

# Evaluation of a Clinical Institute Withdrawal Assessment-Revised (CIWA-Ar) Electronic Order Set for Management of Alcohol Withdrawal Syndrome

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## Background

According to a study conducted by the Centers for Disease Control and Prevention, excessive alcohol use continues to be a burden on the American economy. Approximately 11% of the total healthcare costs in 2010 were due to complications associated with excessive alcohol use (2). Further, the state of California incurred costs of approximately 35 billion dollars due to alcohol abuse in 2010 (2).

The CIWA-Ar protocol is a validated 10-item scoring tool that stratifies alcohol withdrawal patients by severity of symptoms. The CIWA-Ar protocol takes minutes to administer and supports management of withdrawal symptoms with benzodiazepines on an as-needed basis. The usage of a CIWA-Ar protocol to manage patients with alcohol withdrawal syndrome (AWS) has been demonstrated to improve outcome measures including hospital length of stay, benzodiazepine usage, escalation of care, and mortality (3-8). A single-center study published in 2019 found that the implementation of a CIWA-Ar based AWS protocol may also significantly improve quality of care, patient safety, and treatment effectiveness in a large, medical/surgical, urban community-based academic medical center (1).

This emerging body of evidence suggests that the evaluation of a CIWA-Ar AWS ordering protocol may improve the management of alcohol withdrawal syndrome at Desert Regional Medical Center, a 385-bed acute care Level II trauma center in Palm Springs.

## Methodology

A retrospective chart review was performed on patients with an initial diagnosis of AWS from January 1, 2020 to June 30, 2020 at Desert Regional Medical Center. The review included patients 18 years or older with the relevant International Classification of Diseases, 10th revision codes for AWS (F10.1, F10.2, and Z71.4). The review excluded patients who were not admitted to the hospital and patients with contraindications to benzodiazepines.

Of the 221 patients admitted with a diagnosis of AWS, 18 patients were identified by the use of a CIWA-Ar AWS order set in their electronic medical records. AWS order sets used included Alcohol Withdrawal – Level I: Prophylaxis, Alcohol Withdrawal – Level II: Mild – Moderate, Alcohol Withdrawal – Level III: Severe – ICU Only, and ED Alcohol Withdrawal. Eighteen patients were randomly selected for analysis from the list of non-order set AWS patients (N=203). Continuous data were analyzed using an unpaired t-test and categorical data were analyzed using a Chi squared test.

The primary outcome was the average hospital length of stay associated with AWS management. The secondary outcomes included intensive care unit (ICU) length of stay, average benzodiazepine (BZD) utilization, adjunctive medication use, seizures during treatment, in-hospital death, 30-day readmission, and respiratory depression.

## Results

**Table 1: Baseline Characteristics**

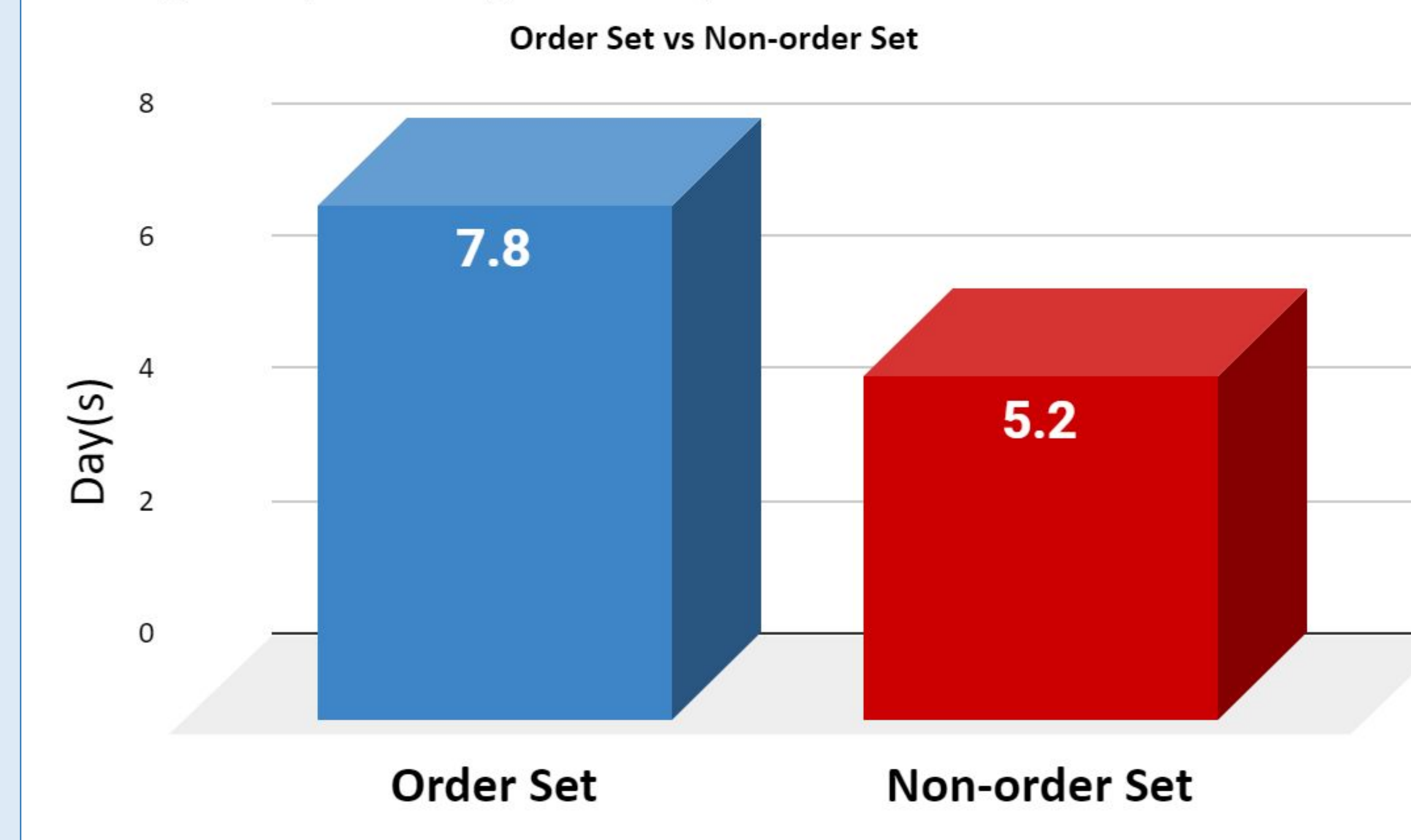
Demographics/Characteristics	Order set arm (N=18)	Non-order set arm (N=18)	P-value
Age, years	51.3	49.8	0.76
Male, %	72.2	55.6	0.29
Prior alcohol withdrawal, %	50	61.1	0.50
Psychosis, %	44.4	44.4	1
COPD/Asthma, %	16.7	12.5	0.63
History of seizure, %	11.1	22.2	0.37
History of multi-substance abuse, %	27.7	38.8	0.48
Baseline INR	1.1	1.2	0.42
Baseline ALT, U/L	76.5	54.6	0.37
Baseline AST, U/L	103.1	88.8	0.66
Baseline total bilirubin, mg/dL	1.4	1.5	0.88
If cirrhosis, MELD Score	12.6	15	0.24
Mean blood alcohol level on admission, %			
<10	<10: ~46.1	<10: ~64.3	
10-300	10-300: ~30.8	10-300: ~35.7	
>300	>300: ~23.1	>300: 0	0.15
Peak initial CIWA-Ar score	16.8	7.6	0.007*

\* denotes statistically significant p-value

**Table 2: Outcomes**

Demographics/Characteristics	Order set arm (N= 18)	Non-order set arm (N= 18)	P-value
Average length of stay, days	7.8	5.2	0.17
ICU length of stay, days	2.5	1.6	0.43
Mean BZD use, mg (lorazepam equivalents)	42.9	21.4	0.18
Seizures during treatment, %	11.1	5.6	0.54
Respiratory depression, %	11.1	5.6	0.54
30 day readmission, %	22.2	16.7	0.67
In hospital death, %	0	0	-

## Average Hospital Length of Stay in Alcohol Withdrawal Patients



## Discussion

The AWS standardized electronic order sets at Desert Regional Medical Center follow the American Society of Addiction Medicine (ASAM) clinical practice guideline on alcohol withdrawal management, providing symptom-triggered treatment algorithms stratified by CIWA-Ar score-based severity. Baseline characteristics were similar between order set and non-order set patient groups with the exception of baseline CIWA-Ar scores. The differences in primary and secondary outcomes studied were not shown to be statistically significant between groups using a significance threshold p-value of 0.05. In the non-order set group, CIWA-Ar regimens prescribed varied widely in benzodiazepine dosing. In the absence of standardized dosing practices in the non-order set arm, it is not possible to identify whether any regimen reliably produced superior outcomes compared to the standardized order sets used. Further, as the mean baseline CIWA-Ar score of the order set group was more than double that of the non-order set group (p=0.007), time to resolution of AWS in the order set group may have been skewed. Limitations include an inadequate sample size to reach a power of 80% and inconsistent ordering of baseline laboratory values by physicians.

## Conclusion

Due to lack of statistical power, it was not possible to conclude the effect that the usage of an electronic order CIWA-Ar protocol had on hospital length of stay, ICU length of stay, average benzodiazepine utilization, adjunctive medication use, seizures during treatment, in-hospital death, 30-day readmission, or respiratory depression. Further studies need to be conducted to validate this finding with a greater population enrolled to achieve adequate power and overcome biases in baseline characteristics.

## Disclosure

The authors of this retrospective chart review have no relevant financial or material interests to disclose.

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