNESTA STUDY FINDINGS

788 healthy adults with insomnia for at least 1 month—sleeping less than 6.5 hours per night and/or taking more than 30 minutes to fall asleep—were given LUNESTA or PLACEBO nightly for 6 months. Here's what happened:

What difference did LUNESTA make?	**People given PLACEBO**	**People given LUNESTA (3 mg each night)**
Did LUNESTA help?		
LUNESTA users fell asleep faster (15 minutes faster)	45 minutes to fall asleep	30 minutes to fall asleep
LUNESTA users slept longer (37 minutes longer)	5 hours 45 minutes	6 hours 22 minutes
Did LUNESTA have side effects?		
Life threatening side effects		
No difference between LUNESTA and a sugar pill	None reported yet	
Symptom side effects		
More had unpleasant taste in their mouth (additional 20% due to drug)	6% 6 in 100	26% 26 in 100
More had dizziness (additional 7% due to drug)	3% 3 in 100	10% 10 in 100
More had drowsiness (additional 6% due to drug)	3% 3 in 100	9% 9 in 100
More had dry mouth (additional 5% due to drug)	2% 2 in 100	7% 7 in 100
More had nausea (additional 5% due to drug)	6% 6 in 100	11% 11 in 100

How long has the drug been in use?
LUNESTA **was approved by FDA in 2005 based on studies involving about 1,200 people.** As with all new drugs, rare but serious side effects may emerge after the drug is on the market—when larger numbers of people have used the drug.

Source: Schwartz & Woloshin, The Prescription Drug Facts Box: Helping Doctors and Patients Make Wise Choices. White River Junction, VT: The Department of Veterans Affairs Medical Center, 2009.

Put pressure on regulators and media to withdraw misleading drug advertisements

Putting pressure on the FDA, the Federal Trade Commission (FTC), and broadcast networks to remove misleading drug advertisements could be a path toward more balanced advertising, without requiring an immense amount of resources or political capital. A targeted effort to identify particularly misleading drug advertisements and send complaints to the FDA and FTC about these ads could spur regulatory action. Especially important will be identifying advertisements targeted at older patients that underplay serious side effects or mislead about the drug's effectiveness. Public complaints targeted at specific ads would be an incremental change, but could raise awareness about egregiously misleading ads, spurring more action. Additionally, the FDA and FTC generally do not have time to review all advertisements, so public complaints drawing attention to specific egregious ads could be effective in leading to regulatory action in these cases.[176]

Media companies such as television and radio networks, newspapers, and magazines rely on pharmaceutical advertisements for a significant amount of their revenue, making them key political opponents of DTCA bans. However, media companies are also receptive to public pressure, and could be a target for campaigns to withdraw certain advertisements. A grassroots effort to boycott certain television networks, radio channels, or print publications until specific misleading ads are removed could spur media companies to action.

Although these campaigns would not prevent DTCA from being aired, they would take far fewer resources than political campaigns to ban or regulate the content of DTCA, and could be implemented immediately. Independent patient advocate groups and watchdogs, such as Public Citizen, as well as grassroots organizing groups, would be natural partners in this effort. Additionally, a systematic campaign to send complaints to the FDA could be useful data for research—similar to the COMPare project, in which researchers sent complaints about outcome misreporting to top journals and recorded the journals' responses.[190]

Conclusion

Curtailing industry influence is an important element in changing our culture of overprescribing and reducing harm from medication overload. However, extensive lobbying efforts and campaign contributions from the pharmaceutical industry make these solutions politically difficult.

We have outlined several potential pathways for limiting industry detailing and advertising. Pursuing legislative solutions (putting a two-year ban on DTCA for new drugs, for example) will face the toughest political hurdles and are likely the least feasible; however, legislative solutions are likely to have the greatest impact. Regulatory solutions, which require action from executive agencies, are also politically difficult, but might be more feasible.

However, these are not the only paths. Institutional-level campaigns to reduce industry influence and grassroots campaigns to demand transparency have the potential to change cultural norms, which can lead to widespread change over time. These solutions are more politically feasible, but would require strong partnerships between medical societies, health care institutions, and patient advocacy groups, all of which are themselves susceptible to industry influence.

Our proposed recommendations represent only a few of the ways in which clinicians, patients, families, caregivers, and policymakers can take action against the outsized role of the pharmaceutical industry in medical culture and medication overload.

Conclusion: What You Can Do Now

Medication overload is an urgent public health problem. Over the last decade, older adults have been hospitalized millions of times as a result of serious adverse drug events. Many of these events could have been avoided with more judicious prescribing and deprescribing. If this dangerous pattern of medication use continues over the next decade, older adults will suffer at least 74 million adverse drug events requiring medical care, and will be hospitalized nearly 5 million times.[1]

A culture of prescribing, information gaps, and a fragmented health care system lead to medication overload, and a multipronged approach is needed to combat it. Patient and older adult organizations, government agencies, public health institutions, researchers, clinical and specialty groups, health care professional schools, payers, and health care institutions all have roles to play in preventing and reducing the harm it is causing.

The good news is that opportunities to reduce medication overload exist in practically every sector of health care, including research, technology, education, guideline creation, regulation, and more. Although national action may be necessary for certain changes, such as regulation of drug advertisements or clinician reimbursements for prescription checkups, many efforts can be undertaken on a local, institutional, or even individual level to reduce the harm.

We have a long way to go to undo the systemic factors in our health care system that prevent more careful prescribing and appropriate deprescribing. But there are actions that can be taken immediately to begin the process of eliminating medication overload. We owe it to our grandparents, our parents, and ourselves to start this work now.

Here's what **you** can do to take action **now**:

Patients and family members/caregivers

- Learn about the risks of medication overload.
- If you're having trouble managing your medications, or you're worried about side effects, ask your doctor for a prescription checkup to talk about your medications.
- Lobby your legislative representatives to better regulate pharmaceutical advertisements.
- Look up your doctor on Dollars For Docs to see if they accept money from pharmaceutical companies, and ask your doctor about it.

Clinicians

- Learn about the risks of medication overload, especially for older adults with multiple chronic conditions.
- Become a "pharma-free" clinician and display your status proudly.
- Request continuing education series about careful prescribing and deprescribing at your institution.
- Make sure you have deprescribing guidelines available at the point of care when you need them.
- Lobby your clinical membership organizations or professional societies to update clinical practice guidelines with appropriate targets for older patients.

Hospitals, clinics, and long-term care facilities

- Implement prescription checkups for patients taking multiple medications.
- Launch an educational campaign for clinicians to raise awareness of medication overload.
- Make deprescribing guidelines available to clinicians.
- Become a "pharma-free" institution and display your status proudly.

Clinician professional societies

- Update clinical practice guidelines to incorporate information on careful prescribing and deprescribing.
- Take steps to reduce financial conflicts of interest among guideline committee members.
- Create specialty deprescribing guideline databases for members.
- Support creation of continuing education content on appropriate prescribing and deprescribing, including presentations at professional meetings.

Health professional schools and academic medical centers

- Launch continuing education programs about careful prescribing and deprescribing, such as Grand Rounds.
- Implement a "Deprescribing Champions" program.
- Launch an educational campaign for clinicians to raise awareness of medication overload.
- Make deprescribing guidelines available to clinicians.
- Incorporate training on careful prescribing and deprescribing into school curricula.
- Pilot a polypharmacy/deprescribing concentration for clinicians specializing in geriatric care.

Government agencies and policymakers

- Support the launch of a public awareness campaign about medication overload.
- Support research to fill in knowledge gaps on deprescribing.
- Support the creation of patient-directed awareness campaigns about specific medications.
- Create a Medicare reimbursement code for prescription checkups, or a code to bundle prescription checkups with Wellness Visits.
- Fund a convening of clinician specialty groups to identify changes needed to clinical practice guidelines.
- Fund a Delphi survey of primary care clinicians and patients to outline needed guideline changes.
- Address key issues with adverse drug event reporting.
- Restrict/regulate direct-to-consumer drug advertising.
- Close the Physician Sunshine Act loophole for drug samples.
- Fund academic detailing programs.

Foundations and nonprofits

- Support a pilot campaign for prescription checkups.
- Support a pilot public awareness campaign about medication overload.
- Fund a convening of clinician specialty groups to identify changes needed to clinical practice guidelines.
- Organize grassroots campaigns against pharmaceutical advertising and marketing.
- Fund creation of more deprescribing guidelines or specialty deprescribing guideline collections.
- Fund a podcast series on deprescribing and other continuing education content.

Glossary, Appendices, and References

Glossary of Key Terms and Organizations

Adverse drug event (ADE)
An ADE is when injury occurs from taking one or more medications. ADEs include serious drug reactions or side effects, medication errors, allergic reactions, and overdoses.

Comprehensive medication management (CMM)
CMM is a program in which a pharmacist reviews all of a patient's medications to make sure that they are all appropriate, effective, and safe. CMM includes an assessment of the patient's health problems as well as medications.

Continuing education (CE)
CE activities are educational seminars, courses, and other activities required for health professionals to maintain their licenses.

Deprescribing
Deprescribing means reducing or stopping medications for which the potential harm outweighs the benefit, or medications that are not compatible with the patient's health goals. The goal of deprescribing is to maintain or improve quality of life.

Direct-to-consumer advertising (DTCA)
DTCA refers to advertisements for medications targeted at the public, rather than clinicians. These include print, online, and broadcast advertisements.

Long-term care (LTC) facility
LTC facilities such as assisted living facilities, retirement communities, or nursing homes, help meet both the medical and non-medical needs of people with a chronic illness or disability who cannot care for themselves for long periods of time.

Medication overload
Medication overload is the use of multiple medications that pose a greater risk of harm than benefit. There is no strict cutoff for when the number of medications becomes harmful, but the more a person is taking, the greater their likelihood of experiencing harm, including serious, even life-threatening adverse drug events.

Medication reconciliation
Medication reconciliation is a process of documenting and comparing patients' medication lists from one care setting to another, with the goal of reducing medication errors during care transitions.

Medication review
A medication review is when a clinician and patient go over the patient's medication list. This review may or may not include documenting all of a patient's medications, discussing the benefits and harms of medications, and making medication changes.

Medication therapy management (MTM)
MTM is a benefit provided by Medicare Part D to eligible patients that includes medication reviews to identify, prioritize, and address medication-related problems, with the goal of increasing adherence and identifying medication problems. A pharmacist usually conducts these reviews.

Polypharmacy
Polypharmacy is a term used in the scientific literature to describe the condition of taking multiple medications. Usually the threshold for polypharmacy is five or more medications, although the cutoff varies because there is not a single agreed-upon definition. Polypharmacy can be helpful or harmful, depending on the patient's conditions and the specific medications.

Prescription checkup

A prescription checkup is a medication review that makes relieving medication overload its primary focus and uses a shared decision making process. Prescription checkups differ from other types of medication reviews because they are explicitly designed to consider reducing dosages or eliminating harmful medications. They are conducted by trusted members of the care team and can be performed over the course of more than one visit, and sometimes over the phone or videochat.

Shared decision making

Shared decision making is a process in which clinicians engage patients (and/or caregivers) in a conversation about their lives to better understand their goals and priorities; make sure patients or caregivers recognize the potential benefits and harms posed by various treatment options, using language they understand; and invite patients or caregivers to be active participants in their health care decisions.

AAMC	Association of American Medical Colleges
AGS	American Geriatrics Society
AHRQ	Agency for Healthcare Research and Quality
AMA	American Medical Association
ANA	American Nurses Association
APA	American Pharmacists Association
CDC	Centers for Disease Control and Prevention
CMMI	Center for Medicare and Medicaid Innovation
CMS	Centers for Medicare and Medicaid Services
FDA	U.S. Food and Drug Administration
FTC	Federal Trade Commission
IHI	Institute for Healthcare Improvement
NAM	National Academy of Medicine, formerly the Institute of Medicine
NCQA	National Committee for Quality Assurance
NICHE	Nurses Improving Care for Healthsystem Elders
NIH	National Institutes of Health
VA	Veterans Health Administration
WHO	World Health Organization

APPENDIX A:

Research Priorities for Medication Overload

Research needed on the health effects of polypharmacy

- Measure the harms of polypharmacy adjusted for patient risk.[1]
- Detect and manage adverse drug events.[12]
- Collect, analyze, and report data that relate to frequency of, and reasons for, withdrawal of drug use in clinical trial participants to build the evidence base of drug-related harm.[44]

Research needed on managing chronic conditions

- Measure the relative benefits and risks of different treatment options for individual chronic diseases, including non-pharmaceutical treatments.[12]
- Develop tools to assess the burden of treatment for adults with multiple chronic conditions.[12]
- Research the potential for lower doses we could prescribe for patients managing chronic conditions.[12]
- Design and conduct clinical trials that recruit older, multimorbid patients, including specific subgroups (e.g., patients with dementia) and aim to define drug benefits and harms using patient stratification methods and multivariate risk modeling methods.[44,191-193]

Research needed on the clinical outcomes of deprescribing

- Conduct high-quality and long-term clinical trials that measure patient-important outcomes of deprescribing.[103]
- Research the following outcomes of deprescribing: serious adverse drug reactions, withdrawal side effects, medication appropriateness, falls, medication regimen complexity, quality of life, mortality, and medication side effects. Studies must be powered to evaluate these outcomes. [53,54]
- Measure how patient outcomes differ when deprescribing for different populations.[12,103]
- Research whether deprescribing can reverse the negative effects of medication overload.[12]
- Evaluate the effect of deprescribing on medications used for varying durations (e.g., short term vs. years).[12]
- Research possible negative, non-reversible effects of ceasing use of certain classes of medication, such as acetylcholinesterase inhibitors.[45]
- Conduct more large-scale randomized controlled trials of systematic deprescribing, to find out the true benefits and harms of deprescribing medication classes.[45]
- Use the following seven outcomes in future trials of medication review in multi-morbid older patients with polypharmacy: drug-related hospital admissions, medication overuse, medication underuse, potentially inappropriate medications, clinically significant drug-drug interactions, health-related quality of life, pain relief.[194]
- Measure the effect of deprescribing on hospitalizations, emergency department visits, and primary care provider visits.[195]

Research needed on non-clinical outcomes of deprescribing

- Measure the potential financial savings of deprescribing—for the patient and for the health system as a whole.[1,12,103]
- Research best practices for managing issues during deprescribing such as withdrawal effects and subsequent re-prescribing.[103]

Research needed on the effectiveness of deprescribing interventions and policy

- Research how to deprescribe drugs of various classes safely.
- Research the risks and benefits of different approaches to reduce polypharmacy using patient-important outcomes such as all-cause mortality, morbidity, function cognitive status, health care utilization, and cost.[12]
- Research best practices for implementing deprescribing interventions successfully in clinical practice.[103]
- Find out which patient profiles benefit the most from deprescribing interventions.[12,103]
- Research the effects of different payment models on strategies to address polypharmacy.[12]
- Develop and evaluate drug safety standards that maximize the potential for reducing inappropriate use of drugs.[44]
- Conduct research to find out when and how often deprescribing interventions should occur.[44]
- Find out in which setting medication reviews are most successful, e.g., hospital, primary care, residential aged care facility.[44]
- Find out which clinicians can conduct successful medication reviews, e.g., clinical pharmacists, physicians, nurses.[44]
- Research how to engage multiple stakeholders (doctors, nurses, pharmacists, patients, and families) in deprescribing initiatives simultaneously.[1]
- Develop national quality metrics for medication overload and the need for deprescribing, eg., Patients using the sulfonylurea drug class over the age of 80 with A1C < 7.0 should be deprescribed.
- Research the most efficient, least burdensome way for health care providers, patients, and caregivers to contribute to the adverse events database.

Research on the patient/caregiver experience

- Research on incorporating patient and caregiver priorities in the clinical experience, including for patients with cognitive impairment.[12,103]
- Understand which clinicians or care team members patients and caregivers feel most comfortable discussing medications with, and in which settings.
- Research which outcomes are most important to patients and families in deprescribing.
- Conduct focus groups to find messaging that best conveys the potential harms of medication overload to patients and family members/caregivers.

APPENDIX B:

Current Initiatives to Address Medication Overload

Deprescribing programs/pilots

AGE-FRIENDLY HEALTH SYSTEMS: The Institute for Healthcare Improvement, in partnership with the John A. Hartford Foundation, created an initiative called "age-friendly health systems," built around improving care for older adults by using evidence-based models across the care continuum. The program's "4M" bundle, which comprises "What Matters, Medication, Mentation, and Mobility," provides a guide for avoiding excess prescriptions and for deprescribing. The bundle is being tested by health systems around the country.

BRUYÈRE DEPRESCRIBING TEAM: The deprescribing team at the Bruyère Institute in Ottowa, Ontario, has developed a rigorous method for developing evidence-based deprescribing guidelines. They are engaged in a variety of research initiatives and programs (community engagement, developing a deprescribing framework for long-term care, developing and evaluating an app to support deprescribing guidelines, and more).

CONNECTICUT MEDICATION RECONCILIATION AND POLYPHARMACY WORK GROUP: In May of 2018, the Connecticut General Assembly established a Working Group to evaluate issues concerning polypharmacy and medication reconciliation. The MRPC provides strategic guidance, recommendations, and ongoing support to the Health IT Advisory Council and the Office of Health Strategy (OHS) for the development and implementation of patient-centered and evidence-based best practices necessary to contribute to the development and maintenance of a best possible medications history, supported by communication, education, and user-friendly digital tools.

INITIATIVE TO MINIMIZE PHARMACEUTICAL RISK IN OLDER VETERANS (IMPROVE): This polypharmacy clinic in New Haven, Connecticut, provided a platform for teaching internal medicine residents and nurse practitioner trainees about outpatient medication management and deprescribing for older adults. After the course, participants showed improvements in knowledge and skills, and two medications, on average, were deprescribed for their patients.

KAISER PERMANENTE ANTIDIABETIC DEPRESCRIBING PROGRAM: A pilot program at the Kaiser Permanente Integrated System. Evaluation of the program found that pharmacist-led deprescribing of selected antidiabetics reduced the risk of hypoglycemia and may have mortality benefit in elderly patients with well-controlled type 2 diabetes.

MEANINGFUL MEDICATION REVIEWS FOR RESIDENTIAL CARE: A program in five residential care communities in British Columbia, Canada, reduced polypharmacy by 10% by making deprescribing a key focus of medication reviews, doing more frequent medication reviews, increasing onsite presence of physicians to do med reviews, and holding polypharmacy education sessions.

MCMASTER TAPER PROGRAM: The Department of Family Medicine at McMaster University has developed and implemented the TAPER project ("Team Approach to Polypharmacy Evaluation and Reduction"). The vision of TAPER is to design a systematic pathway for reducing the burden of polypharmacy that is part of routine primary care prevention for older adults.

MEDSAFER PILOT STUDY: Medsafer is an electronic decision support tool for deprescribing. In a pilot study, using Medsafer increased the

proportion of patients with one or more potentially inappropriate medications deprescribed at hospital discharge by 7.8%.

REDUCING ANTI-PSYCHOTIC USE IN NURSING HOMES: The Centers for Medicare and Medicaid Services created this initiative to reduce unnecessary antipsychotic use among nursing home residents with dementia.

SHARED CARE POLYPHARMACY RISK REDUCTION: A multi-year initiative in British Columbia to reduce medications in residential and acute care. Results can be found in their final project report. The project identified that acute care pharmacists can play an important role in polypharmacy risk reduction by conducting medication reviews prior to patient discharge. Small changes in workflow helped streamline form preparation to aid medication reconciliation and reduce physician frustration at discharge. It also included the goal of improving communication at discharge between patient/family, PCP, hospitalist, and community pharmacist.

VA VIONE MODEL: A deprescribing program from the U.S. Department of Veterans Affairs, using the acroynm VIONE: Vital — is this medication essential for my health? Important — How important is this medication to improve my quality of life? Optional — By taking this medicine, do the benefits outweigh the risks? Not Indicated — Am I taking medications that are no longer needed? Every medication has a reason — Does every medication I take have a clear reason or diagnosis?

Deprescribing networks

AUSTRALIAN DEPRESCRIBING NETWORK: The Australian Deprescribing Network (ADeN) comprises clinicians, academic researchers, policymakers, students, and consumers working together to develop the evidence base, clinical guidance, and knowledge translation to facilitate deprescribing of medicines that are no longer providing benefit or are causing harm. ADeN was formed in 2014 following a workshop in Brisbane that brought together clinicians and researchers with an active interest in deprescribing. Since then ADeN has held annual meetings in cities across Australia.

ENGLISH DEPRESCRIBING NETWORK: The English Deprescribing Network (EDeN) was launched in June 2019. EDeN aims to bring together health care professionals, researchers, and policymakers to share ideas, best practices, and resources, help improve communication between patients and clinicians; and shape the national strategy around appropriate prescribing and the avoidance of medicines-related harm.

CANADIAN DEPRESCRIBING NETWORK: The Canadian Deprescribing Network is a group of health care leaders, clinicians, decision makers, academic researchers, and patient advocates working together to mobilize knowledge and promote the deprescribing of medication that may no longer be of benefit or that may be causing harm.

INTERNATIONAL GROUP FOR REDUCING INAPPROPRIATE MEDICATION USE & POLYPHARMACY: This international network released a position statement in 2018 proposing recommendations for action and research to reduce inappropriate medication use and polypharmacy.

NORTHERN EUROPEAN RESEARCHERS IN DEPRESCRIBING (NERD): This network was launched in 2019 to support collaboration and increasing visibility of deprescribing research in North Europe.

U.S. DEPRESCRIBING RESEARCH NETWORK: This network, newly formed in the fall of 2019 with support from a grant from the National Institute on Aging, is designed to develop and disseminate evidence on deprescribing. Activities include educational and training opportunities for junior investigators; funding pilot and exploratory studies; engaging patient, caregiver, and health systems stakeholders in research on deprescribing; and providing a variety of data and other resources to promote deprescribing research.

For more information and resources on careful prescribing and deprescribing, see the Lown Institute report, Medication Overload: America's Other Drug Problem.

APPENDIX C:

Prescription Checkup Details

Components of a prescription checkup

A prescription checkup may be undertaken as a preventive measure, to identify potential medications for deprescribing before the patient is overloaded; or, when a patient is suffering harm or is having problems managing medications, the prescription checkup may be an intervention undertaken to deprescribe the medications causing harm.

A prescription checkup consists of four main components: Inventory, Inquiry, Intervention, and Follow-up.

1. **Inventory** — A trusted clinician or member of the care team, along with the patient and/or patient's family/caregivers, inventories and documents all medications the patient is taking, including prescriptions, over-the-counter medications, supplements, topicals, and inhalers. A skilled patient navigator, nurse, or medical assistant may work with the patient to conduct the inventory. The provider may want to begin by reviewing the electronic health record, but every inventory should also include a "brown bag review" (in which the patient and family/caregiver bring all medications to the visit) to ensure that all the medications the patient is taking are documented.

2. **Inquiry** — A trusted clinician—usually a physician, pharmacist, or nurse practitioner knowledgeable about the benefits and harms of medications—elicits the patient's values, preferences, and goals and explains the treatment options. Ideally, the clinician conducting the inquiry is part of the patient's care team and is familiar with the patient's medical history. Clinicians and patients may require more than one visit to discuss benefits and harms of each medication.

   This conversation is important to the shared decision making process, providing a foundation for subsequent medication decisions. For example, taking blood pressure medications reduces the risk of serious cardiovascular events in the future, but may cause spells of dizziness that interfere with daily activities. Some patients may prioritize their everyday activities, such as being able to garden or play with their grandchildren, above prevention of future cardiovascular events. Other patients may prefer to accept moderate side effects to improve their likelihood of living longer. The only way patients can make these decisions is to have the magnitude of the potential benefits and harms explained to them so they can use this information to make a decision for themselves.

   Following the conversation about values, preferences, and goals, the clinician and patient (and/or family/caregiver) review the patient's medication list and discuss the reason each medication is being taken (e.g., alleviation of symptoms, treatment of a medical condition, or prevention of future illness), as well as the patient's impression of their medications (including side effects, medication burden, and affordability). Then together they review each medication in relation to the patient's values, preferences, and goals previously discussed.

3. **Intervention** — The clinician or team and the patient (and/or family/caregiver) create a plan of action for medication use (e.g., continuing the medication, reducing the dose, or deprescribing) and necessary follow-up. The goal of the plan should be to reduce medication overload, though in some cases patients may need new or alternative medications.

4. **Follow-up** — Clinicians and patients should schedule a follow-up appointment to monitor the improvement or development of symptoms and see if adjustments to the plan need to be made. For some medications (such as anti-anxiety medications and other psychiatric medications), slow tapering is necessary and requires the clinician to closely monitor the patient.

Changes in the patient's medication list must be clearly communicated to the patient's other health care providers, including the pharmacy. The patient (and/or family members or caregivers) should be given a full report of the medication list and the intervention plan. Providing patients with a written description of their medication plan, including notes about the results of shared decision making discussions, can help them understand and adhere to their plan. The plan should also be shared with the patient's other clinicians to reduce the risk of patients getting conflicting information.

Prescription checkups in the hospital

The transition into or out of an acute care setting represents a moment of vulnerability for patients and an important opportunity to review medications. This is especially true when a medication has caused an adverse event that triggered the hospitalization or when medications have been prescribed during the hospital stay but are meant to be discontinued after discharge.[196]

However, the hospital setting presents resource and time limitations, since clinicians may have only a few days to review patients' medications before patients leave the hospital. Given these limitations, it is likely not feasible for clinicians to conduct a prescription checkup for all patients in the hospital that are taking multiple medications.

In the hospital setting, a clinician or care team should still carry out the three major components of the prescription checkup, but there are some key differences:

1) If it is not feasible to conduct prescription checkups for all older patients taking five or more medications, clinicians should prioritize prescription checkups for patients for whom hospitalization was triggered by an issue with a medication. The hospital team can also alert community-based clinicians, such as a primary care doctor, if they suspect that a patient who has been hospitalized may need a prescription checkup.
2) Addressing each medication on the patient's medication list may not be feasible or appropriate in the hospital setting. Special attention should be paid to reviewing drugs that were newly prescribed in the hospital, with an eye toward eliminating medications that were prescribed for temporary symptom control. Follow-up should include alerting the patient's primary care team to the possible need for further medication adjustments.
    a. A hospital prescription checkup presents an opportunity for new clinicians to look at the patient's medication list with a fresh eye, and identify potential medications to deprescribe. If time allows, clinicians and patients should be empowered to deprescribe preventive medications in the hospital, as well as medications for symptom control.
3) For patients admitted to the hospital for medication problems, a clinician should conduct a prescription checkup soon after admission. It may be necessary to conduct another checkup before discharge, so that any drugs prescribed in the acute setting can be reviewed before discharge. Upon discharge, any changes made to the patient's medication regimen must be communicated to the patient's family/caregiver and primary care provider in their community or LTC facility.

References

1. Garber J, Brownlee S. Medication Overload: America's Other Drug Problem. Brookline, MA: The Lown Institute, 2019.

2. Hanlon JT, Pieper CF, Hajjar ER, et al. Incidence and predictors of all and preventable adverse drug reactions in frail elderly persons after hospital stay. *The Journals of Gerontology* 2006; **61**(5): 511-5.

3. Viktil KK, Blix HS, Moger TA, Reikvam A. Polypharmacy as commonly defined is an indicator of limited value in the assessment of drug-related problems. *British Journal of Clinical Pharmacology* 2007; **63**(2): 187-95.

4. Gandhi, Weingart, Borus, et al. Adverse drug events in ambulatory care. *New England Journal of Medicine* 2003; **April 2017**(348).

5. Boyd CM, Darer J, Boult C, Fried LP, Boult L, Wu AW. Clinical practice guidelines and quality of care for older patients with multiple comorbid diseases: implications for pay for performance. *JAMA* 2005; **294**(6): 716-24.

6. Lutgenberg M, Burgers JC, Clancy C, Westert GP, Schneider ER. Current Guidelines Have Limited Applicability to Patients with Comorbid Conditions: A Systematic Analysis of Evidence-Based Guidelines. *PloS One* 2011; **6**(10): e25987.

7. Tannenbaum C, Farrell B, Shaw J, et al. An Ecological Approach to Reducing Potentially Inappropriate Medication Use: Canadian Deprescribing Network. *Canadian journal on aging* 2017; **36**(1): 97-107.

8. Stewart D, Mair A, Wilson M, et al. Guidance to manage inappropriate polypharmacy in older people: systematic review and future developments. *Expert Opinion on Drug Safety* 2017; **16**(2): 203-13.

9. Quality Use of Medicines to Optimise Ageing in Older Australians: Recommendations for a National Strategic Action Plan to Reduce Inappropriate Polypharmacy. Sydney, Australia: NHMRC Cognitive Decline Partnership Centre, University of Sydney, in Collaboration with the Australian Deprescribing Network and NPS MedicineWise. 2018.

10. Schwartz L, Woloshin S. Medical Marketing in the United States, 1997-2016. *JAMA* 2019; **321**(1): 80-96.

11. Scott IA, Anderson K, Freeman CR, Stowasser DA. First do no harm: a real need to deprescribe in older patients. *The Medical Journal of Australia* 2014; **201**(7): 390-2.

12. Mangin D, Bahat G, Golomb BA, et al. International Group for Reducing Inappropriate Medication Use & Polypharmacy (IGRIMUP): Position Statement and 10 Recommendations for Action. *Drugs & Aging* 2018.

13. Conklin J, Farrell B, Suleman S. Implementing deprescribing guidelines into frontline practice: Barriers and facilitators. *Research in Social & Administrative Pharmacy : RSAP* 2018.

14. Anderson K, Foster M, Freeman C, Luetsch K, Scott I. Negotiating "Unmeasurable Harm and Benefit": Perspectives of General Practitioners and Consultant Pharmacists on Deprescribing in the Primary Care Setting. *Qualitative Health Research* 2017; **27**(13): 1936-47.

15. Liu LM. Tips for Deprescribing in the Nursing Home. *Annals of Long-Term Care: Clinical Care and Aging* 2016; **24**(9): 26-32.

16. Jokanovic N, Tan EC, Dooley MJ, Kirkpatrick CM, Bell JS. Prevalence and factors associated with polypharmacy in long-term care facilities: a systematic review. *Journal of the American Medical Directors Association* 2015; **16**(6): 535 e1-12.

17. Martin P, Tannenbaum C. A realist evaluation of patients' decisions to deprescribe in the EMPOWER trial. *BMJ Open* 2017; **7**(4): e015959.

18. Ailabouni NJ, Nishtala PS, Mangin D, Tordoff JM. Challenges and Enablers of Deprescribing: A General Practitioner Perspective. *PloS one* 2016; **11**(4): e0151066.

19. Reeve E, Wolff JL, Skehan M, Bayliss EA, Hilmer SN, Boyd CM. Assessment of attitudes toward deprescribing in older medicare beneficiaries in the united states. *JAMA Internal Medicine* 2018.

20. Van der Linden L, Decoutere L, Walgraeve K, et al. Combined Use of the Rationalization of Home Medication by an Adjusted STOPP in Older Patients (RASP) List and a Pharmacist-Led Medication Review in Very Old Inpatients: Impact on Quality of Prescribing and Clinical Outcome. *Drugs & Aging* 2017; **34**(2): 123-33.

21. Martin P, Tamblyn R, Ahmed S, Benedetti A, Tannenbaum C. A consumer-targeted, pharmacist-led, educational intervention to reduce inappropriate medication use in community older adults (D-PRESCRIBE trial): study protocol for a cluster randomized controlled trial. *Trials* 2015; **16**: 266.

22. Bain KT, Holmes HM, Beers MH, Maio V, Handler SM, Pauker SG. Discontinuing medications: a novel approach for revising the prescribing stage of the medication-use process. *Journal of the American Geriatric Society* 2008; **56**(10): 1946-52.

23. Bell HT, Granas AG, Enmarker I, Omli R, Steinsbekk A. Nurses' and pharmacists' learning experiences from participating in interprofessional medication reviews for elderly in primary health care - a qualitative study. *BMC family practice* 2017; **18**(1): 30.

24. Cross A, Le V, Johnson G, Woodward M, Elliott R. Stakeholder perspectives on pharmacist involvement in a memory clinic to review patients' medication management and assist with deprescribing. *Research in Social and Administrative Pharmacy* 2019.

25. Barry M, Edgman-Levitan S. Shared Decision Making — The Pinnacle of Patient-Centered Care. *New England Journal of Medicine* 2012; (366): 780-1.

26. Verdoorn S, Kwint H-F, Blom JW, Gussekloo J, Bouvy ML. Effects of a clinical medication review focused on personal goals, quality of life, and health problems in older persons with polypharmacy: A randomised controlled trial (DREAMeR-study). *PLoS Med* 2019.

27. Tinetti ME, Naik AD, Dindo L, et al. Association of Patient Priorities–Aligned Decision-Making With Patient Outcomes and Ambulatory Health Care Burden Among Older Adults With Multiple Chronic Conditions: A Nonrandomized Clinical Trial. *JAMA Internal Medicine* 2019.

28. Marvin V, Ward E, Poots AJ, Heard K, Rajagopalan A, Jubraj B. Deprescribing medicines in the acute setting to reduce the risk of falls. *European Journal of Hospital Pharmacy Science and Practice* 2017; **24**(1): 10-5.

29. Schmader K, Hanlon J, Pieper C, et al. Effects of geriatric evaluation and management on adverse drug reactions and suboptimal prescribing in the frail elderly. *The American Journal of Medicine* 2004; **116**(6): 394-401.

30. Wouters H, Scheper J, Koning H, et al. Discontinuing Inappropriate Medication Use in Nursing Home Residents: A Cluster Randomized Controlled Trial. *Annals of Internal Medicine* 2017; **167**(9): 609-17.

31. Garfinkel D, Zur-Gil S, Ben-Israel J. The war against Polypharmacy: A New Cost-Effective Geriatric-Palliative Approach for Improving Drug Therapy in Disabled Elderly People. *The Israel Medical Association Journal* 2007; **9**(6): 430-4.

32. Lee C, Lo A, Ubhi K, Milewski M. Outcome after Discontinuation of Proton Pump Inhibitors at a Residential Care Site: Quality Improvement Project. *The Canadian Journal of Hospital Pharmacy* 2017; **70**(3): 215-23.

33. Johansson T, Abuzahra ME, Keller S, et al. Impact of strategies to reduce polypharmacy on clinically relevant endpoints: a systematic review and meta-analysis. *British Journal of Clinical Pharmacology* 2016; **82**(2): 532-48.

34. Viswanathan M, Kahwati LC, Golin CE, et al. Medication Therapy Management Interventions in Outpatient Settings A Systematic Review and Meta-analysis. *JAMA Internal Medicine* 2015; **175**(1): 76-87.

35. Cooper JA, Cadogan CA, Patterson SM, et al. Interventions to improve the appropriate use of polypharmacy in older people: A Cochrane systematic review. *BMJ Open* 2015; **5**(12): e009235.

36. Ulley J, Harrop D, Ali A, Alton S, Fowler Davis S. Deprescribing interventions and their impact on medication adherence in community-dwelling older adults with polypharmacy: a systematic review. *BMC Geriatrics* 2019; **19**(1): 15.

37. Kolhatkar A, Cheng L, Chan F, Harrison M, Law M. The impact of medication reviews by community pharmacists. *Journal of the American Pharmacists Association* 2016.

38. Redmond P, Grimes TC, McDonnell R, Boland F, Hughes C, Fahey T. Impact of medication reconciliation for improving transitions of care. *The Cochrane database of systematic reviews* 2018.

39. Agency for Healthcare Research and Quality. Medication Reconciliation. 2019. https://psnet.ahrq.gov/primers/primer/1/medication-reconciliation (accessed 7/20/19).

40. Hui RL, Chang CC, Niu F, et al. Evaluation of a Pharmacist-Managed Antidiabetic Deprescribing Program in an Integrated Health Care System. *Journal of Managed Care and Specialty Pharmacy* 2019; **25**(8): 927-34.

41. McBane SE, Dopp AL, Abe A, et al. Collaborative Drug Therapy Management and Comprehensive Medication Management: American College of Clinical Pharmacy. *Pharmacotherapy* 2015.

42. McInnis T, Capps K. Get the medications right: a nationwide snapshot of expert practices-Comprehensive medication management in ambulatory/community pharmacy. Health2 Resources, 2016.

43. The Patient-Centered Medical Home: Integrating Comprehensive Medication Management to Optimize Patient Outcomes. The Patient-Centered Primary Care Collaborative, 2012.

44. Scott IA, Hilmer SN, Reeve E, et al. Reducing inappropriate polypharmacy: the process of deprescribing. *JAMA Internal Medicine* 2015; **175**(5): 827-34.

45. Reeve E, Shakib S, Hendrix I, Roberts MS, Wiese MD. The benefits and harms of deprescribing. (Report). *The Medical Journal of Australia* 2014; **201**(7): 386-9.

46. Iyer S, Naganathan V, McLachlan A, Le Couteur D. Medication withdrawal trials in people aged 65 years and older: a systematic review. *Drugs & Aging* 2008; **25**(12): 1021-31.

47. Page AT, Clifford RM, Potter K, Schwartz D, Etherton-Beer CD. The feasibility and effect of deprescribing in older adults on mortality and health: a systematic review and meta-analysis. *British Joural of Clinical Pharmacology* 2016; **82**(3): 583-623.

48. Scott IA, Gray LC, Martin JH, Mitchell CA. Minimizing inappropriate medications in older populations: a 10-step conceptual framework. *American Journal of Medicine* 2012; **125**(6): 529-37.

49. Brandt NJ. Optimizing Medication Use Through Deprescribing: Tactics for This Approach. *Journal of Gerontological Nursing* 2016; **42**(1): 10-4.

50. Duncan P, Duerden M, Payne RA. Deprescribing: a primary care perspective. *European Journal of Hospital Pharmacy* 2017; **24**(1).

51. Jansen J, Naganathan V, Carter SM, et al. Too much medicine in older people? Deprescribing through shared decision making. *BMJ* 2016; **353**: i2893.

52. Naughton C, Hayes. Deprescribing in older adults: a new concept for nurses in administering medicines and as prescribers of medicine. *European Journal of Hosp. Pharm. 2017*

53. Rankin A, Cadogan CA, Ryan C, Clyne B, Smith S, Hughes C. Core Outcome Set for Trials Aimed at Improving the Appropriateness of Polypharmacy in Older People in Primary Care. *Journal of the American Geriatrics Society* 2018; **66**(6): 1206-12.

54. Hilmer S, Gnjidic D. Deprescribing: the emerging evidence for and the practice of the 'geriatrician's salute'. *Age and Ageing* 2018; **47**(5): 638-40.

55. Sacarny A, Barnett ML, Le J, Tetkoski F, Yokum D, Agrawal S. Effect of Peer Comparison Letters for High-Volume Primary Care Prescribers of Quetiapine in Older and Disabled Adults: A Randomized Clinical Trial. *JAMA Psychiatry* 2018.

56. Redberg R. Failing Grade for Shared Decision Making for Lung Cancer Screening. *JAMA Internal Medicine* 2018.

57. Goff SL, Mazor KM, Ting HH, Kleppel R, Rothberg MB. How Cardiologists Present the Benefits of Percutaneous Coronary Interventions to Patients With Stable Angina. *JAMA Intern Medicine* 2014; **174**(10): 1614-16221.

58. Scott IA, Le Couteur DG. Physicians need to take the lead in deprescribing. *Internal Medicine Journal* 2015; **45**(3): 352-6.

59. Turner JP, Currie J, Trimble J, Tannenbaum C. Strategies to promote public engagement around deprescribing. *Therapeutic Advances in Drug Safety* 2018.

60. Tannenbaum C, Martin P, Tamblyn R, Benedetti A, Ahmed S. Reduction of inappropriate benzodiazepine prescriptions among older adults through direct patient education: the EMPOWER cluster randomized trial. *JAMA Internal Medicine* 2014; **174**(6): 890-8.

61. Mangin D. Could you be on too many drugs? RxRisk; June 13, 2014.

62. Martin P, Tamblyn R, Benedetti A, Ahmed S, Tannenbaum C. Effect of a pharmacist-led educational intervention on inappropriate medication prescriptions in older adults: The d-prescribe randomized clinical trial. *JAMA* 2018; **320**(18): 1889-98.

63. Dollman W, Leblanc V, Stevens L, O'Connor P, Roughead EE, Gilbert A. Achieving a sustained reduction in benzodiazepine use through implementation of an area-wide multi-strategic approach. *Journal of Clinical Pharmacy and Therapeutics* 2005; **30**(5): 425-32.

64. The American Academy of Pediatrics. Reducing Sudden Infant Death with "Back to Sleep." 2019. https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/7-great-achievements/Pages/Reducing-Sudden-Infant-Death-with-Back-to-.aspx (accessed 05/23/19).

65. Wakefield M, Loken B, Hornik R. Use of mass media campaigns to change health behaviour. *The Lancet* 2010; **376**(9748).

66. Long T, Taubenheim A, Wayman J, Temple S, Ruoff B. "The Heart Truth:" Using the Power of Branding and Social Marketing to Increase Awareness of Heart Disease in Women. *Social Marketing Quarterly* 2008; **14**(3): 3-29.

67. Driving Toward Age-Friendly Care for the Future. New York, NY: WebMD. The John A. Hartford Foundation, 2019.

68. Anderson K, Stowasser D, Freeman C, Scott I. Prescriber barriers and enablers to minimising potentially inappropriate medications in adults: a systematic review and thematic synthesis. *BMJ Open* 2014; **4**(12): e006544.

69. Addressing the Prescription Opioid Crisis: Rx Awareness Campaign Overview. Atlanta, GA: Centers for Disease Control and Prevention,2017.

70. Pechmann C, Reibling E. Anti-smoking advertising campaigns targeting youth: case studies from USA and Canada. *Tobacco Control* 2000; **9**: 18-31.

71. Bar-Zemer N. Patient and Clinician Perceptions of Polypharmacy. The Lown Institute; 2018.

72. Farrelly M, Niederdeppe J, Yarsevich J. Youth tobacco prevention mass media campaigns: past, present, and future directions. *Tobacco Control* 2003; **12**(35-47).

73. Gillet J, Ross A. Confronting Medicine's Dichotomies: Older Adults' Use of Interpretative Repertoires in Negotiating the Paradoxes of Polypharmacy and Deprescribing. *Qualitative Health Research* 2019.

74. Martin P, Tamblyn R, Benedetti A, Ahmed S, Tannenbaum C. Effect of a Pharmacist-Led Educational Intervention on Inappropriate Medication Prescriptions in Older Adults. *JAMA* 2018; **320**(18): 1889–98.

75. Turner J, Tannenbaum C. Older Adults' Awareness of Deprescribing: A Population-Based Survey. *Journal of the American Geriatrics Society* 2017; **65**(12): 2691-6.

76. Linder JA, Meeker D. Effects of Behavioral Interventions on Inappropriate Antibiotic Prescribing in Primary Care 12 Months After Stopping Interventions. *JAMA* 2017; **318**(14): 1391-2.

77. Meeker D, Linder JA, Fox C, Friedberg MW, Persell S, Doctor J. Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices. *JAMA* 2016; **315**(6): 562-70.

78. Doctor J, Nguyen A, Lev R, et al. Opioid prescribing decreases after learning of a patient's fatal overdose. *Science* 2018; **361**(6402): 588-90.

79. Taking action on overuse: An action-planning framework and change package: MacColl Center for Health Care Innovation, 2016.

80. Wheeler D, Marcus P, Nguyen J. Evaluation of a Resident-Led Project to Decrease Phlebotomy Rates in the Hospital: Think Twice, Stick Once. *JAMA Internal Medicine* 2016; **176**(5): 708-10.

81. Nurses Improving Care for Health System Elders. Success Stories. 2016. https://nicheprogram.org/resources/success-stories.

82. Coloian M. Second Right Care Educators program announced at Lown conference. Brookline, MA: The Lown Institute; 2016.

83. Reeve E, Bell JS, Hilmer SN. Barriers to Optimising Prescribing and Deprescribing in Older Adults with Dementia: A Narrative Review. *Current Clinical Pharmacology* 2015; **10**(3): 168-77.

84. Timmerman L. Failing To Report Severe Drug Side Effects: A National Embarrassment. *Forbes* 2015.

85. Farrell B, Richardson L, Raman-Wilms L, de Launay D, Alsabbagh MW, Conklin J. Self-efficacy for deprescribing: A survey for health care professionals using evidence-based deprescribing guidelines. *Research in Social & Administrative Pharmacy : RSAP* 2018; **14**(1): 18-25.

86. McCarthy D. Reducing Inappropriate Medication Use by Implementing Deprescribing Guidelines. Cambridge, Massachusetts: Institute for Healthcare Improvement, 2017.

87. Thompson W, Pizzola L, Hogel M, Black C, Farrell B. Developing an evidence-based deprescribing guideline: instruction manual for guideline coordinators (working document). Ottowa, CA: Deprescribing.org, 2018.

88. Deprescribing Guidelines and Algorithms. 2019. https://deprescribing.org/resources/deprescribing-guidelines-algorithms/ (accessed 07/15/19).

89. Reeve E, Farrell B, Thompson W, et al. Evidence-based Clinical Practice Guideline for Deprescribing Cholinesterase Inhibitors and Memantine: The University of Sydney NHMRC Partnership Centre: Dealing with Cognitive and Related Functional Decline in Older People (Cognitive Decline Partnership Centre) Bruyère Research Institute, Deprescribing Guidelines in the Elderly Project, 2018.

90. Polypharmacy Guidance Realistic Prescribing, 3rd Edition. Scotland, UK: Scottish Government Polypharmacy Model of Care Group, 2018.

91. Lindsay J, Dooley M, Martin J, et al. The development and evaluation of an oncological palliative care deprescribing guideline: the 'OncPal deprescribing guideline'. *Supportive Care in Cancer* 2014; **23**(1): 71-8.

92. Mistler L, Mellman T, Drake R. A pilot study testing a medication algorithm to reduce polypharmacy. *BMJ Quality & Safety* 2009; **18**: 55-8.

93. Chong S, Ravichandran N, Poon L, Soo K, Verma S. Reducing polypharmacy through the introduction of a treatment algorithm: use of a treatment algorithm on the impact on polypharmacy. *Annals of Academy of Medicine Singapore* 2006; **35**(7): 457-60.

94. Scott I, Anderson K, Freeman C. Review of structured guides for deprescribing. *European Journal of Hospital Pharmacy* 2017; **24**: 51-7.

95. American Diabetes Association Older Adults: Standards of Medical Care in Diabetes—2019. *Diabetes Care* 2019; **42**: S139-S47.

96. Boyd CM, McNabney MK, Brandt N, et al. Guiding Principles for the Care of Older Adults with Multimorbidity: An Approach for Clinicians. *Journal of the American Geriatrics Society* 2012.

97. Multimorbidity: clinical assessment and management. UK: National Institute for Healthcare Excellence; 2016.

98. Boyd C, Smith C, Masoudi F, et al. Decision Making for Older Adults With Multiple Chronic Conditions: Executive Summary for the American Geriatrics Society Guiding Principles on the Care of Older Adults With Multimorbidity. *Journal of the American Geriatrics Society* 2019; **67**(4): 665-73.

99. Hayward A. Polypharmacy and Deprescribing in Older Adults: Presentation at Oregon Geriatrics Society, October 9, 2016.

100. Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain — United States, 2016: Centers for Disease Control and Prevention, 2016.

101. Farrell B, Conklin J, Dolovich L, et al. Deprescribing guidelines: An international symposium on development, implementation, research and health professional education. *Research in Social and Administrative Pharmacy* 2019; **15**(6): 780-9.

102. Farrell B, Tsang C, Raman-Wilms L, Irving H, Conklin J, Pottie K. What are priorities for deprescribing for elderly patients? Capturing the voice of practitioners: a modified delphi process. *PloS One* 2015; **10**(4): e0122246.

103. Thompson W, Reeve E, Moriarty F, et al. Deprescribing: Future directions for research. *Research in Social and Administrative Pharmacy* 2019.

104. Farrell B, Pottie K, Rojas-Fernandez CH, Bjerre LM, Thompson W, Welch V. Methodology for Developing Deprescribing Guidelines: Using Evidence and GRADE to Guide Recommendations for Deprescribing. *PloS One* 2016; **11**(8): e0161248.

105. Lavan AH, Gallagher P, Parsons C, O'Mahony D. STOPPFrail (Screening Tool of Older Persons Prescriptions in Frail adults with limited life expectancy): consensus validation. *Age and Aging* 2017; **46**(4): 600-7.

106. McKean M, Pillans PI, Scott IA. A medication review and deprescribing method for hospitalised older patients receiving multiple medications. *Internal Medicine Journal* 2016; **46**(1): 35-42.

107. Vasilevskis EE, Shah AS, Hollingsworth EK, et al. A patient-centered deprescribing intervention for hospitalized older patients with polypharmacy: rationale and design of the Shed-MEDS randomized controlled trial. *BMC Health Services Research* 2019; **19**.

108. DeJong C, Steinbrook R. Continuing Problems With Financial Conflicts of Interest and Clinical Practice Guidelines. *JAMA Internal Medicine* 2018; **178**(12): 1715.

109. Molino CC, Leite-Santos NC, Gabriel FC, et al. Factors Associated With High-Quality Guidelines for the Pharmacologic Management of Chronic Diseases in Primary Care: A Systematic Review. *JAMA Internal Medicine* 2019; **179**(4): 553-60.

110. Uhlig K, Leff B, Kent D, et al. A framework for crafting clinical practice guidelines that are relevant to the care and management of people with multimorbidity. *Journal of General Internal Medicine* 2014; **29**(4): 670-9.

111. Bennett W, Robbins C, Bayliss E, et al. Engaging Stakeholders to Inform Clinical Practice Guidelines That Address Multiple Chronic Conditions. *Journal of General Internal Medicine* 2017; **32**(8): 883-90.

112. Smith K, Ashburn S, Aminawung J, Mann M, Ross J. Physician clinical management strategies and reasoning: a cross-sectional survey using clinical vignettes of eight common medical admissions. *BMC Health Services Research* 2014; **14**(176).

113. Ramadurai D, Tanaka D. What should the target blood pressure be? The Lown Institute; 2018.

114. Mallery LH, Ransom T, Steeves B, Cook B, Dunbar P, Moorhouse P. Evidence-informed guidelines for treating frail older adults with type 2 diabetes: from the Diabetes Care Program of Nova Scotia (DCPNS) and the Palliative and Therapeutic Harmonization (PATH) program. *Journal of the American Medical Directors Association* 2013; **14**(11): 801-8.

115. 2020 Medicare Advantage and Part D rate announcement and call letter. Center for Medicare and Medicaid Services; April 1, 2019.

116. Norris S, Holmer H, Ogden L, Burda B. Conflict of interest in clinical practice guideline development: a systematic review. *PloS One* 2011; **6**(10).

117. Lenzer J, Hoffman JR, Furberg CD, Ioannidis JP. Ensuring the integrity of clinical practice guidelines: a tool for protecting patients. *BMJ* 2013; **347**: f5535.

118. Samal L, Dykes PC, Greenberg JO, et al. Care coordination gaps due to lack of interoperability in the United States: a qualitative study and literature review. *BMC Health Services Research* 2016; **16**.

119. Palagyi A, Keay L, Harper J, Potter J, Lindley RI. Barricades and brickwalls--a qualitative study exploring perceptions of medication use and deprescribing in long-term care. *BMC Geriatrics* 2016; **16**: 15.

120. Schiff G, Mirica MM, Dhavle AA, Galanter WL, Lambert B, Wright A. A Prescription For Enhancing Electronic Prescribing Safety. *Health Affairs* 2018; **37**(11).

121. Scott IA, Pillans PI, Barras M, Morris C. Using EMR-enabled computerized decision support systems to reduce prescribing of potentially inappropriate medications: a narrative review. *Therapeutic Advances in Drug Safety* 2018.

122. Teich JM, Osheroff JA, Pifer EA, Sittig DF, Jenders RA. Clinical Decision Support in Electronic Prescribing: Recommendations and an Action Plan: Report of the Joint Clinical Decision Support Workgroup *Journal of the American Medical Informatics Association* 2005; **12**(4): 365-76.

123. Schiff GD, Galanter WL, Duhig J, Amy E. Lodolce, Koronkowski MJ, Lambert BL. Principles of Conservative Prescribing. *Archives of Internal Medicine* 2011; **171**(16): 1433-40.

124. Middleton B, Bloomrosen M, Dente M, et al. Enhancing patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA. *Journal of the American Medical Informatics Association* 2013; **20**(e1): e2-8.

125. Gyawali B, Hey SP, Kesselheim AS. Assessment of the Clinical Benefit of Cancer Drugs Receiving Accelerated Approval. *JAMA Internal Medicine* 2019; **179**(7): 906-13.

126. Hohl CM, Woo S, Cragg A, et al. Repeat exposures to culprit drugs contribute to adverse drug events in emergency department patients. *California Journal of Emergency Medicine* 2017; **19**: S59.

127. Questions and Answers on FDA's Adverse Event Reporting System (FAERS). 2018. https://www.fda.gov/drugs/surveillance/fda-adverse-event-reporting-system-faers2019).

128. Hazell L, Shakir S. Under-Reporting of Adverse Drug Reactions. *Drug Safety* 2006; **29**(5): 385-96.

129. Stergiopoulos S, Brown CA, Felix T, Grampp G, Getz KA. A Survey of Adverse Event Reporting Practices Among US Healthcare Professionals. *Drug Safety* 2016; **39**(11): 1117-27.

130. Ma P, Marinovic I, Karaca-Mandic P. Drug Manufacturers' Delayed Disclosure of Serious and Unexpected Adverse Events to the US Food and Drug Administration. *JAMA Internal Medicine* 2015; **175**(9): 1565-6.

131. Dweik RA, Stacey D, Kohen D, Yaya S. Factors affecting patient reporting of adverse drug reactions: a systematic review. *British Journal of Clinical Pharmacology* 2017; **83**: 875-83.

132. Sentinel System Five-Year Strategy 2019-2023. U.S. Food and Drug Administration, 2019.

133. Drazen J, Rainey J, Begg H, Butler AS. Adverse Drug Event Reporting: The Roles of Consumers and Health-Care Professionals. Washington, DC: Institute of Medicine of the National Press, 2007.

134. Gordon J. The under-representation of elderly patients in a problem-based medical school curriculum. *Medical Teacher* 2007; **29**(8): 844.

135. Raman-Wilms L, Farrell B, Sadowski C, Austin Z. Deprescribing: An educational imperative. *Research in Social and Administrative Pharmacy* 2019; **15**(6): 790-5.

136. Preparing the Current and Future Health Care Workforce for Interprofessional Practice in Sustainable, Age-Friendly Health Systems: Advisory Committee on Interdisciplinary Community-Based Linkages. Health Resources and Services Administration 2019.

137. Mecca M, Thomas J, Niehoff K, et al. Assessing an Interprofessional Polypharmacy and Deprescribing Educational Intervention for Primary Care Post-graduate Trainees: a Quantitative and Qualitative Evaluation. *Journal of General Internal Medicine* 2019; **34**(7): 1220-7.

138. University of British Columbia, Faculty of Pharmaceutical Sciences. Pharmacists Clinic. https://pharmsci.ubc.ca/pharmacists-clinic

139. Cervero R, Gaines J. Effectiveness of continuing medical education: Updated synthesis of systematic reviews: Accreditation Council for Continuing Medical Education, 2014.

140. ACCME Data Report: Growth and Advancement in Accredited in Continuing Medical Education – 2018: Accreditation Council for Continuing Medical Education, 2019.

141. Casebeer L, Brown J, Roepke N, et al. Evidence-based choices of physicians: a comparative analysis of physicians participating in Internet CME and non-participants. *BMC Medical Education* 2010; **10**(42).

142. Results of the academic detailing service for primary care providers. Ontario, Canada: Centre for Effective Practice, 2017.

143. Avorn J, Soumerai S. Improving Drug-Therapy Decisions through Educational Outreach — A Randomized Controlled Trial of Academically Based Detailing. *The New England Journal of Medicine* 1983; **308**: 1457-63.

144. Daina L. Wells, Popish S, Chad Kay, Torrise V, Christopher MLD. VA Academic Detailing Service: Implementation and Lessons Learned. *Federal Practitioner* 2016.

145. Naughton C, Feely J, Bennett K. A RCT evaluating the effectiveness and cost-effectiveness of academic detailing versus postal prescribing feedback in changing GP antibiotic prescribing. *Journal of Evaluation of Clinical Practice* 2009; **15**(5).

146. Moriates C. Email Correspondence, 9/22/19.

147. Klara K, Kim J, Ross J. Direct-to-Consumer Broadcast Advertisements for Pharmaceuticals: Off-Label Promotion and Adherence to FDA Guidelines. *Journal of General Internal Medicine* 2018; **33**(5): 651-8.

148. Birrer R, Tokuda Y. Medicalization: A historical perspective. *Journal of General Family Medicine* 2017; **18**(2): 48-51.

149. Fickweiler F, Fickweiler W, Urbach E. Interactions between physicians and the pharmaceutical industry generally and sales representatives specifically and their association with physicians' attitudes and prescribing habits: a systematic review. *BMJ Open* 2017; **7**(8).

150. Rasmussen K, Bero L, Redberg R, Gotzsche PC, Lundh A. Collaboration between academics and industry in clinical trials: cross sectional study of publications and survey of lead academic authors. *The BMJ* 2018.

151. Spurling G, Mansfield P, Montgomery B, et al. Information from pharmaceutical companies and the quality, quantity, and cost of physicians' prescribing: a systematic review. *PLoS Med* 2010; **19**(7).

152. Adair R, Holmgren L. Do drug samples influence resident prescribing behavior? A randomized trial. *American Journal of Medicine* 2005; **118**(8): 881-4.

153. Chew L, O'Young T, Hazlet T, Bradley K, Maynard C, Lessler D. A physician survey of the effect of drug sample availability on physicians' behavior. *Journal of General Internal Medicine* 2000; **15**(7): 478-83.

154. Lahey T. The High Costs of "Free" Drug Samples. *Clinical and Translational Gastroenterology* 2014; **5**(12).

155. Fugh-Berman A, Ahari S. Following the Script: How Drug Reps Make Friends and Influence Doctors. *PLoS Med* 2007; **4**(4): e150.

156. Drug and Drug-Related Supply Promotion by Pharmaceutical Company: Sales Representatives at VA Facilities. *Federal Register* 2010, Vol. 75, No. 90.

157. Larkin I, Ang D, Steinhart J, et al. Association Between Academic Medical Center Pharmaceutical Detailing Policies and Physician Prescribing. *JAMA* 2017; **317**(17): 1785-95.

158. Larkin I, Ang D, Avorn J, Kesselheim A. Restrictions On Pharmaceutical Detailing Reduced Off-Label Prescribing Of Antidepressants And Antipsychotics In Children. *Health Affairs* 2014; **33**(6).

159. Carlat DJ, Fagrelius T, Ramachandran R, Ross JS, Bergh S. The updated AMSA scorecard of conflict-of-interest policies: a survey of U.S. medical schools. *BMC Medical Education* 2016; **16**(202).

160. Reporting Drug Sample Information Under Section 6004 of the Affordable Care Act. U.S. Food and Drug Administration. Washington, DC; 2014.

161. Richardson E. The Physician Payments Sunshine Act. *Health Affairs* 2014.

162. Kopp E, Lupkin S, Lucas E. Patient Advocacy Groups Take In Millions From Drugmakers. Is There A Payback? *Kaiser Health News*, 2018. https://khn.org/news/patient-advocacy-groups-take-in-millions-from-drugmakers-is-there-a-payback/ (accessed 6/10/19).

163. Kang S-Y, Bai G, Karas L, Anderson GF. Pharmaceutical Industry Support of US Patient Advocacy Organizations: An International Context. *American Journal of Public Health* 2019; **109**(4): 559-61.

164. Gaunt MJ. Medication Samples and Safety Concerns for Physician Practices. *Pharmacy Times*, 2013. https://www.pharmacytimes.com/publications/issue/2013/july2013/medication-samples-and-safety-concerns-for-physician-practices (accessed 6/10/19).

165. Backer E, Lebsack J, Van Tonder R, Crabtree B. The value of pharmaceutical representative visits and medication samples in community-based family practices. *Journal of Family Practice* 2000; **49**(9): 811-6.

166. Evans KL, Brown SR. Many Sample Closet Medications Are Expired. *The Journal of the American Board of Family Medicine* 2012; **25**(3): 394-5.

167. Recommendations for Avoiding Medication Errors With Drug Samples: National Coordinating Council for Medication Error Reporting and Prevention, 2008.

168. Brett AS, Burr W, Moloo J. Are Gifts From Pharmaceutical Companies Ethically Problematic? A Survey of Physicians. *JAMA Internal Medicine* 2003; **163**(18).

169. Chimonas S, Kassirer J. No More Free Drug Samples? *PLoS Med* 2009; **6**(5).

170. Joyce M. Industry gifts to doctors are linked to their prescribing … and you. *Health News Review*, 2017. https://www.healthnewsreview.org/2017/10/158166/ (accessed 6/10/19).

171. Just Medicine Campaign. 2019. https://www.amsa.org/advocacy/just-medicine-campaign/ (accessed 07/20/19).

172. Donahue J. A History of Drug Advertising: The Evolving Roles of Consumers and Consumer Protection. *Milbank Quarterly* 2006; **84**(4): 659-99.

173. Mintzes B. The tip of the iceberg of misleading online advertising. *International Journal of Health Policy Management* 2016; **5**(5): 329-31.

174. Kaufman J. Think You're Seeing More Drug Ads on TV? You Are, and Here's Why. *The New York Times*. 2017.

175. The Impact of Direct-to-Consumer Advertising. Washington, DC: US Food and Drug Administration, 2015.

176. Ventola CL. Direct-to-Consumer Pharmaceutical Advertising:Therapeutic or Toxic? *Pharmacy & Therapeutics* 2011; **36**(10): 669-74.

177. Donahue J, Cevasco M, Rosenthal M. A Decade of Direct-to-Consumer Advertising of Prescription Drugs. *The New England Journal of Medicine* 2007; **357**: 673-81.

178. Prescription Drug Advertising: Questions and Answers. 2015. https://www.fda.gov/drugs/prescription-drug-advertising/prescription-drug-advertising-questions-and-answers (accessed 06/25/19).

179. Crosse M. Prescription Drugs: Improvements Needed in FDA's Oversight of Direct-to-Consumer Advertising. Washington, DC: US Government Accountability Organization; 2006.

180. Gahart MA, Duhamel LM, Dievler A, Price R. Examining The FDA's Oversight Of Direct-To-Consumer Advertising. *Health Affairs* 2003; **22**.

181. Shuchman M. Drug Risks and Free Speech — Can Congress Ban Consumer Drug Ads? *The New England Journal of Medicine* 2007; **356**: 2236-9.

182. Chipman B. Senator Chipman Introduces Bill to Ban Prescription Drug Advertising. Maine Senate; 2019.

183. The Future of Drug Safety: Promoting and Protecting the Health of the Public. Washington, DC: Institute of Medicine, 2007.

184. Shaheen J. Shaheen Introduces Legislation to Close Big Pharma Advertising Tax Loophole. Washington, DC; 2019.

185. ELIQUIS TV Commercial, 'Around the Corner'. iSpotTV; 2018.

186. Granger CB, Alexander JH, John J.V. McMurray, et al. Apixaban versus Warfarin in Patients with Atrial Fibrillation. *The New England Journal of Medicine* 2011; **365**: 981-92.

187. Schwartz L, Woloshin S. The Prescription Drug Facts Box: Helping Doctors and Patients Make Wise Choices. White River Junction, VT: The Department of Veteran's Affairs Medical Center, 2009.

188. Schwartz L, Woloshin S. The Drug Facts Box: Improving the communication of prescription drug information. *Proceedings of the National Academy of Sciences of the USA* 2013; **110**: 14069-74.

189. Thomas K. Drug Makers Sue to Block Requirement for Listing Prices in TV Ads. *The New York Times*. 2019.

190. Goldacre B, Drysdale H, Powell-Smith A, et al. The COMPare Trials Project. University of Oxford: Centre for Evidence-Based Medicine, 2016.

191. Kent D, Hayward R. Limitations of applying summary results of clinical trials to individual patients: the need for risk stratification. *JAMA* 2007; **298**(10): 1209-12.

192. Kent D, Nelson J, Altman DG, Hayward R. Treatment Effect Heterogeneity in Clinical Trials: An Evaluation of 13 Large Clinical Trials Using Individual Patient Data. *Value in Health* 2014; **17**(7): A543-4.

193. Kent D, Rothwell P, Ioannidis J, Altman D, Hayward R. Assessing and reporting heterogeneity in treatment effects in clinical trials: a proposal. *Trials* 2010; **11**(85).

194. Beuscart J-B, Knol W, Cullinan S, et al. International core outcome set for clinical trials of medication review in multi-morbid older patients with polypharmacy. *BMC Medicine* 2018; **16**(21).

195. Mirk A, Echt KV, Vandenberg AE, Kemp L, Johnson TM, Molly M. Perkins P. Polypharmacy Review of Vulnerable Elders: Can We IMPROVE Outcomes? *Federal Practitioner* 2016; **33**(3): 39-41.

196. Hohl CM, Dankoff J, Colacone A, Afilalo M. Polypharmacy, adverse drug-related events, and potential adverse drug interactions in elderly patients presenting to an emergency department. *Annals of Emergency Medicine* 2001; **38**(6): 666-71.

21 Longwood Avenue
Brookline, MA 02446-5239 www.lowninstitute.org info@lowninstitute.org 617-992-9322