

## Stratification Tool for Opioid Risk Mitigation (STORM)

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## *Bottom Line Up Front*

The Veteran population experiences higher rates of chronic pain, mental health and substance use disorders relative to the general U.S. population. Combined with high rates of opioid prescriptions, these disorders put Veterans at a greater risk of experiencing opioid-related adverse events and developing opioid use disorder (OUD). In response to concerns about opioid safety, the Veterans Health Administration (VHA) developed and mandated the use of the Stratification Tool for Opioid Risk Management (STORM), a web-based dashboard that prioritizes review of VHA patients receiving opioids based on their predicted risk of experiencing an adverse event. This policy brief describes the results from an early evaluation showing that mandating the use of STORM for high-risk patients increases the provision of risk mitigation interventions and decreases the probability of patient mortality.

## Introduction

The Centers for Disease Control and Prevention estimates that almost 143 million opioid prescriptions were dispensed in 2020, or 43.3 prescriptions per 100 persons, with an average of 44 people dying each day from overdoses involving prescription opioids.<sup>1</sup>

In 2020, nearly 250,000 Veterans received an opioid prescription from the Veterans Health Administration (VHA).<sup>2</sup> Opioid use (both prescription and non-prescription) may be particularly pronounced in the VHA patient population due to higher rates of chronic pain, mental health and substance use disorders relative to the general U.S. population.<sup>3,4,5</sup> Combined with high rates of opioid prescriptions, these disorders put Veterans at a greater risk of experiencing opioid-related adverse events and developing opioid use disorder (OUD). In fact, the prevalence of opioid use disorder (OUD) is seven times higher at the VHA compared to commercial health plans.<sup>6</sup>

**7x**  
Diagnosed opioid misuse is almost **seven times higher** in the VHA Veteran population than in commercial health plan populations

Given concerns about opioid safety and overdose, the VHA has implemented multifaceted efforts to address the risks associated with prescribing opioids, including the Opioid Safety Initiative<sup>7</sup> and the 2016 the Comprehensive Addiction and Recovery Act (CARA). In particular, CARA requires the VHA to improve opioid therapy treatment strategies and to establish responsible prescribing practices.<sup>8</sup>

In 2018, in response to CARA, the VHA mandated a case review intervention for all opioid analgesic prescribed patients at high risk of experiencing adverse outcomes. This national policy required VHA providers to collaborate on a treatment strategy to augment care for specific high risk patients. High risk patients were identified in a web-based clinical support system—the **Stratification Tool for Opioid Risk Mitigation, or STORM**. Providers were instructed to use the STORM dashboard to evaluate individual patient risk factors and to augment or revise patient treatment plans as appropriate. Crucially, the case review mandate was implemented across all VHA facilities in a randomized manner in order to facilitate the evaluation of its impact on patient outcomes.

The remainder of this policy brief describes the STORM tool in more detail, the evaluation of the mandated case review, and major findings from the evaluation. It concludes with the relevance for future policy and practice.

## Intervention: STORM and the Case Review Mandate

### The Stratification Tool for Opioid Risk Management

STORM is a web-based population management dashboard that uses predictive analytics to determine the risk for opioid-related serious adverse events (SAEs) for each VHA patient with an opioid prescription and provides decision support based on practice guideline recommendation. Each patient's level of risk is determined by a predictive algorithm that incorporates factors such as prior history of mental illness, history of substance use disorders, prescription dosage, prior adverse events, and emergency department encounters, among others.<sup>6</sup> The risk levels are presented on the web-based dashboard, along with risk factor summaries, tracking of recommended risk mitigation interventions, and additional information that can be used to help clinicians prioritize the review of high-risk patients and support care coordination across providers (*see Figure 1*).

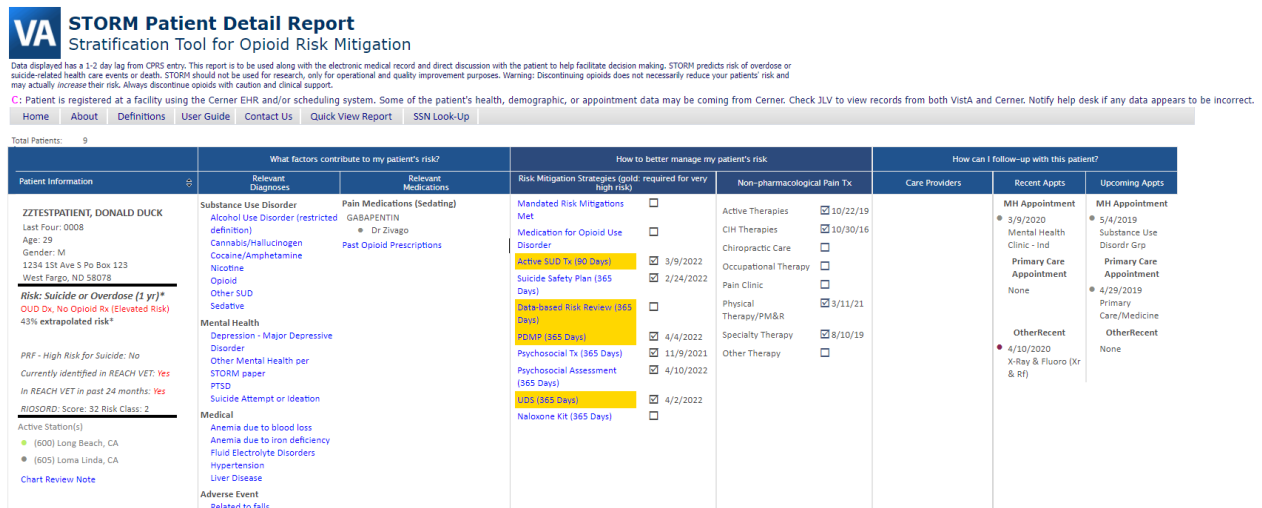


Figure 1: The STORM dashboard.

### Mandated Case Review

In 2018, VHA implemented a mandated case review policy targeting Veterans with opioid prescriptions at highest risk of opioid-related SAEs. The national governance required providers to collaborate on a care strategy for specific high-risk Veterans, who could be identified in the STORM dashboard.<sup>9</sup>

Case reviews were to be conducted by an interdisciplinary team of providers specializing in chronic pain, mental health, substance use disorders, pharmaceuticals, and rehabilitation. Providers conducting case reviews were encouraged to use the STORM dashboard to evaluate each patient's risk factors and determine the need for treatment plan revisions or care augmentation. The dashboard encouraged providers to consider risk mitigation strategies such as providing a naloxone kit, prescription drug monitoring program, suicide safety plan, substance use disorder treatment, and medication-assisted treatment, among others.<sup>9</sup>

## The Evaluation

The Partnered Evidence-based Policy Resource Center (PEPRc) led a two-part evaluation to assess the effectiveness of the mandated case review policy.

The evaluation used a stepped-wedge cluster randomized control trial to test the impact of mandated case reviews on opioid-related SAEs and all-cause mortality. The evaluation offered a unique opportunity to rigorously examine the uptake and effectiveness of this policy change and provide policymakers with evidence-based recommendations.<sup>10</sup>

One aim of the evaluation was to study if **mandated case reviews** would decrease the probability of opioid-related SAEs among Veterans designated by the STORM dashboard as “very high risk” at participating facilities. To facilitate evaluation, medical centers were randomly assigned to expand the definition of very high-risk over time. Initially, the case review mandate applied to Veterans within the top 1% of predicted risk of experiencing an overdose or suicide-related event in the next year, according to STORM. Then, at randomly selected medical centers, the review mandate was expanded to Veterans within the top 5% of predicted risk. Over time, all medical centers were required to case review patients in the top 5% of risk. This stepped-wedge rollout provided a means of contrasting the outcomes for facility-months that had undergone risk expansion with those that had not. VHA administrative data was used to follow up on all participants for SAEs and all-cause mortality.

The second aim of the evaluation was to examine the impact of **policy language** on provider behavior. Participating facilities were randomly allocated to one of two groups: the “oversight arm” receiving a policy memo indicating specific actions if case review completion targets were not met (e.g., action planning and additional oversight), and the “non-oversight arm” receiving a policy memo without any mention of such actions. After eighteen months, VHA administrative data was used to test whether inclusion in the oversight arm had an impact on SAEs for all participants.

## Main Findings

### *Effectiveness of Mandated Case Review*

Mandated case review of “very high risk” Veterans was associated with 22% lower odds of mortality.<sup>9</sup> The evaluation found no statistically significant changes in documented SAEs. However, Veterans subject to a mandated case review were five times more likely to receive a case review and received 0.5 more risk mitigation strategies, on average.

## Opioid-related Serious Adverse Events of Interest

- Accidental falls
- Acetaminophen overdose
- Mortality
- Motor vehicle accident
- Opioid detoxification
- Opioid overdose
- Other life-threatening accidents
- Other life-threatening drug overdoses
- Possible and confirmed suicide-related events
- Sedative overdose

## Main Findings

- Veterans subject to a mandated case review were **five times** more likely to receive a case review
- Mandated case review was associated with **22% lower odds of mortality**
- Contrary to prior expectations, facilities in the non-oversight arm were **significantly more likely** to meet the 97% case review target
- **60% of Veterans received a case review**, compared to 6.6% before the intervention

These findings suggest that receiving care because of case review could be a mechanism of reduced mortality risk.<sup>9</sup> It's also possible that a high-risk designation leads to changes in utilization patterns, the probability of engaging in care at VHA, and/or patterns of opioid prescribing.

While these findings are significant, there was a relatively short four-month timeframe for outcome assessment. A longer assessment window, made impossible by the COVID-19 pandemic, might have captured some delayed positive health outcomes (e.g., decreased SAEs, improved pain management, positive mental health outcomes), because of Veterans participating in longer-term recovery or rehabilitative activities.

#### *Effectiveness of Policy Intervention*

Counter to prior expectations, analysis found that facilities in the non-oversight arm were significantly more likely to meet the 97% case review target (specified in the policy) than those in the oversight arm (30% of facilities vs. 11%, respectively).<sup>10</sup> It's possible that sites facing oversight felt less directly responsible for Veteran outcomes than other sites. Additionally, it is possible that VHA's multiple ongoing efforts to enhance opioid safety caused confusion and fatigue among VHA providers. It is unknown if case review quality was consistent and comparable between oversight and non-oversight facilities.

#### *Overall Findings*

Overall, the case review mandate policy intervention may have been successful in directing provider attention to Veterans at high-risk for opioid-related SAEs. Approximately 60% of eligible Veterans received a case review, compared to 6.6% before the intervention.<sup>10</sup> The number of very high-risk Veterans entering the study declined over time, likely due to VHA's overall efforts to increase opioid safety.

Future analyses may include examining potential mechanisms for mortality reduction, including changes in opioid prescribing behavior, the likelihood of experiencing opioid discontinuation, and the receipt of individual risk mitigation strategies. In a concurrent study with this evaluation, researchers from the VA Center for Health Equity Research and Promotion found that specific implementation strategies were associated with case review completion.<sup>11</sup> These strategies included practice pattern adjustment, tailoring efforts to local needs, and pre-implementation academic detailing. Such changes in provider behavior merit additional research, as they may support the sustainability of long-term changes in patient outcomes. Future work might also look at how predictive risk analyses and coordinating policy intervention impact subpopulations of Veterans, including those who are newly diagnosed with OUD or those with long-term opioid prescriptions.

### **Relevance for Policy and Practice**

As the opioid epidemic continues, the identification of systematic, evidence-based, and effective risk mitigation tools is a high priority. The evaluation of mandated case reviews suggests that providers can leverage risk assessment and predictive analytics to save lives. The evaluation also suggests that policymakers can implement a targeted mandate to improve outcomes.

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## ABOUT PEPR<sub>e</sub>C POLICY BRIEFS

This evidence-based policy brief is written by Partnered Evidence-based Policy Resource Center (PEPR<sub>e</sub>C) staff to inform policymakers and Veterans Health Administration (VHA) managers about the evidence regarding important developments in the broader health system and economy. PEPR<sub>e</sub>C is a Quality Enhancement Research Initiative-funded resource center that collaborates with operational partners to design and execute randomized evaluations of VHA initiatives, develops and refines performance metrics, and writes evidence-based policy briefs. *The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.*



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