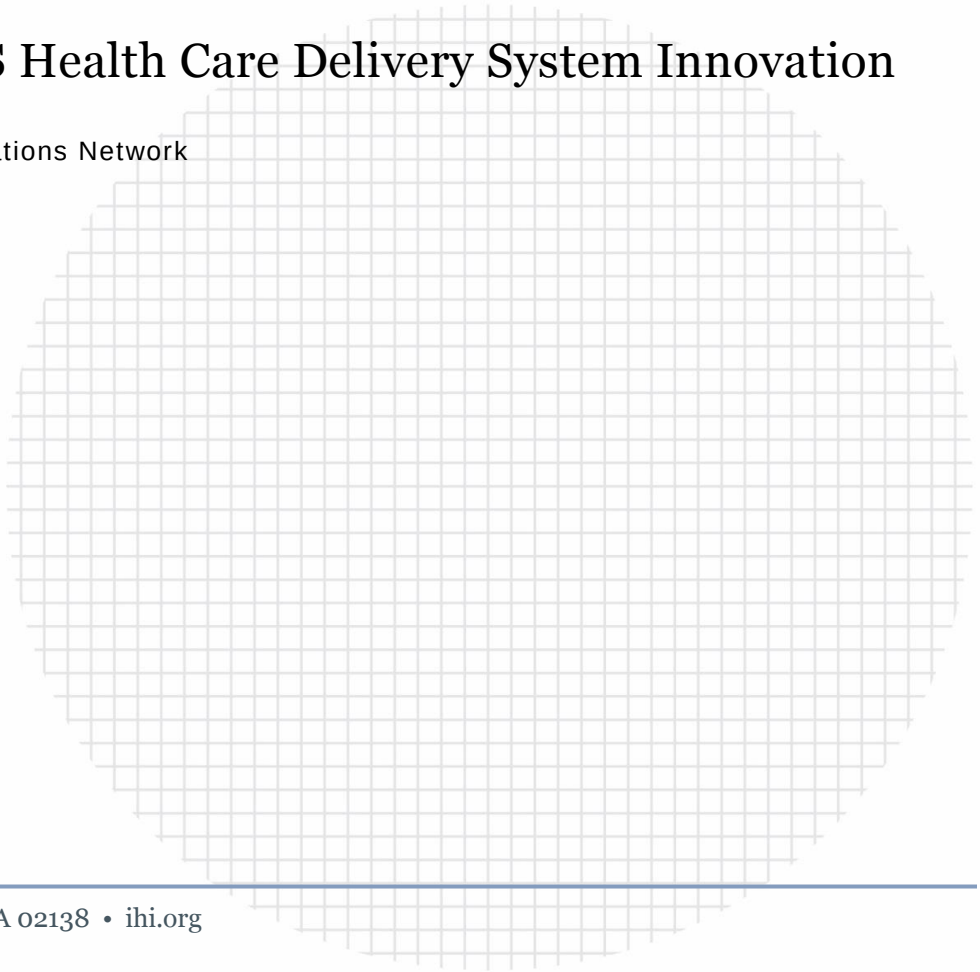
Institute for Healthcare Improvement

Reducing Inappropriate Medication Use by Implementing Deprescribing Guidelines

A Case Study for US Health Care Delivery System Innovation

IHI/Commonwealth Fund Innovations Network



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Summary

A multidisciplinary team of clinical experts in Ottawa, Canada, created a credible, low-cost process for developing and implementing evidence-based deprescribing guidelines and tools for assessing, tapering, and stopping medications that may cause harm or no longer benefit patients. Although the intervention led primary care teams to consider approaches for identifying such medications and engaging patients in conversations about discontinuing them, information and time constraints limited uptake during clinical encounters. The intervention was more successful in long-term care settings, where it strengthened team-based medication reviews in fulfillment of routine quality improvement and reporting requirements. Clinical pharmacists acted as "champions" for guideline use in both settings. Expected outcomes include reductions in adverse drug events and medication costs as well as improvements in patient quality of life. Adoption of these deprescribing guidelines in the United States may be facilitated by medication management and stewardship programs, value-based payment incentives, and patient concerns about medication safety and cost-sharing burdens.

Introduction

The problems that plague US health care systems are longstanding and many seem to be intractable. Yet, by studying health care systems in other countries, innovative solutions may be available globally to help solve or improve these problems. To this end, The Commonwealth Fund, in collaboration with the Institute for Healthcare Improvement (IHI), established the International Program for US Health Care System Innovation. This program aims to 1) identify promising frontline delivery system approaches to health care from abroad that might be transferred to the United States to improve quality of care, control costs, and increase value; and 2) test the innovations in the US health care systems to adapt for a US context.

The program established an Innovations Network of 15 leading US-based health care systems to identify and prioritize four intractable problems in the US delivery system. An international panel of experts scanned industrialized countries outside the US for innovative solutions to the intractable problems, evaluated the feasibility and transferability of the innovations, and selected four of the most promising solutions for site visits to gain a firsthand understanding of how the "solution" works in the local context.

This case study presents one of the four selected innovations for which a site visit was conducted, describing the innovation in the local context and discussing considerations for implementing the innovation in the US health care system. A team of three researchers from the Institute for Healthcare Improvement and four health care leaders from the IHI/Commonwealth Fund Innovators Network conducted a three-day site visit in Ottawa, Ontario, in April 2016. The team met with developers, researchers, trainers, and implementers of the deprescribing method; documented conversations in detailed notes; and audio-recorded most interviews. After each day, the team discussed findings and unanswered questions and prepared for upcoming discussions. Common themes were identified, and supported by quotes and literature. The case study was written by the primary author, and reviewed by all site visitors and deprescribing experts. The research and initial written summary of this innovation were completed in August 2016.

Overview of the Innovation

Many patients take medications that may harm or no longer benefit them. Clinical guidelines specify when medications should be started, but rarely indicate when or how they should be stopped. This Canadian innovation demonstrated a systematic and adaptable process for developing and implementing guidelines for clinicians to discontinue unnecessary or inappropriate medications. It has the following features:

- Uses rigorous methods to create relevant, evidence-based deprescribing guidelines for drug classes with good evidence about the opportunity for and effects of deprescribing and for which clinicians need guidance to enact change.
- Incorporates feedback from implementation sites, including contextual information and practical tools such as recommendations for tapered dosing and monitoring for adverse effects of deprescribing.
- Uses a structured, reflective process aimed at success, focused on increasing prescribers' self-efficacy (i.e., knowledge, skill, and ability) for acting on patients' acceptance of deprescribing recommendations.

The incorporation of feedback and reflection were uniquely innovative aspects of the deprescribing guidelines process, in comparison to traditional guideline development. The cost of development was estimated at $75,000 (Canadian) per guideline. Guideline use was associated with a 20 percent reduction in the use of proton pump inhibitors at one long-term care site, with little cost for implementation other than staff training time. Costs and benefits in other settings are more uncertain.

Background

In the United States in 2013, almost one of five elderly adults (ages 65 and older) was prescribed a potentially inappropriate medication for which the risk of harm outweighs the likely benefit; the rate varied from 9 to 30 percent across 300 local health care markets.[1] A literature review reported up to 50 percent of elderly patients were taking one or more drugs that were not medically indicated.[2]

In 2011–2012, two of five elderly US adults were taking at least five medications at the same time, a threshold referred to as polypharmacy.[3] This may be beneficial for individuals with multiple health conditions, but it can also increase "risk of adverse drug events, drug interactions, medication non-adherence, reduced functional capacity, and multiple geriatric syndromes."[4]

Media attention has led to growing public awareness about the risks of polypharmacy and the adverse effects of certain drugs, prompting opportunities for conversations between clinicians and patients.[5,6] Clinicians may recognize the need to stop a medication but be uncertain about how to safely do so. Generic deprescribing algorithms do not provide the guidance clinicians need to assess the risks and benefits of specific classes of drugs. A pharmacy research collaborative in Ontario, Canada, offered funding and a supportive context for undertaking an innovative approach to address this gap, with potential for application in the United States and other countries.

The Deprescribing Guidelines Project[7] was conceived and led by Barbara Farrell, a pharmacist and clinical researcher, and James Conklin, a social scientist, at the Ottawa-based Bruyère Research Institute, and was funded by the Government of Ontario through Ontario Pharmacy Research Collaboration. They assembled a project team of respected co-investigators, methodologists, and

staff (including medical librarians, research assistants, and coordinators) to carry out the three-year project.

Stakeholders in the Deprescribing Guidelines Project include the following:

- The Bruyère Research Institute conducts research to improve the health and care of aging people. It is a program of Bruyère, a Catholic health care organization that focuses on providing sub-acute, geriatric, and palliative care for vulnerable and medically complex patients in residential and ambulatory care settings.
- The Ontario Pharmacy Research Collaboration (OPEN) aims to foster innovation and evaluate the effectiveness of pharmacist-led medication management programs in Ontario. OPEN is supported by the Government of Ontario, the University of Waterloo School of Pharmacy, and the Department of Family Medicine at McMaster University. Other participants in its research include the University of Toronto and Western University in Ontario.

To select guideline topics, an expert panel compiled a list of 29 drug classes that are overused or potentially harmful to the elderly (e.g., Beers and STOPP criteria).[8,9] Through a consensus process, clinicians and experts in geriatric medicine, long-term and primary care, and guideline development rated these drug classes to identify those for which deprescribing guidelines would be most useful for practicing clinicians.[10] From the 14 highest-rated drug classes, the project team selected three — proton pump inhibitors (PPI), benzodiazepines, and antipsychotics — for initial deprescribing guideline development.

Guideline development teams of experts and clinicians were convened for each of the three selected drug classes:

- Proton pump inhibitors (PPIs), a class of drugs that reduce acid production in the stomach, commonly used to treat heartburn, among other conditions. The team started development on this topic first because it had the greatest evidence for the benefits of deprescribing.
- Benzodiazepine receptor agonists, a class of drugs also called hypnotics or sedatives that are commonly prescribed for insomnia, among other conditions. This topic received the highest priority rating from the advisory panel for developing a deprescribing guideline.
- Atypical antipsychotics, a class of drugs used to treat psychosis and schizophrenia, among other conditions. This drug class is the focus of public reporting in both Canada and the United States, which has helped raised awareness of its potential overuse.

Guideline teams used a logic model and rigorous methods to synthesize and grade the quality of evidence and rate the strength of recommendations based on a consideration of harms, patient values and preferences, and cost.[11,12] Each guideline features a synthesis of evidence for continuing or discontinuing the medication, contextual information on patient values or preferences and on costs associated with the decision, as well as a section on clinical considerations such as how to taper dosing and monitor patients.[13]

Each guideline was tested in six pilot sites: three family health teams and three long-term care facilities.

- Family health teams are community-centered primary care practices established by the province of Ontario to improve access to care by providing a range of services to patients. The interprofessional teams typically consist of family physicians, nurse practitioners, social workers, dieticians, therapists, and clinical pharmacists. This type of practice setting was

selected for participation in the project based on an assumption that pharmacists would act as champions in implementing the guidelines.

- Long-term care homes participating in the project ranged in size. Each home is served by several part-time private practice physicians who typically spend one day a week looking after residents at the facility. Each facility was serviced by a pharmacy company that provided dispensing services and a contracted clinical pharmacist who performs medication reviews on a quarterly basis, as mandated by the provincial government. (Note that, in Ontario, pharmacists who have appropriate training can apply for authorization to prescribe smoking cessation products and to refill prescriptions such as statins for up to six months for patients that have chronic diseases.)

Guidelines were developed and implemented in a sequential fashion, rather than all at once, to permit successive learning from each and to minimize the burden of implementation in pilot sites. Feedback from pilot sites was incorporated into guidelines, particularly the clinical considerations section. The clinical considerations section notes when there isn't good evidence for one approach versus another (e.g., tapering one or two weeks at a lower dose before stopping a PPI), so prescribers may use their best judgment. Feedback from long-term care homes led the team to modify its monitoring advice when stopping PPIs; for care home residents who are unable to speak and report symptoms such as heartburn, staff should look for signs such as loss of appetite, agitation, or weight loss.

The project team helped mobilize and empower pilot sites by delivering presentations to clinical leaders and facilitating team discussion of approaches for implementing guidelines. At the request of pilot sites, the project team developed one-page algorithms summarizing each guideline as a bridge to its implementation.[14] The team found that this derivative tool was more highly valued in the pilot sites than the guideline itself. The sites also asked for patient education material; in response, the team developed a pamphlet for PPIs that helps engage patients in decision making by eliciting their preferences during discussions with a pharmacist or clinician.

The project was strengthened by applying the principles of developmental evaluation to shape the work as it progressed.[15] "We wanted to create a positive learning loop, so that all of the participants were noticing what's working, what's not working, and what should we change right now in order to promote more success in the implementation of these guidelines," Conklin noted. This reflective process has enabled learning that is helping make the experience transferable.

Findings

The research team conducted observations of and interviews with guideline development teams and implementation sites to identify factors contributing to an effective process. They conducted pre–post surveys to assess changes in physicians' perceived self-efficacy for tapering or stopping medications.[16] Preliminary findings suggest that guideline development teams need a committed leader and diverse expertise (e.g., nurse practitioners as well as physicians), including those with access to networks and resources, and support from a coordinator and medical librarian. Their work requires a structure and process with clearly defined roles, responsibilities, and timelines (see Appendix A).

Feedback from clinicians indicates they find the guidelines credible and useful for decision making, and that they encounter less resistance from patients in stopping medications than they had initially feared. Some clinicians said that the guidelines created the impetus for doing what they knew they should be doing, and they appreciated the authority it conferred to assure family

members that they were making appropriate decisions for patients. A few clinicians reported that they have internalized the thought process involved in deprescribing and apply it to other drug classes for which specific guidelines have not yet been developed.

The long-term care pilot sites were most successful in implementation by incorporating the guidelines into existing quarterly team-based medication reviews led by a clinical pharmacist and mandated by the provincial government. Although deprescribing may seem less daunting in a residential setting where patients can be monitored, it nevertheless can be challenging to shift institutional norms and behavioral routines. Staff at one institution described the importance of mutual support and understanding so that when deprescribing didn't work for one resident, efforts to deprescribe with other residents would not be discouraged as a result. A facility leader attributed success with deprescribing to three factors: executive support of the initiative; interdisciplinary teamwork among physicians, pharmacists, and nursing staff; and engagement of family members in deprescribing decisions.

Primary care sites experienced challenges with implementation because of competing improvement priorities and limited time for conversations with patients during clinical encounters. Both long-term and primary care settings faced challenges because electronic health record (EHR) systems could not generate lists of patients using particular drugs; moreover, records often lacked information on the indications for initially prescribing a medication. To overcome these challenges, clinical pharmacists conducted often time-consuming chart reviews to identify candidates for deprescribing, researched the original reasons for prescriptions, and made recommendations to prescribing clinicians individually or during medication reviews.

The scope of the Deprescribing Guidelines Project did not encompass an assessment of clinical outcomes of deprescribing. A review of the published literature conducted by the project team found that deprescribing interventions led to reductions in medication use and costs, and that the withdrawal of drugs was generally well tolerated.[17] A recent systematic review found significantly reduced mortality in deprescribing trials that applied patient-specific interventions, but not in trials that relied on educational programs alone; other outcomes were generally unchanged, although there were fewer falls among the subset of patients who had previously experienced a fall.[18] More robust research is needed to assess health outcomes of deprescribing in larger populations.

Lessons and Implications for US Health Care Organizations Adopting the Innovation

Representatives from two health care systems in the United States visited Ottawa in April 2016 to learn about the process of creating and using the deprescribing guidelines. They interviewed clinicians that had been testing the guidelines in long-term care facilities and primary care. The representatives expressed interest in methods for deprescribing as well as opportunities to begin the process further "upstream" in health care, when patients are in the hospital and before they reach post-acute settings. Many hospitals in the US have instituted antibiotic stewardship programs to promote judicious and appropriate use of antibiotics; these programs might provide a foundation that could be extended to support medication deprescribing efforts in hospitals.

Although the deprescribing guidelines innovation was not tested in acute care settings in Ottawa, several published trials offer precedent for deprescribing in hospitals.[19]

The US Medicare program requires that prescription drug plans establish a medication therapy management program that "ensures optimum therapeutic outcomes for targeted beneficiaries

through improved medication use and reduces the risk of adverse events," among other provisions.[20] Describing could help fulfill such requirements as part of interventions to ensure appropriate polypharmacy.[21]

To the degree that deprescribing promotes better patient outcomes and reduces medication costs, it may be a cost-effective approach for providers facing value-based and alternative payment incentives. To facilitate more efficient uptake of the innovation, US health systems might explore the feasibility of modifying their EHR systems and procedures so that prescribers are able to (or required to) record the original indication for starting a medication.

The idea that there are multiple times in an episode of care to intervene and deprescribe medications offers more options for replication in the United States.

Appendix A: Key Roles in Developing and Implementing the Deprescribing Guidelines

Role	Responsibilities and Important Recommendations
Development of Guidelines	
Co-lead investigators (Drs. Farrell and Conklin)	• Direct and ensure completion of project tasks, adherence to timelines and completion of knowledge translation activities
Guidelines methods committee	• Direct and oversee guidelines development methods (requires experience in conducting systematic reviews, developing guidelines, and clinical experience in managing prescribing) • Determine guidelines topics (using results of Delphi consensus and scoping reviews)
Guidelines lead	• Identify and recruit guidelines development team members • Direct guidelines development, set meeting agendas, facilitate team member task completion, ensure evidence syntheses completed according to protocol, ensure guidelines sections meet standards and are written in a consistent degree of detail and voice • Draft guidelines recommendations, corresponding PowerPoint summary, and one-page algorithm decision aid • Take responsibility for guidelines publication submission
Guidelines coordinator	• Draft and oversee adherence to guidelines timeline, major tasks, and deliverables (requires co-location with guidelines lead) • Maintain “conflict of interest” data from team members • Liaise with guidelines team and librarian to facilitate literature searches and evidence syntheses, ensure adherence to protocols (requires Cochrane systematic review training) • Draft guidelines recommendations, corresponding PowerPoint summary, and one-page algorithm (with guidelines lead) • Facilitate guidelines development team meeting agendas (stating decision and action items), coordinate guidelines task completion and guidelines reviews (worked well with concise communication via weekly email updates, and Dropbox used to share literature)
Guidelines development team members	• Work as part of a team of experts to develop evidence-based deprescribing guidelines, which adhere to Cochrane protocols • Attend meetings to discuss tasks, progress, and to make decisions • Define the guidelines scope; identify PICO (Population of interest, Intervention, Comparator, Outcomes) and other questions • Finish evidence synthesis, and scoping and systematic reviews • Draft guidelines sections by synthesizing available evidence on topics and applying clinical and academic expertise (worked well when team members had access to their own resources such as staff and students, and had writing experience) • Weigh evidence and use expertise to vote on, discuss, and review recommendations and guidelines content

Role	Responsibilities and Important Recommendations
Implementation of Guidelines	
Site champion (long-term and primary care)	• Encourage clinical team to attend guidelines introductory meeting and mobilize team behind the initiative • Work with guidelines coordinator to ensure guidelines and associated tools are made available to clinical team in a format and manner most applicable to your team • Act as a point person for clinical team to access guidelines, support tools, and other information on deprescribing • Check in with clinical team at scheduled meetings to remind them of guidelines and tools, and to answer their questions • Connect clinical team with guidelines coordinator as needed
Prescribers (e.g., physicians, nurse practitioners, pharmacists) (long-term and primary care)	• Review list of patients on targeted medication, indication, and assess if need is ongoing • Plan a taper schedule • Discuss deprescribing plans with patients and their families and/or power of attorneys to obtain consent to deprescribe • Initiate deprescribing • Monitor for effect and continue taper, or stop, or reintroduce medication as needed
Pharmacist (long-term care)	• Seek and review indication for each targeted medication • Prepare/present recommendation for discussion with physicians • Produce list of targeted patients for physicians to review • Attach deprescribing algorithm to patient report to support decision making by clinical team • Discuss deprescribing plans with patients and their families and/or power of attorneys and with other members of the care team to obtain consent to deprescribe
Pharmacist (primary care)	• Search EHR for patients taking targeted medications, verify ongoing use and seek original indication • Provide a list of patients on targeted medication to physicians
Frontline staff (long-term care)	• Discuss deprescribing plans with patients and their families and/or power of attorneys and with other members of the care team to obtain consent to deprescribe • Document any behavior change exhibited by patients in chart progress notes to assist with monitoring effect of deprescribing

References

[1] Radley D, McCarthy D, Hayes SL. *Rising to the Challenge: A Scorecard on Local Health System Performance, 2016 Edition*. New York: The Commonwealth Fund; 2016.

[2] Maher RL, Hanlon J, Hajjar ER. Clinical consequences of polypharmacy in elderly. *Expert Opinion in Drug Safety*. 2014 Jan;13(1):57-65.

[3] Kantor ED, Rehm DC, Haas JS, et al. Trends in prescription drug use among adults in the United States from 1999-2012. *Journal of the American Medical Association*. 2015 Nov;314(17):1818-1831.

[4] Maher RL, Hanlon J, Hajjar ER. Clinical consequences of polypharmacy in elderly. *Expert Opinion in Drug Safety*. 2014 Jan;13(1):57-65.

[5] Span P. "The Dangers of 'Polypharmacy,' the Ever-Mounting Pile of Pills." *The New York Times*. April 22, 2016.

[6] Goodman B. "Research Points to 'Smoking Gun' for PPI Risks." *WebMD Health News*. June 8, 2016.

[7] 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 Aug 12;11(8):e0161248.

[8] American Geriatrics Society 2012 Beers Criteria Update Expert Panel. American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. *Journal of the American Geriatrics Society*. 2012 Apr;60(4):616-631.

[9] O'Mahony D, Gallagher P, Ryan C, et al. STOPP & START criteria: A new approach to detecting potentially inappropriate prescribing in old age. *European Geriatric Medicine*. 2010;1:45-51.

[10] Farrell B, Tsang C, Raman-Wilms L, et al. What are priorities for deprescribing for elderly patients? Capturing the voice of practitioners: A modified Delphi process. *PLoS One*. 2015;10(4):e0122246.

[11] Guyatt G, Oxman A, Akl E, et al. GRADE Guidelines: 1. Introduction: GRADE evidence profiles and summary of findings tables. *Journal of Clinical Epidemiology*. 2011;64(4):383-394.

[12] Brouwers MC, Kho ME, Browman GP, et al. AGREE Next Steps Consortium. AGREE II: Advancing guideline development, reporting, and evaluation in health care. *Canadian Medical Association Journal*. 2010 Dec;182(18):E839-842.

[13] 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 Aug 12;11(8):e0161248.

[14] Ontario Pharmacy+ Evidence Network. "Evidence-based Deprescribing Algorithm for Proton Pump Inhibitors." http://www.open-pharmacy-research.ca/evidence-based-ppi-deprescribing-algorithm/

[15] Conklin J, Farrell B, Ward N, et al. Developmental evaluation as a strategy to enhance the uptake and use of deprescribing guidelines: Protocol for a multiple case study. *Implementation Science*. 2015 Jun;10:91.

[16] 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 Aug 12;11(8):e0161248.

[17] Thompson W, Farrell B. Deprescribing: What is it and what does the evidence tell us? *Canadian Journal of Hospital Pharmacy*. 2013 May;66(3):201-202.

[18] Page AT, Clifford RM, Potter K, et al. The feasibility and the effect of deprescribing in older adults on mortality and health: A systematic review. *British Journal of Clinical Pharmacology*. 2016 Sep;82(3):583-623.

[19] Page et al. reported results for 14 studies of deprescribing in hospital settings.

[20] Centers for Medicare and Medicaid Services. "Medication Therapy Management." https://www.cms.gov/medicare/prescription-drug-coverage/prescriptiondrugcovcontra/mtm.html

[21] 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 Dec;5(12):e009235.

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