

## Implementation Study

## Improving Alcohol Withdrawal Outcomes in Acute Care

Jo Melson, MSN, RN, FNP-BC; Michelle Kane, RN, MSN; Ruth Mooney, PhD, MN, RN-BC;  
James McWilliams, MSN, RN, NP-C; Terry Horton, MD

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**Abstract**

**Context:** Excessive alcohol consumption is the nation's third leading cause of preventable deaths. If untreated, 6% of alcohol-dependent patients experience alcohol withdrawal, with up to 10% of those experiencing delirium tremens (DT), when they stop drinking. Without routine screening, patients often experience DT without warning.

**Objective:** Reduce the incidence of alcohol withdrawal advancing to DT, restraint use, and transfers to the intensive care unit (ICU) in patients with DT.

**Design:** In October 2009, the alcohol withdrawal team instituted a care management guideline used by all disciplines, which included tools for screening, assessment, and symptom management. Data were obtained from existing datasets for three quarters before and four quarters after implementation. Follow-up data were analyzed and showed a great deal of variability in transfers to the ICU and restraint use. Percentage of patients who developed DT showed a downward trend.

**Main Outcome Measures:** Incidence of alcohol withdrawal advancing to DT and, in patients with DT, restraint use and transfers to the ICU.

**Results:** Initial data revealed a decrease in percentage of patients with alcohol withdrawal who experienced DT (16.4%-12.9%). In patients with DT, restraint use decreased (60.4%-44.4%) and transfers to the ICU decreased (21.6%-15%). Follow-up data indicated a continued downward trend in patients with DT. Changes were not statistically significant. Restraint use and ICU transfers maintained postimplementation levels initially but returned to preimplementation levels by third quarter 2012.

**Conclusion:** Early identification of patients for potential alcohol withdrawal followed by a standardized treatment protocol using symptom-triggered dosing improved alcohol withdrawal management and outcomes.

**Introduction**

Early identification and treatment of alcohol withdrawal syndrome using symptom-triggered dosing can reduce use of restraints, transfers to the intensive care unit (ICU), and progression to delirium tremens (DT).

Mokdad et al<sup>1</sup> used data from the Centers for Disease Control and Prevention in Atlanta, GA, for the Year 2000 and determined that excessive alcohol consumption was the third leading cause of preventable deaths in the US, with tobacco use being first and poor diet and physical inactivity second. Saitz et al<sup>2</sup> found that 17% of patients reported risky drinking behavior, and 77% of those patients, or 13% overall,

were found to be alcohol dependent. Risky drinking was defined as more than 14 standard drinks per week or 4 or more drinks per occasion for men, for women as more than 11 drinks per week and as more than 3 drinks per week for people older than age 66 years.

Current evidence dictates the need for screening and early management of alcohol withdrawal syndrome to prevent progression of symptoms and/or onset of DT.<sup>3,4</sup> Early intervention and symptom-triggered dosing is recommended in managing alcohol withdrawal and preventing DT.<sup>5,6</sup> The management of patients with alcohol withdrawal syndrome is a challenging and resource-intensive process.<sup>6</sup>

Patients experiencing alcohol withdrawal syndrome often place themselves and staff at risk of injury. Lansford et al<sup>3</sup> reported violence, including kicking, biting, scratching, and other violent episodes, in 36% of patients before they received a standardized care protocol. This rate was reduced to 8% in the protocol group. Phillips et al<sup>7</sup> developed a protocol to manage patients with alcohol withdrawal syndrome in the ICU. One of the reasons for developing the protocol was injury to staff that occurred because of violent patient behavior as patients withdrew from alcohol.

Alcohol use disorder includes alcohol dependence, commonly called alcoholism, and alcohol abuse. Alcohol dependence has the following characteristics: craving, loss of control, physical dependence, and alcohol tolerance. Patients with alcohol abuse may not fulfill family, work, or school responsibilities but are not physically dependent on alcohol. The alcohol-dependent patient is of most concern to us, because 6% of dependent patients go into withdrawal if untreated, and 10% of these are at risk of DT.<sup>7-9</sup>

Alcohol withdrawal can manifest as nausea and vomiting; disorientation and clouding of the sensorium; tremors; diaphoresis; anxiety; tactile, auditory, and visual disturbances; and headache. If left untreated, alcohol withdrawal can lead to delirium, seizures, and possibly death.

This project was initiated at Christiana Care Health System, the largest provider of acute care in Delaware. As found in a pilot study, 7% of patients admitted to Christiana Care acknowledged drinking daily. Before 2009, Christiana Care had no standardized screening criteria for assessing risk of alcohol withdrawal syndrome,

Jo Melson, MSN, RN, FNP-BC, is a Nurse Practitioner in the Stepdown Unit at Christiana Care Health System in Wilmington, DE. E-mail: [jmelson@christianacare.org](mailto:jmelson@christianacare.org). Michelle Kane, RN, MSN, is a Medicine Outcomes Coordinator in the Performance Improvement Department at Christiana Care Health System in Newark, DE. E-mail: [mikane@christianacare.org](mailto:mikane@christianacare.org). Ruth Mooney, PhD, MN, RN-BC, is a Research Facilitator for the Christiana Care Health System in Newark, DE. E-mail: [rmooney@christianacare.org](mailto:rmooney@christianacare.org). James McWilliams, MSN, RN, NP-C, is a Nurse Practitioner with the Healthstar Physicians of Hot Springs, AR. E-mail: [polonius47@gmail.com](mailto:polonius47@gmail.com). Terry Horton, MD, is the Chief of the Division of Addiction Medicine for the Christiana Care Health System in Newark, DE. E-mail: [thorton@christianacare.org](mailto:thorton@christianacare.org).

no consistent approach to treatment, and no formal method for monitoring and adjusting treatment outside the critical care units. Likewise, colleagues from other hospitals told us that they also experience problems managing patients with alcohol withdrawal and do not have robust screening and treatment protocols. At Christiana Care, identification of patients at risk of alcohol withdrawal syndrome, especially outside critical care units, was not timely and often occurred at the onset of severe symptoms. Delayed diagnosis and treatment of alcohol withdrawal syndrome resulted in several adverse patient and staff outcomes.

Because of adverse patient outcomes, the existing team for alcohol withdrawal management was enhanced to include nurses, physicians, a social worker, a pharmacist, a nurse from Performance Improvement, and a data analyst. The Patient Safety Committee charged the team with developing a system of assessment and management that would result in the following: 1) early identification and monitoring of patients at risk of alcohol withdrawal syndrome and 2) reduced variation in care through the adoption of evidence-based standards/guidelines and clinician order set. Regular intervals for reporting back were established.

The alcohol withdrawal team determined that identifying patients at risk of alcohol withdrawal syndrome was essential and that all adult inpatients should be screened for risk of this syndrome in a manner similar to other routine risk assessments. Finding a screening tool with known reliability and validity for detecting alcohol use disorders and pairing it with a symptom-based assessment tool were identified as priorities for broad implementation. The team used performance improvement techniques to determine the impact of instituting a bundled approach. This approach included screening of all adult inpatients for risk of alcohol withdrawal syndrome and using symptom-triggered management based on the revised Clinical Institute Withdrawal Assessment of Alcohol Scale (CIWA-Ar) scores for those patients experiencing alcohol withdrawal syndrome or DT.

This report describes the development, implementation, and evaluation of a bundled approach to the manage-

**Table 1. Components of the Alcohol Withdrawal Symptom Management Care Management Guideline**

Component	Description
Alcohol withdrawal risk assessment	Performed in all adult patients at time of admission using Alcohol Use Disorders Identification Test-Piccinelli Consumption (AUDIT-PC) <sup>11</sup> If score is $\geq 5$ , perform CIWA-Ar
CIWA-Ar	Assessment to determine level of severity of alcohol withdrawal syndrome
Precautions algorithm	Followed when CIWA-Ar score is $\leq 8$
Treatment algorithm	Followed when CIWA-Ar score is $\geq 9$
Physician order set	Initiated for patients with alcohol withdrawal syndrome
Sedation Agitation Scale	Administered before each medication dose

CIWA-Ar = revised Clinical Institute Withdrawal Assessment of Alcohol Scale.

ment of alcohol withdrawal syndrome in the acute care hospital. The Alcohol Withdrawal Symptom Management Care Management Guideline was developed to be used by multiple clinical disciplines. This care management guideline includes an alcohol withdrawal risk assessment, the symptom-based CIWA-Ar assessment, two clinical algorithms, and a clinician order set. The Sedation Agitation Scale<sup>10</sup> was included to provide for ongoing assessment for oversedation (Table 1).

**Methods**

Beginning in October 2009, the standard nursing admission assessment for adult patients included a risk assessment for alcohol withdrawal using the Alcohol Use Disorders Identification Test-Piccinelli Consumption (AUDIT-PC). The AUDIT-PC is a 5-item scale developed to screen for hazardous alcohol intake.<sup>11</sup> Patients who scored 5 or greater were then assessed using the CIWA-Ar, a 10-item scale used to categorize alcohol withdrawal on the basis of symptom severity. The physician was

notified of the results and then determined if medication was appropriate. If the patient scored 8 or below on the CIWA-Ar, the patient was monitored for further symptoms. If the score was 9 or greater, the treatment algorithm was followed. Evidence for the protocol was supported by recommendations from Reoux and Oreskovich,<sup>12</sup> which included symptom-triggered medication administration based on CIWA-Ar scores.<sup>8,13,14</sup>

The alcohol withdrawal management team monitored results for effectiveness and made adjustments when indicated.

- The aims of this project were to
1. reduce the incidence of alcohol withdrawal syndrome advancing to DT
  2. reduce restraint use in patients with a DT diagnosis
  3. decrease transfers to the ICU for patients with DT.

Data analysts extracted information from existing data sources for patients with a discharge diagnosis of alcohol withdrawal syndrome or DT for 9 months before implementation. Data were also

**Table 2. Impact of program on patients with alcohol withdrawal syndrome and delirium tremens**

Selected program results	Before implementation <sup>a</sup>	After implementation <sup>b</sup>	Percentage change
Patients with DT who were restrained, %	60.4	44.4	26.4
Patients with DT who were transferred to ICU, %	21.6	15.0	30.5
Patients with alcohol withdrawal syndrome in whom DT developed, %	16.4	12.9	21.3

<sup>a</sup> First, second, and third quarters of 2009.

<sup>b</sup> Fourth quarter of 2009 and first, second, and third quarters of 2010.

DT = delirium tremens; ICU = intensive care unit.

compiled quarterly after implementation to provide insight into the effectiveness of the intervention. Following implementation of the intervention, nursing quality and safety representatives conducted monthly monitors to determine if the alcohol withdrawal risk assessment and the CIWA-Ar were administered as indicated by the care management guideline. Quarterly retrospective chart abstractions were conducted to determine ongoing fidelity to the care management guideline. A data report card was created to reflect the percentage of patients with primary or secondary diagnoses of alcohol withdrawal syndrome or DT, restraint use, average length of stay, ICU admissions, and transfers to the ICU.

Before the results were presented, information was submitted to the Christiana Care institutional review board. Approval for dissemination was granted.

**Results**

Of the 39,402 admissions before implementation of the care management guideline, 462 patients had a discharge diagnosis of alcohol withdrawal syndrome or DT, including 134 patients with a discharge diagnosis of DT (76 patients with a secondary diagnosis of DT). During the first 4 quarters after implementation, there were 50,534 admissions. Of these, 602 patients had a discharge diagnosis of alcohol withdrawal syndrome or DT, with 159 having a discharge diagnosis of DT (78 patients with a secondary diagnosis of DT). The percentage of patients with a diagnosis of alcohol withdrawal syndrome who developed DT decreased from 16.4% (76/462) before implementation to 12.9% (78/602) after implementation (Table 2).

A review of records for patients with discharge diagnoses of DT revealed the following findings. In the 3 quarters preceding implementation, 60.4% of the patients with DT (81/134) were restrained compared with 44.4% (71/159) restrained in the 4 quarters after implementation. Transfers from floors other than ICUs to the ICU decreased from 21.6% (29/134) before implementation to 15% (24/159) after implementation.

Figure 1 depicts the trend lines for the percentage of patients who experienced delirium tremens before and after implementation of the care management guideline.

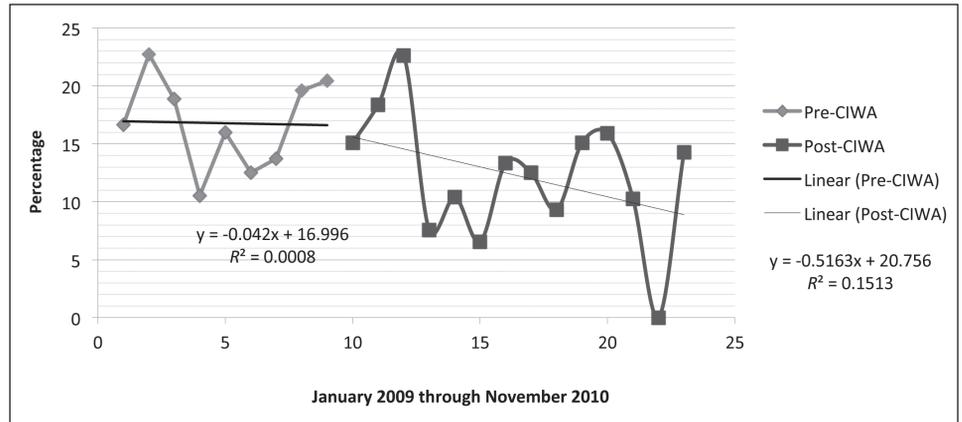


Figure 1. Percentage of patients who experienced delirium tremens before and after implementation of the care management guideline.

CIWA = Clinical Institute Withdrawal Assessment of Alcohol Scale.

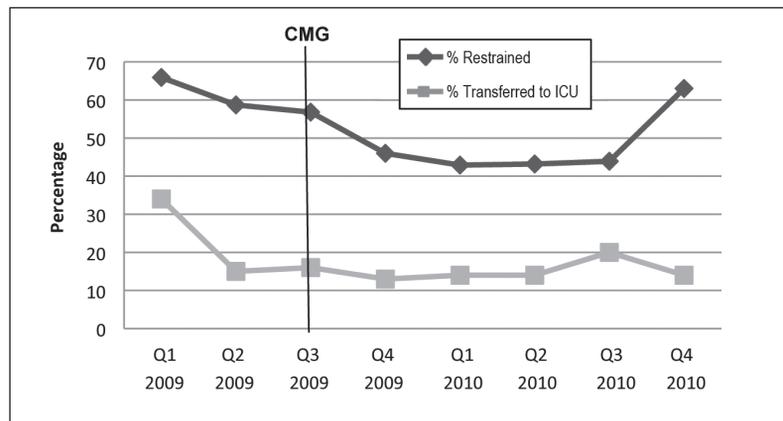


Figure 2. Pre- and postimplementation percentage of patients with delirium tremens diagnosis who were restrained or transferred to the intensive care unit.

CMG = care management guideline (implemented in Third Quarter 2009, or Q3 2009); ICU = intensive care unit; Q = quarter.

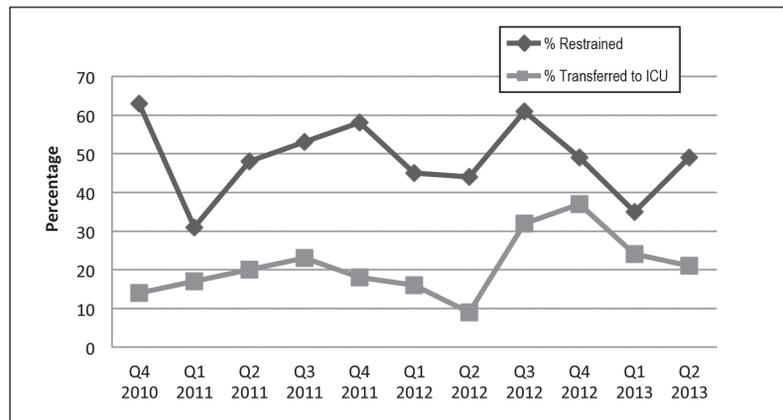


Figure 3. Percentage of patients at follow-up with delirium tremens diagnosis restrained or transferred to the intensive care unit postimplementation.

ICU = intensive care unit; Q = quarter.

Because of the great degree of variability, the  $R^2$  is low for both periods ( $R^2 = 0.0008$  before implementing the care management guideline;  $R^2 = 0.1513$  after implementation). Linear regression analysis revealed  $p = 0.5$  and therefore is not statistically significant.

Figure 2 depicts the percentage of patients restrained from the first quarter of 2009 to the third quarter of 2009 (before implementation) and from the fourth quarter of 2009 to the fourth quarter of 2010 (after implementation). The percentage of patients with a DT diagnosis requiring restraints reflected a steady decrease from the time of implementation of the care management guideline through the end of the fourth quarter of 2010, when the initial analysis took place. The percentage of patients transferred from a non-ICU floor to the ICU declined in the immediate postimplementation period.

Restraint utilization has increased and shows a great deal of variability through the first quarter of 2013. Transfers to the ICU varied considerably but remained below preimplementation rates until the first quarter of 2013 (Figure 3).

## Discussion

In the words of one nurse manager, "I never thought it would be possible to put a patient going through DT on a medical-surgical floor, but since the implementation of this [care management guideline], we have empowered nurses with the tools needed to care for them adequately on the floor. You made a believer out of me!"

Research conducted before this project found that using a symptom-driven management protocol resulted in a decrease in transfers to the ICU, use of restraints, and frequency of DT.<sup>3</sup> Patients with delays in recognition and management had worse outcomes.<sup>3,6</sup> In this project, all adult inpatients were screened for risk of alcohol withdrawal syndrome at the time of admission. This contributed to early identification of patients needing further monitoring or treatment. An evidence-based symptom management protocol provided physicians and nurses with a clearly defined plan for patient care.

Ongoing retrospective chart reviews were performed to evaluate and determine fidelity to the care management

guideline. Christiana Care demonstrated a decrease in the incidence of alcohol withdrawal syndrome progressing to DT. For patients with a DT diagnosis, Christiana Care also reduced restraint use and transfers to the ICU. Although statistical significance was not demonstrated, this project is considered a success at Christiana Care because of the decreased number of patients who progressed to DT. Examination of restraint use and transfers to the ICU revealed an initial downward trend after protocol implementation. Perhaps patients at risk for alcohol withdrawal displaying only mild symptoms were identified and adequately treated and therefore did not progress into DT, require restraints, or transfer to ICU. As the percentage of patients who experienced DT decreased, this resulted in a lower denominator thus increasing the percentage of patients restrained or transferred to ICU.

Variations in pharmacologic management resulted from differences in physician orders. The order set provided recommended dosages for benzodiazepines; however, clinicians were free to choose. Anticipated next steps are to develop modifications to the order set to make it easier to use. In addition, we plan to alert clinicians of previous patient admissions in which the CIWA-Ar protocol was initiated, including highest daily CIWA-Ar score and total daily dose of medication. This is being done to give the clinician more information concerning the path of alcohol withdrawal syndrome for the patient in the past and the dosage of medication required to control symptoms. This step may result in higher initial doses of medication, resulting in fewer patients progressing to DT and requiring restraints and/or transfer to the ICU.

Because of facilitywide implementation of this project, there was no opportunity for including a group that did not receive the intervention. Furthermore, data collection relied on accurate physician documentation of alcohol withdrawal syndrome or DT as an admission and discharge diagnosis. Challenges of performing research in the clinical area were experienced in this project. Clinical observations and results of a nursing focus group found the following: CIWA-Ar not being completed one hour after medication administration, not awakening patients for repeated CIWA-Ar, and

not effectively using as-needed medications. Additional education was instituted as these challenges were identified.

Patients may be reluctant to truthfully answer questions regarding their alcohol consumption history because they fear judgment. Nurses often receive conflicting information about alcohol use from patients and family members, leading to a dilemma in the assignment of a risk score for alcohol withdrawal syndrome. Pecoraro et al<sup>15</sup> reported that only 2.2% of patients with alcohol withdrawal syndrome in their study denied alcohol use. However, patients may underreport the amount they drink, which in turn results in a lower score on the AUDIT-PC. The present study initially offered limited referral mechanisms for follow-up care after discharge. Christiana Care has since implemented peer-to-peer counseling to improve discharge planning and to facilitate patient progression into appropriate treatment modalities.

## Conclusion

This project was initiated because alcohol withdrawal syndrome was often not recognized until patients displayed severe symptoms that resulted in adverse outcomes and safety concerns. Implementation of the "CIWA-Ar Protocol," as referred to by clinicians and clinical nurses, has had a large impact both on clinicians who use it to order treatment and on staff who provide care for this patient population. This tool has not only simplified and standardized the management of patients experiencing alcohol withdrawal syndrome but also has literally transformed our culture. Results have shown a decreased number of patients who progressed to DT and a decrease in restraint use and the number of transfers to the ICU.

Reevaluation is a must, and the team continues to work on project improvements. Some future project plans include implementing identifiers for patients who enter the Emergency Department and have experienced alcohol withdrawal syndrome in past admissions, designating a unit where patients who have alcohol withdrawal syndrome are admitted, reporting high CIWA-Ar scores as a critical laboratory value, and simplifying the ordering and modifying process online. ❖

**Disclosure Statement**

The author(s) report no conflicts of interest and received no external funding for this project.

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