PROGRAM PROFILE

# Understanding Principles of High Reliability Organizations Through the Eyes of VIONE,

## A Clinical Program to Improve Patient Safety by Deprescribing Potentially Inappropriate Medications and Reducing Polypharmacy

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The assessment of polypharmacy and reduction of potentially inappropriate medications using VIONE has benefited about 60,000 veterans with more than 128,000 medications deprescribed, yielding more than $4 million in annualized cost avoidance.

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High reliability organizations (HROs) incorporate continuous process improvement through leadership commitment to create a safety culture that works toward creating a zero-harm environment.[1] The Veterans Health Administration (VHA) has set transformational goals for becoming an HRO. In this article, we describe VIONE, an expanding medication deprescribing clinical program, which exemplifies the translation of HRO principles into health care system models. Both VIONE and HRO are globally relevant.

Reducing medication errors and related adverse drug events are important for achieving zero harm. Preventable medical errors rank behind heart disease and cancer as the third leading cause of death in the US.[2] The simultaneous use of multiple medications can lead to dangerous drug interactions, adverse outcomes, and challenges with adherence. When a person is taking multiple medicines, known as polypharmacy, it is more likely that some are potentially inappropriate medications (PIM). Current literature highlights the prevalence and dangers of polypharmacy, which ranks among the top 10 common causes of death in the US, as well as suggestions to address preventable adverse outcomes from polypharmacy and PIM.[3-5]

Deprescribing of PIM frequently results in better disease management with improved health outcomes and quality of life.[4] Many health care settings lack standardized approaches or set expectations to proactively deprescribe PIM. There has been insufficient emphasis on how to make decisions for deprescribing medications when therapeutic benefits are not clear and/or when the adverse effects may outweigh the therapeutic benefits.[5]

It is imperative to provide practice guidance for deprescribing nonessential medications along with systems-based infrastructure to enable integrated and effective assessments during opportune moments in the health care continuum. Multimodal approaches that include education, risk stratification, population health management interventions, research and resource allocation can help transform organizational culture in health care facilities toward HRO models of care, aiming at zero harm to patients.

The practical lessons learned from VIONE implementation science experiences on various scales and under diverse circumstances, cumulative wisdom from hindsight, foresight and critical insights gathered during nationwide spread of VIONE over the past 3 years continues to propel us toward the desirable direction and core concepts of an HRO.

The VIONE program facilitates practical, real-time interventions that could be tailored to various health care settings, organizational needs, and available resources. VIONE implements an electronic Computerized Patient Record System (CPRS) tool to enable planned cessation of nonessential medications that are potentially harmful, inappropriate, not indicated, or not necessary. The

VIONE tool supports systematic, individualized assessment and adjustment through 5 filters (Figure 1). It prompts providers to assign 1 of these filters intuitively and objectively. VIONE combines clinical evidence for best practices, an interprofessional team approach, patient engagement, adapted use of existing medical records systems, and HRO principles for effective implementation.

As a tool to support safer prescribing practices, VIONE aligns closely with HRO principles (Table 1) and core pillars (Table 2).[6-8] A zero-harm safety culture necessitates that medications be used for correct reasons, over a correct duration of time, and following a correct schedule while monitoring for adverse outcomes. However, reality generally falls significantly short of this for a myriad of reasons, such as compromised health literacy, functional limitations, affordability, communication gaps, patients seen by multiple providers, and an accumulation of prescriptions due to comorbidities, symptom progression, and management of adverse effects. Through a sharpened focus on both precision medicine and competent prescription management, VIONE is a viable opportunity for investing in the zero-harm philosophy that is integral to an HRO.

## DESIGN AND IMPLEMENTATION

Initially launched in 2016 in a 15-bed inpatient, subacute rehabilitation unit within a VHA tertiary care facility, VIONE has been sustained and gradually expanded to 38 other VHA facility programs (Figure 2). Recognizing the potential value if adopted into widespread use, VIONE was a Gold Status winner in the VHA Under Secretary for Health *Shark Tank*-style competition in 2017 and was selected by the VHA Diffusion of Excellence as an innovation worthy of scale and spread through national dissemination.[9] A toolkit for VIONE implementation, patient and provider brochures, VIONE vignette, and National Dialog template also have been created.[10]

Implementing VIONE in a new facility requires an actively engaged core team committed to patient safety and reduction of polypharmacy and PIM, interest and availability to lead project implementation strategies, along with meaningful local organizational support. The current structure for

**FIGURE 1** VIONE Overview

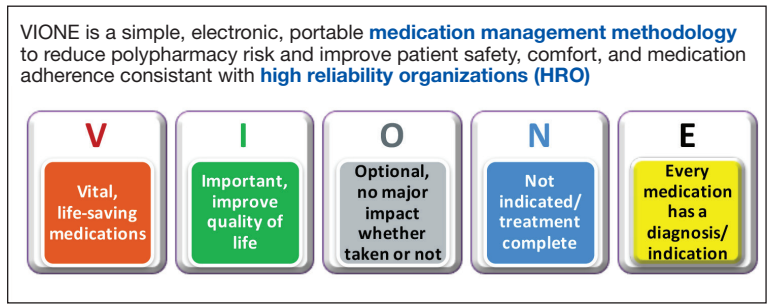
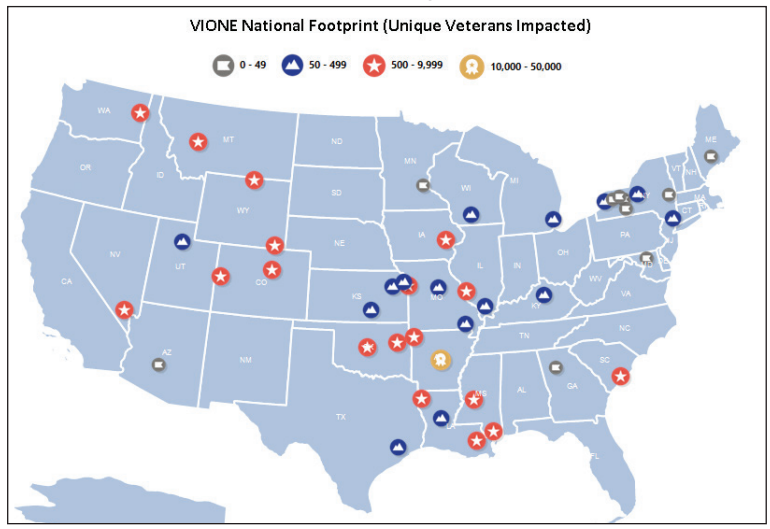



**FIGURE 2** Spread of VIONE Program




VIONE spread is as follows:

- Interested VHA participants review information and contact vavione@va.gov.
- The VIONE team orients implementing champions, mainly pharmacists, physicians, nurse practitioners, and physician assistants at a facility program level, offering guidance and available resources.
- Clinical Application Coordinators at Central Arkansas VA Healthcare System and participating facilities collaborate to add deprescribing menu options in CPRS and install the VIONE Polypharmacy Reminder Dialog template.
- Through close and ongoing collaborations, medical providers and clinical pharmacists proceed with deprescribing, aiming at planned cessation of nonessential and PIM, using the mnemonic prompt of VIONE. Vital and Important medications are continued and consolidated while a methodical plan is developed to deprescribe any medications that could lead to more harm than

**TABLE 1** Cross Walk Between Key Principles of an HRO and the VIONE Program

| High Reliability Organizations Principles | VIONE Implementation Principles |
|---|---|
| Sensitivity to operations | • Incorporates into the workflow with ease, whereby providers can document VIONE related interventions as they are making decisions regarding appropriate medication continuation/planned cessation of medications;<br>• Considers EVERY medication within methodology; no medication is excluded from a review as any could lead to AEs; and<br>• Focuses on deprescribing as a solution rather than blaming the original prescriber, accepting that overprescribing and polypharmacy is a known health system issue rarely related to a single HCP. |
| Reluctance to simplify | • Does not make sweeping assumptions about a single medication or medication class as inappropriate; it deals with each patient's clinical picture individually;<br>• Incorporates shared decision making and captures, transmits, communicates relevant data in simple formats;<br>• Training focuses on patient safety and quality of life, in addition to medication management. |
| Preoccupation with failure | • Staged to become a standard mind-set for polypharmacy, PIM deprescribing practice; every patient could (and should) be evaluated with the VIONE methodology as a standard to prevent any patient from having an AE; and<br>• Going forward, the VIONE Risk Score is a malleable evolving stratification method to identify high-risk patients based on new risk factors identified by experts. |
| Deference to expertise | • Empowers HCPs at all levels in all specialties to focus on deprescribing in polypharmacy situations; and<br>• Patient identification and review can be a team approach, deferring to either the intake nurse, clinical pharmacy specialist, or specialty prescriber depending on the expertise required for the medication. |
| Commitment to resilience | • Designed to address risk factors for poly pharmacy/PIM related AEs; patients who have historical polypharmacy related AEs (falls, emergency department visits, vulnerable patients, aged > 65 years, on > 15 medications, etc), have higher VIONE Risk Scores and thus warrant expedited review to prevent a similar AE in the future. |

Abbreviations: AE, adverse event; HCP, health care provider; HRO, high reliability organization; PIM, potentially inappropriate medication.

benefit and qualify based on the filters of Optional, Not indicated, and Every medicine has a diagnosis/reason. They select the proper discontinuation reasons in the CPRS medication menu (Figure 3) and document the rationale in the progress notes. It is highly encouraged that the collaborating pharmacists and health care providers add each other as cosigners and communicate effectively. Clinical pharmacy specialists also use the VIONE Polypharmacy Reminder Dialog Template (RDT) to document complete medication reviews with veterans to include deprescribing rationale and document shared decision making.

- A VIONE national dashboard captures deprescribing data in real time and automates reporting with daily updates that are readily accessible to all implementing facilities. Minimum data captured include the number of unique veterans impacted, number of medications deprescribed, cumulative cost avoidance to date, and number of prescriptions deprescribed per veteran. The dashboard facilitates real-time use of individual patient data and has also been designed to capture data from VHA administrative data portals and Corporate Data Warehouse.

## RESULTS

As of October 31, 2019, the assessment of polypharmacy using the VIONE tool across VHA sites has benefited > 60,000 unique veterans, of whom 49.2% were in urban areas, 47.7% in rural areas, and 3.1% in highly rural areas. Elderly male veterans comprised a clear majority. More than 128,000 medications have been deprescribed. The top classes of medications deprescribed are antihypertensives, over-the-counter medications, and antidiabetic medications. An annualized cost avoidance of > $4.0 million has been achieved. Cost avoidance is the cost of medications that otherwise would have continued to be filled and paid for by the VHA if they had not been deprescribed, projected for a maximum of 365 days. The calculation methodology can

$$\textit{Annualized Cost Avoidance} = \frac{\textit{Price Per Dispensed Unit} \times \textit{Quantity Dispensed}}{\textit{Days Supply}} \times \textit{Days of Cost Avoidance Achieved (max. 365)}$$

be summarized as follows:

The calculations reported in Figure 4 are conservative and include only chronic outpatient prescriptions and do not account for medications deprescribed in inpatient units, nursing home, community living centers, or domiciliary populations. Data tracked separately from inpatient and community living center patient populations indicated an additional 25,536 deprescribed medications, across 28 VA facilities, impacting 7,076 veterans with an average 2.15 medications deprescribed per veteran. The additional achieved cost avoidance was $370,272 (based on $14.50 average cost per prescription). Medications restarted within 30 days of deprescribing are not included in these calculations.

The cost avoidance calculation further excludes the effects of VIONE implementation on many other types of interventions. These interventions include, but are not limited to, changing from aggressive care to end of life, comfort care when strongly indicated; reduced emergency department visits or invasive diagnostic and therapeutic approaches, when not indicated; medical supplies, antimicrobial preparations; labor costs related to packaging, mailing, and administering prescriptions; reduced/prevented clinical waste; reduced decompensation of systemic illnesses and subsequent health care needs precipitated by iatrogenic disturbances and prolonged convalescence; and overall changes to prescribing practices through purposeful and targeted interactions with colleagues across various disciplines and various hierarchical levels.

**TABLE 2** Cross Walk Between Core Pillars of High Reliability Organizations and VIONE

| High Reliability Organization Pillars | VIONE |
|---|---|
| **Leadership Commitment** Safety and reliability is reflected in leadership's vision, decisions, and actions | • Decisions and actions to adopt a systems-based approach to improve safety and reliability of prescribing practices; and<br>• Empowerment of staff to directly and proactively assess risk and reduce harm from polypharmacy. |
| **Safety Culture** Throughout the organization, safety values and practices are used to prevent harm and learn from mistakes | • Education about the risks of potentially inappropriate medications; and<br>• Collective mind-set for identification and correction of medication errors without fear of retribution. |
| **Continuous Process Improvement** Across the organization, teams use effective tools for continuous learning and improvement | • Ongoing practice of continuous assessment of polypharmacy and planning for cessation of medications as appropriate; and<br>• Ongoing refinement and the systemwide spread of program. |
| **Demonstrate Safety and Reliability Outcomes** | • Reduced adverse effects due to polypharmacy potentially inappropriate medications; and<br>• Improved quality of care. |

**TABLE 3** VIONE Results February 2016 to October 2019

| | |
|---|---|
| Unique Patients | 60,737 |
| Unique Deprescribed Medications | 130,695 |
| Total Annualized Cost Avoidance | $4,061,076 |
| Average Medications Deprescribed per Patient | 2.15 |
| Average Annualized Cost Avoidance per Patient | $66.86 |

## DISCUSSION

The VIONE clinical program exemplifies the translation of HRO principles into health care system practices. VIONE offers a systematic approach to improve medication management with an emphasis on deprescribing nonessential medications across various health care settings, facilitating VHA efforts toward zero harm. It demonstrates close alignment with the key building blocks of an HRO. Effective VIONE incorporation into an organizational culture reflects leadership commitment to safety and reliability in their vision and actions. By empowering staff to proactively reduce inappropriate medications and thereby prevent patient harm, VIONE contributes to enhancing an enterprise-wide culture of safety, with fewer errors and greater reliability. As a standardized decision support tool for the ongoing practice of assessment and planned cessation of potentially inappropriate medications, VIONE illustrates how continuous process improvement can be a part of staff-engaged, veteran-centered, highly reliable care. The standardization of the VIONE tool promotes achievement and sustainment of desired HRO principles and practices within health care delivery systems.

## CONCLUSIONS

The VIONE program was launched not as a cost savings or research program but as a practical, real-time bedside or ambulatory

care intervention to improve patient safety. Its value is reflected in the overwhelming response from scholarly and well-engaged colleagues expressing serious interests in expanding collaborations and tailoring efforts to add more depth and breadth to VIONE related efforts.

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## Author disclosures

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## Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner*, Frontline Medical Communications Inc., the US Government, or any of its agencies.

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**FIGURE 3** VIONE Discontinuation Order Screen (Provider View)

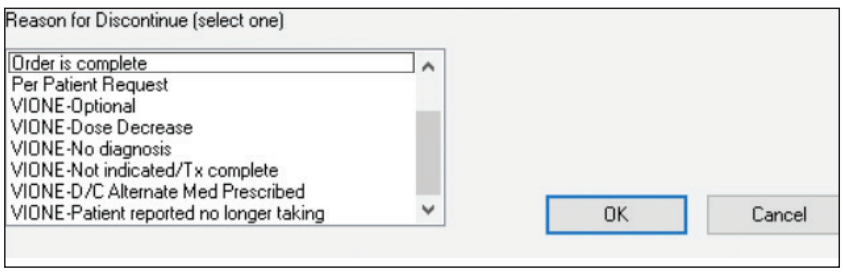


**FIGURE 4** VIONE Cumulative Impact from April 2016-October 2019