Alcohol Withdrawal Syndrome

Judy Mikhail, PhD

Alcohol Withdrawal Syndrome (AWS)

Judy Mikhail, PhD, MBA, RN

Program Manager

MTQIP

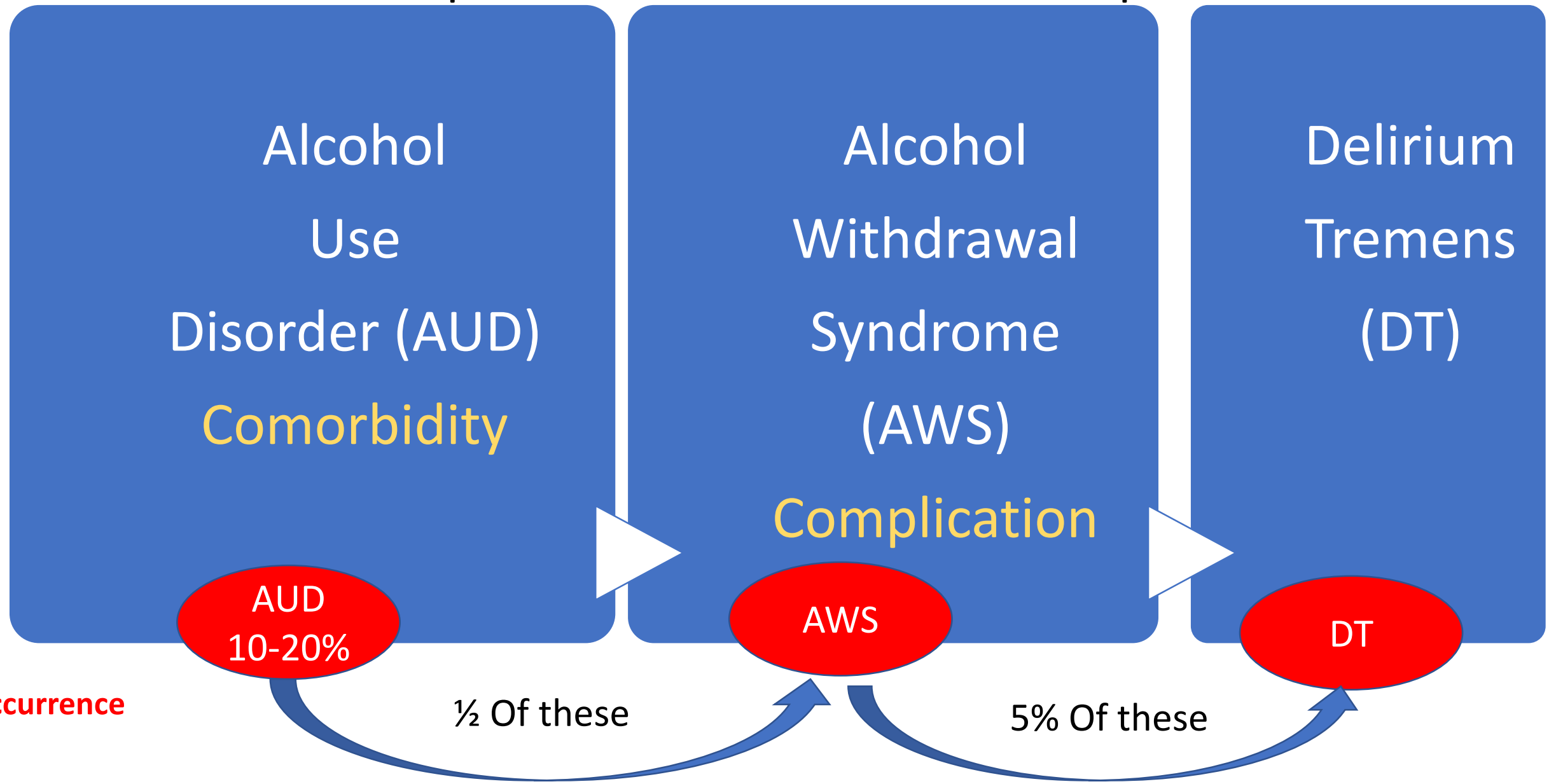
Alcohol Withdrawal Syndrome Literature Review 2010-2018

#	Journal Type n=65
15	Pharmacology
13	Critical Care
9	Toxicology/Substance Abuse
8	Internal Med
8	Surgery/Trauma
6	ED
3	Cochrane Library
2	Psychiatry
2	Professional Organizations

Status of AWS Research

- Mostly small retrospective studies < 2010
- Markedly Heterogeneous: Settings, Populations, Assessments
- Few recent trials……No money in it…
- Unethical to do placebo studies?
- No universally agreed upon Guideline
- Consensus driven care by setting & population

Alcohol Spectrum in General Population



MTQIP Data Collection

Center ID	Alcohol use disorder 0	1	3	Total
	35	0	0	35
	36	1	0	37
	41	3	1	45
	26	0	2	28
	37	0	1	38
	53	0	2	55
	53	1	1	55
			0	21
			0	48
			0	39
			1	7
			2	28
			3	46
			1	21
			2	21
			0	28
			1	45
			1	28
	32	0	2	34
	40	1	0	41
	51	2	2	55
	34	2	0	36
	48	0	0	48
	20	0	1	21
	21	0	0	21
	42	2	0	44
	56	0	2	58
	5	0	2	7
	48	1	2	51
Total	988	24	29	1,041

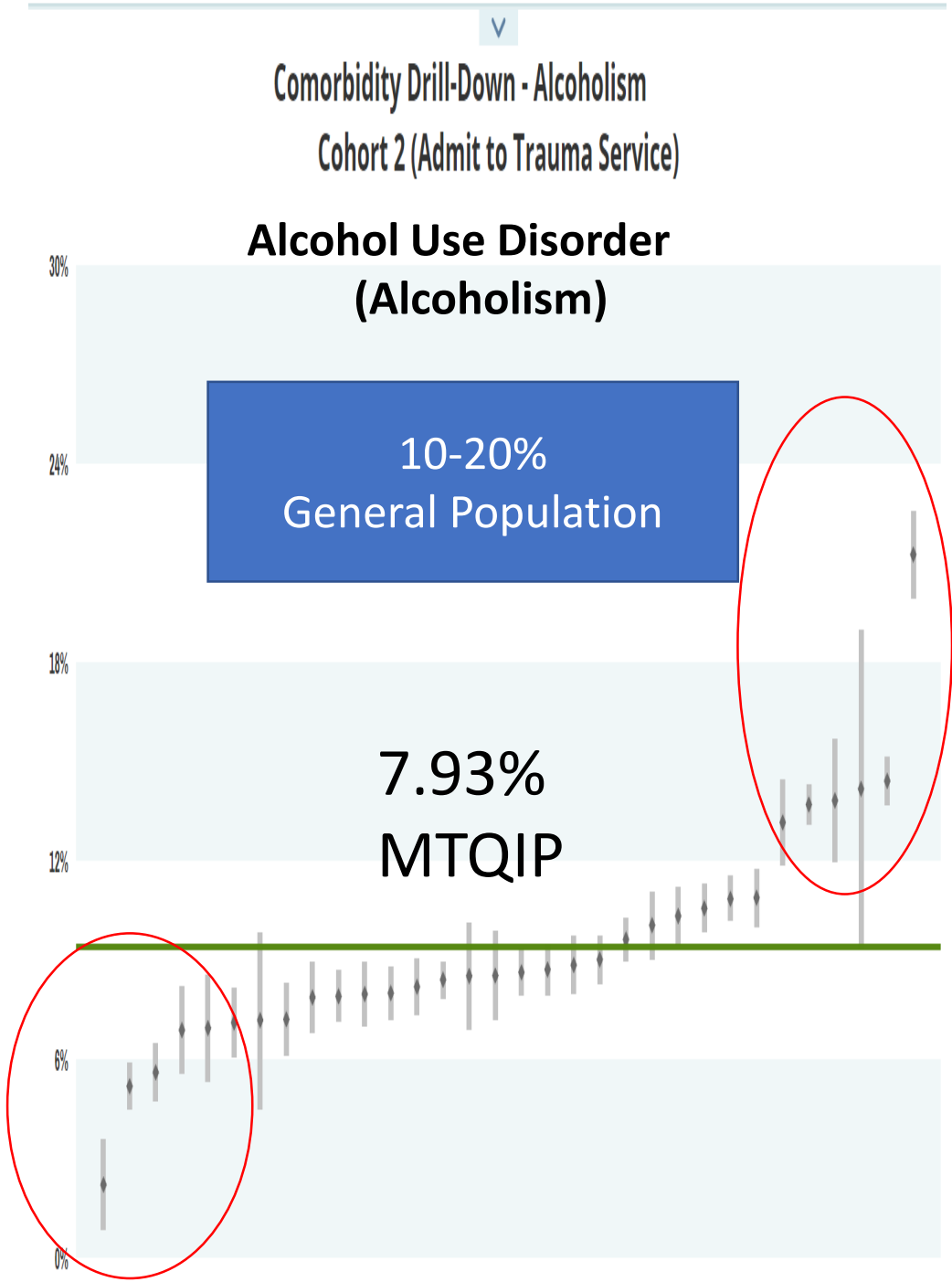
Data Validation

Reg Under

Reg Over

Alcohol Use Disorder

- Evidence of chronic use such as withdrawal episodes **or**
- In the 2 wks prior to admission:
  - >2 oz hard liquor/daily
  - >2 (12 oz) beers/daily
  - >2 (6 oz) wine/daily
- Binge Drinker
  - Total Drinks during binge/7dys
  - Then apply definition



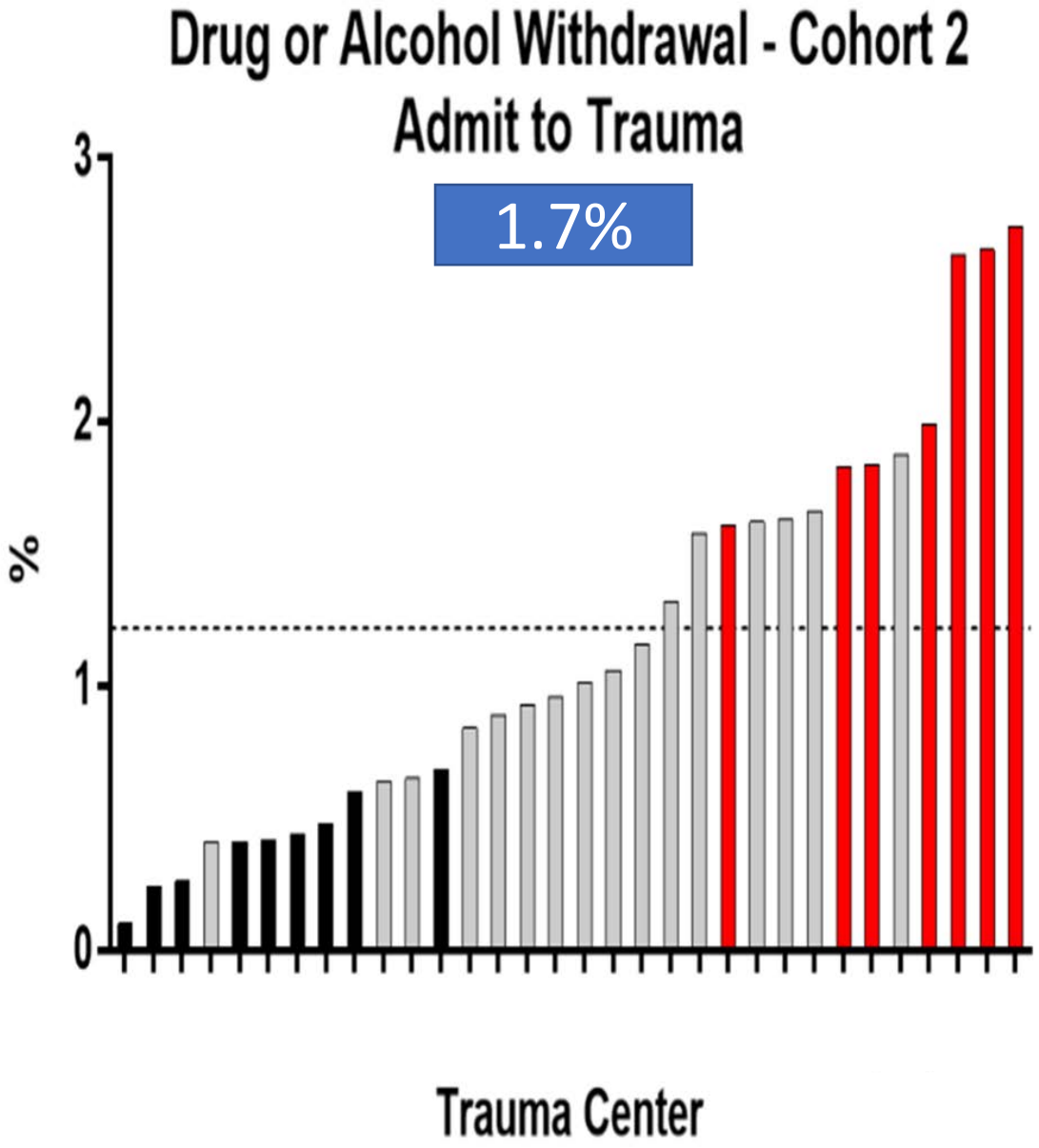
MTQIP Data Collection

Center ID	Alcohol withdrawal syndrome 0	1	Total
	35	0	35
	27	0	27
	34	1	35
	28	0	28
	27	1	28
	35	0	35
	27	1	28
	19	2	21
	28	0	28
	39	0	39
	6	1	7
	27	1	28
	36	0	36
	20	1	21
	21	0	21
	27	1	28
	35	0	35
	27	1	28
	34	0	34
	21	0	21
	33	2	35
	35	1	36
	28	0	28
	21	0	21
	21	0	21
	34	0	34
	28	0	28
	7	0	7
	30	0	30
Total	790	13	803

AWS

- Characterized by:
  1. Tremor
  2. Sweating
  3. Anxiety
  4. Agitation
  5. Depression
  6. Nausea
  7. Malaise
  8. Seizures
  9. Delirium

← Under capture→



Alcohol Withdrawal Syndrome in Trauma

The Journal of TRAUMA® Injury, Infection, and Critical Care

2006

Alcohol Withdrawal Syndrome: Turning Minor Injuries Into a Major Problem

Michael R. Bard, MD, FACS, Claudia E. Goettler, MD, FACS, Eric A. Toschlog, MD, FACS, Scott G. Sagraves, MD, FACS, Paul J. Schenarts, MD, FACS, Mark A. Newell, MD, FACS, Mark Fugate, MD, and Michael F. Rotondo, MD, FACS

Background: Abrupt cessation of chronic drinking patterns places hospitalized pati… with those without AWS. Demographics, mechanism of injury (MOI), ISS, revised … suffered more complications, including respiratory failure ($p < 0.0001$), pneumonia … infection (p = … tracheostomy … aneous endo… 001); and had Mortality was … roups. … ury acuity pa… sed morbidity, … stay and cost. … remain minor … to identify pa… AWS prophy… ation.

Single Trauma Center
5 yr review
Adult trauma
ISS<16
n=6,431

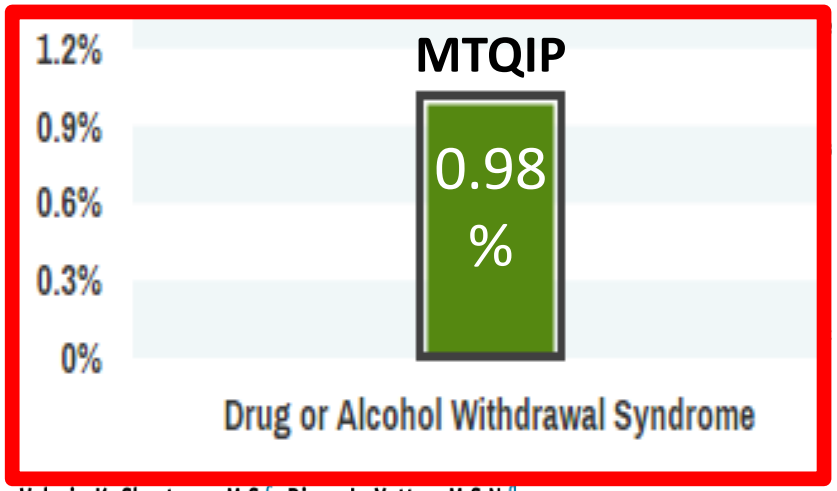
AWS
0.9%

Alcohol use, abuse, and dependence is prevalent among trauma populations.[1,2] When alcohol-dependent patients are injured and … perience an abrupt cessation of … which places them at an increased … withdrawal syndrome (AWS). Clin… from anxiety, confusion, tachycar… tion. In severe cases, patients may … ium tremens.[3]

Delirium has been evaluated and studied throughout the elderly population and found to be associated with increased length of stay (LOS), morbidity, mortality, and cost. Recent … but there is very little reported on hospital course and outcomes in this group.

…reviewing outcomes, LOS, survivability, and fis… of trauma populations predominantly focus on …ured patients. The assumption is that patients …njury acuity have a shorter LOS, fewer compli… …er survivability, and decreased cost as compared …re injured counterparts. Intuitively, patients suf… …fications, regardless of the initial degree of injury, will have an increased LOS and higher costs than similarly matched patients without complications.

One such complication is AWS. Although the literature



Valerie K. Shostrom, M.S.[c] Diane L. Yetter, M.S.N.[d]
Heath…
Lina L…

[a]Division…
NY, USA
Public H…
Medical …
NE, USA

Two Trauma Centers
10 yr review
Adult trauma
n=19,369

AWS
0.82%

KEYW…
Alcoh…
Alcoh…
Traum…

…ypothesized that a …ithdrawal (AW). …008 were evaluated for patients aged at least 16 years.

RESULTS: Of 19,369 trauma admissions, 159 patients had AW. Blood alcohol concentration (BAC) testing was performed in 31.5% of the patients. BAC was significantly higher in AW patients versus other… …HL). BAC was 0 in 14.4% of AW patients. As compared… …had a significantly greater age (50.2 vs 42.1 years), hospi… …unit length of stay (2 vs 0 days), need for mechanical … …% vs 2.3%). AW patients were less frequently discharg… …not different.
C… …nts. Of note, it occurred in patients with an initial BAC…
Publi…

Alcohol use and abuse is highly prevalent in trauma patients. Alcohol has been reported to be involved in 31% of … method used. An estimate from the US highway, National Highway Traffic Safety Administration in 1999 indicated

Occurrence, Predictors, and Prognosis of Alcohol Withdrawal Syndrome and Delirium Tremens Following Traumatic Injury

2017

Kristin Salottolo, MPH[1–4]; Emmett McGuire, MD[1]; Charles W. Mains, MD[2]; Erika C. van Doorn, MD[3]; David Bar-Or, MD[1–5]

Objectives: We sought to determine occurrence, predictors, and prognosis of a… in patients wit…
Design: Retros…
Setting: Three…
Patients: Twen…
admitted from…
Interventions:
Measurements …of alcohol with… …acteristics, ris… …outcomes, pha… …drome, and Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-Ar) scores. Alcohol withdrawal syndrome severity was defined by CIWA-Ar score as minimal (< 10), moderate (10–20), and severe (> 20). Alcoh… developed in 0.88% (n = 246), includi… moderate, and 53% severe. Alcohol wit… gressed to delirium tremens in 11%. Bef… withdrawal syndrome severity was associ… hypokalemia, baseline CIWA-Ar score, and established alcohol withdrawal syndrome risk factors. Logistic regression identified the following predictors of delirium tremens: baseline CIWA-Ar score greater than or equal to 10 (odds ratio, 6.05; p = 0.02) …03). …ere …dds …nifi… …bital …syn… …wal …sta… …ntly …only …%; p = 0.02); otherwise, there were no differences in mortality by severity (4%, 4%, and 0% by minimal, moderate, and severe …syndrome).
…a patients with alcohol withdrawal syndrome …occurrence of delirium tremens that is associ… …t mortality. These data demonstrate the pre… …seline CIWA-Ar score, age, and severe head injury for developing delirium tremens. (*Crit Care Med* 2017; 45:867–874)

Key Words: alcohol withdrawal syndrome; Clinical Institute Withdrawal Assessment for alcohol; delirium tremens; mortality

Three Trauma Centers
5 yr review
Adult trauma
n=28,101

AWS
0.88%

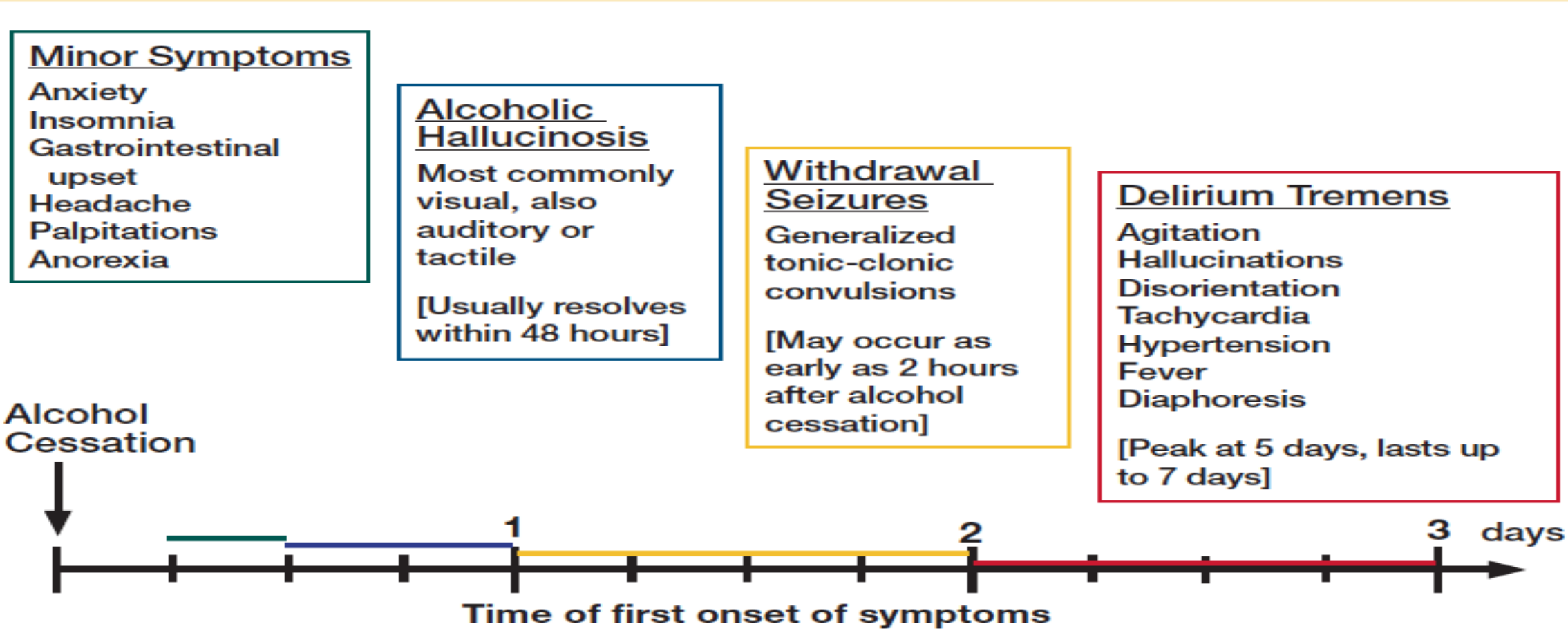
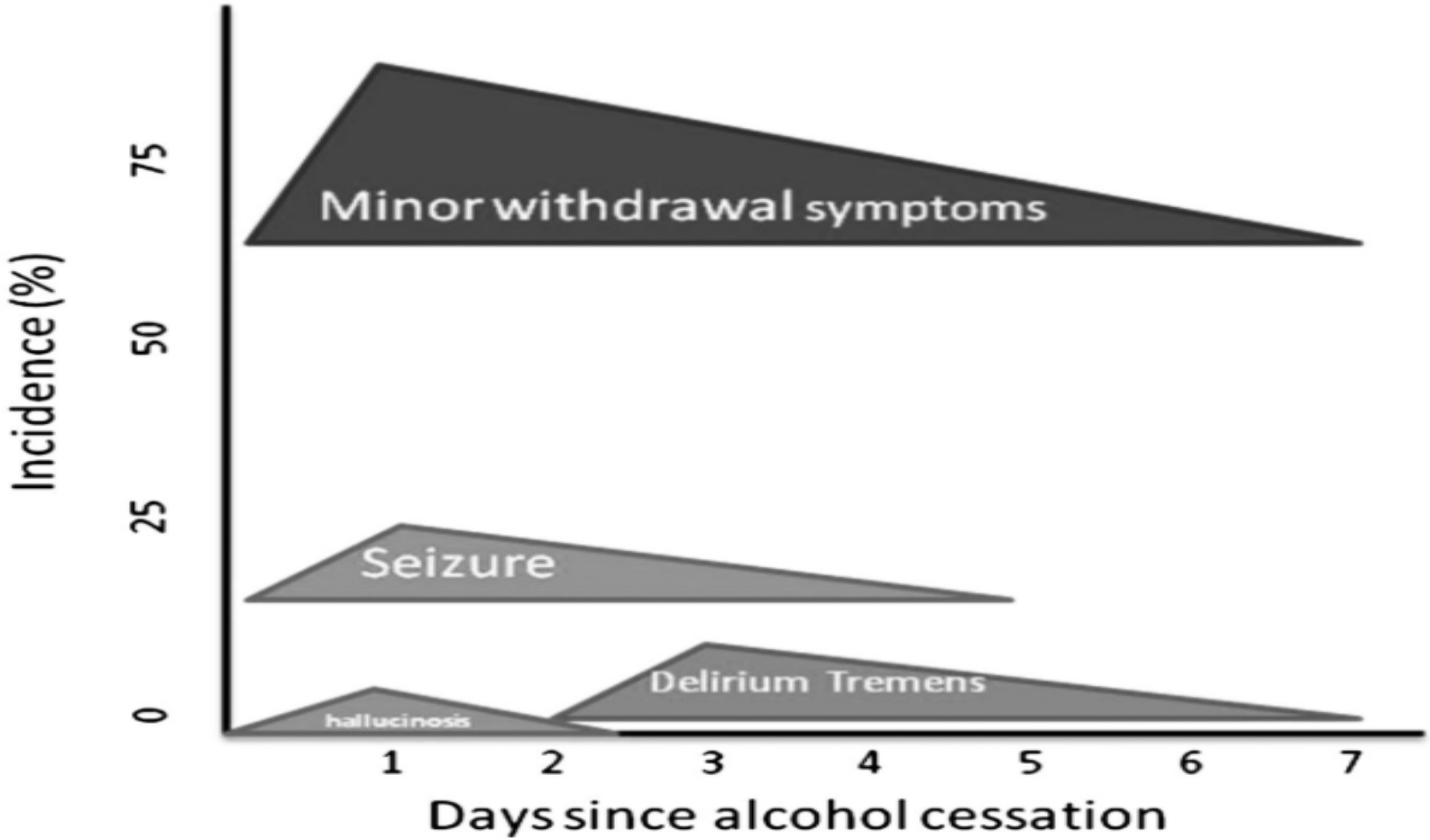


Figure. The four distinct conditions of alcohol withdrawal syndrome shown on a spectrum of severity and timeline scale. This figure was adapted with permission from Alcohol Withdrawal Syndrome.[19] *American Family Physician*, ©American Academy of Family Physicians. All Rights Reserved.

- **Progression variable non-linear**
- **Stages may overlap, skip**
- **Seizures do not predict DTs**

Onset & Frequency of Alcohol Withdrawal Symptoms



Delirium Tremens

- Result of no treatment/undertreatment (*failure to rescue*)
- Hallmark is delirium: rapid fluctuation of consciousness → Disorientation
- Autonomic symptoms (↑HR, ↑BP, ↑T, sweating, N&V, tremor, anxiety)
- Seizures & Coma
- Mortality
  - Historically (w/o treatment 15%)
  - Currently (w treatment <2%)
  - Most due: arrhythmias or MI

Mirijello 2015 Drugs
Schuckit 2014 NEJM
Mirijello 2015 Drugs

Delirium Tremens Incidence in Trauma

Excerpta Medica

The American Journal of Surgery

The American Journal of Surgery 187 (2004) 332–337
Scientific paper

Admission characteristics of trauma patients in whom delirium develops

2004

Richard D. Blondell, M.D.[a,d,*], Glen E. Powell, M.S.P.H.[a], Heather N. Dodds[a], Stephen W. Looney, Ph.D.[b], James K. Lukan, M.D.[c]

Single Trauma Center
2001-2002
2-yr REG review
Chart review
n=11,140

Abstract

Background ...dictive of the development ...
Methods: In... ...dications, and outcomes) w... ...admission for traumatic inj... ...s.
Results: Ad... ...were age more than 45 years... ...ed had longer hospital and ...
Conclusions ...ial to improve care and decrease lengths of stay.

Keywords: Delirium; Age; Alcoholism; Surgery; Trauma;Wounds; Injuries

Delirium is a disturbance ... ...l problems, cognitive impairment or ability to focus, sustain, o... ...cal, visual or hearing impairment [9]; cognition or the developme... ...ior to admission [10]; fracture on ad- that is not better accounted f... ...age [6]; psychoactive drug use, severe or evolving dementia [1]. ...ever or hypothermia [11]; electrolyte during hospitalization repres... ...and an "unstable" condition on admis- surgeons who care for thes... delirium can be as high as ...nalysis of 26 surgical studies involving patients [2], and tends to occ... ...atients, the overall prevalence of post- and those undergoing opera... ...as noted to be 36.8% with a range of ...rdiac surgery and a range of 28% to ...pedic surgery [12]. The prevalence of delirium was noted to be 11.4% in a study of 500 consecutive patients undergoing "major elective surgery" [13]. Risk factors for postoperative delirium include: biochemical

DTs
12%

Several characteristics ha... tors for delirium among the elderly, including few social interactions or "polypharmacy" [3]; dementia [4,5]; infection, especially of the urinary tract [6,7]; low serum albumin

Risk Factors for Delirium in Trauma Patients: The Impact of Ethanol Use and Lack of Insurance

2011

BERNARDINO C. BRANCO, M.D.,* KENJI INABA, M.D.,* MARKO BUKUR, M.D.,† PEEP TALVING, M.D., PH.D.,* MATTHEW OLIVER, M.D.,* JEAN-STEPHANE DAVID, M.D.,‡ LYDIA LAM, M.D.,* DEMETRIOS DEMETRIADES, M.D., PH.D.*

*From the *Division of Trauma and Surgical Critical Care, University of Southern California, Los Angeles, California; †Division of Trauma and Critical Care, Cedars-Sinai Medical Center, Los Angeles, California; and the ‡Department of Anesthesiology & Critical Care, Lyon-Sud Hospital, Hospital Civilis de Lyon and Claude Bernard University, Lyon, France*

NTDB Study
2002-2006
5-yr REG review
ETOH Level Drawn
n=504,839

The ... ...ct of alco... ...l in- gest... ...y all pati... ...rium were... ...ntify inde... ...with adm... ...ents deve... ...stain ther... ...ding chro... $P <$ 0.00... ...eth- anol... ...1). A step... ...sion, chro... ...nce, falls... ...nt of deli... ...risk facto... ...y be helpful in designing interventions to prevent delirium.

THE DEVELOPMENT OF DELIRIUM during hospital admission is associated with ... ...size and the lack of logistic Previous reports have docume... ...ntify predictors for the dication rates, prolonged Inten... length of stay (LOS) and hospi... ...atients at risk of developing develops, resulting in an incr... ...may facilitate the initiation and treatment costs.[1–4] More... ..., allow early diagnosis, and difficult to distinguish from ...tions for those who develop gression of traumatic brain in... ...xis with the practical goal of diagnosis and treatment of thes... ...uch as self-extubation, falls, Ethanol use is prevalent in ...ation. The purpose of the trauma center after injury. It is estimated that a quarter of patients admitted to urban hospitals are positive for ethanol.[6] These patients may be at significant risk of developing delirium. To date, very few studies have examined the risk factors associated with the development of delirium in trauma patients.[7, 8] These studies were present study was to examine the prevalence of delirium in an acutely injured patient cohort and to identify independent risk factors for its development.

DTs
0.6%

Occurrence, Predictors, and Prognosis of Alcohol Withdrawal Syndrome and Delirium Tremens Following Traumatic Injury

2017

Kristin Salottolo, MPH[1–4]; Emmett McGuire, MD[1]; Charles W. Mains, MD[2]; Erika C. van Doorn, MD[3]; David Bar-Or, MD[1–5]

3 Trauma Centers
2010-2014
5-yr REG review
n=28,101

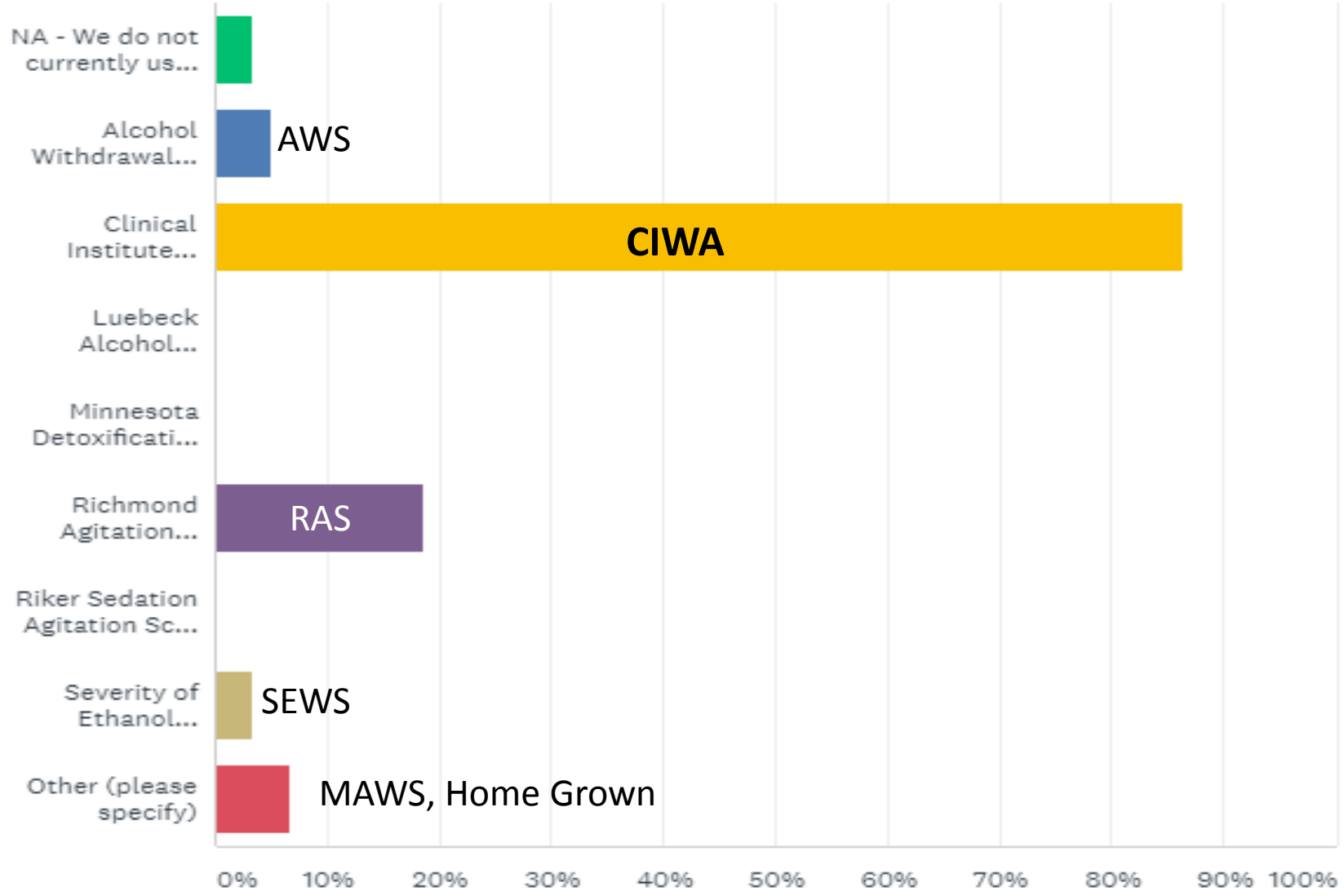
Objectives: We... ...05; $p = 0.02$) prognosis of a... ...24; $p = 0.03$). in patients with... ...rome, severe **Design:** Retros... ...remens (odds **Setting:** Three ...derline signifi- **Patients:** Twen... ...es of hospital admitted from ...thdrawal syn- **Interventions:** ...ol withdrawal **Measurements** ...re manifesta- of alcohol with... ...o significantly acteristics, risk factors for alcohol withdrawal syndrome, clinical outcomes, pharmacologic treatment for alcohol withdrawal syndrome, and Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-Ar) scores. Alcohol withdrawal syndrome severity was defined by CIWA-Ar score as m... ate (10–20), and severe (> 20). Alcoho... developed in 0.88% (n = 246), includi... moderate, and 53% severe. Alcohol wit... gressed to delirium tremens in 11%. Bef... withdrawal syndrome severity was associ... hypokalemia, baseline CIWA-Ar score, a... withdrawal syndrome risk factors. Logistic regression identified the following predictors of delirium tremens: baseline CIWA-Ar differed by alcohol withdrawal syndrome severity but was only greater in patients who progressed to delirium tremens (11.1%; $p = 0.02$); otherwise, there were no differences in mortality by ...by minimal, moderate, and severe ... with alcohol withdrawal syndrome ... of delirium tremens that is associ- ... These data demonstrate the pre- .../A-Ar score, age, and severe head ... tremens. (*Crit Care Med* 2017; 45:867–874)

Key Words: alcohol withdrawal syndrome; Clinical Institute Withdrawal Assessment for alcohol; delirium tremens; mortality

DTs
11%

Which of the following ICU scoring tools are used to assess and manage alcohol withdrawal?

Answered: 59 Skipped: 0



Clinical Institute for Withdrawal Assessment for Alcohol (**CIWA-Ar**) *revised*

Lists 10 Signs & Symptoms

1. Agitation
2. Anxiety
3. Headache
4. N&V
5. Auditory disturbances
6. Tactile disturbances
7. Visual disturbances
8. Paroxysmal sweats
9. Tremor
10. Orientation (0-4)

(0-7)

Score	Withdrawal
<8	Absent
9-14	Mild
15-20	Moderate
>20	Severe

Scores range from 0-67

- >8-10 trigger for intervention
- Cons:
  - Requires patient cooperation
  - Subjective
  - ≈ 5-15 minutes to complete?
  - Confounded by trauma – critical illness

APPENDIX 1. (*Continued*). Revised Clinical Institute Withdrawal Assessment for Alcohol Scale

Assessment Protocol a. Vitals, assessment now. b. If initial score ≥ 8 repeat q1h × 8 hr, then if stable q2h × 8 hr, then if stable q4h. c. If initial score < 8, assess q4h × 72 hr. If score < 8 for 72 hr, d/c assessment. If score ≥ 8 at any time, go to (b) above. d. If indicated (see indications below) Administer PRN medications as ordered and record on MAR and below.	Date												
	Time												
	Pulse												
	RR												
	O_2 sat												
	Blood pressure												
Assess and rate each of the following (CIWA-Ar):	Refer to reverse for detailed instructions in use of the CIWA-Ar												
Nausea/vomiting (0–7) 0: none; 1: mild nausea, no vomiting; 4: intermittent nausea; 7: constant nausea, frequent dry heaves and vomiting													
Tremors (0–7) 0: no tremor; 1: not visible but can be felt; 4: moderate with arms extended; 7: severe, even with arms not extended													
Anxiety (0–7) 0: none, at ease; 1: mildly anxious; 4: moderately anxious or guarded; 7: equivalent to acute panic state													
Agitation (0–7) 0: normal activity; 1: somewhat normal activity; 4: moderately fidgety/restless; 7: paces or constantly thrashes about													
Paroxysmal sweats (0–7) 0: no sweats; 1: barely perceptible sweating, palms moist; 4: beads of sweat obvious on forehead; 7: drenching sweat													
Orientation (0–4) 0: oriented; 1: uncertain about date; 2: disoriented to date by ≤ 2 d; 3: disoriented to date by > 2 d; 4: disoriented to place and/or person													
Tactile disturbances (0–7) 0: none; 1: very mild itch, pins and needle sensation, numbness; 2: mild itch, pins and needle sensation, burning, numbness; 3: moderate itch, pins and needle sensation, burning, numbness; 4: moderate hallucinations; 5: severe hallucinations; 6: extremely severe hallucinations; 7: continuous hallucinations													
Auditory disturbances (0–7) 0: not present; 1: very mild harshness/ability to startle; 2: mild harshness, ability to startle; 3: moderate harshness, ability to startle; 4: moderate hallucinations; 5: severe hallucinations; 6: extremely severe hallucinations; 7: continuous hallucinations													
Visual disturbances (0–7) 0: not present; 1: very mild sensitivity; 2: mild sensitivity; 3: moderate sensitivity; 4: moderate hallucinations; 5: severe hallucinations; 6: extremely severe hallucinations; 7: continuous hallucinations													
Headache (0–7) 0: not present; 1: very mild; 2: mild; 3: moderate; 4: moderately severe; 5: severe; 6: very severe; 7: extremely severe													
Total CIWA-Ar score													
	Dose given (mg):												
	Route:												
Time of PRN medication administration:													
Assessment of response (CIWA-Ar score 30–60 min after medication administered)													
RN initials													

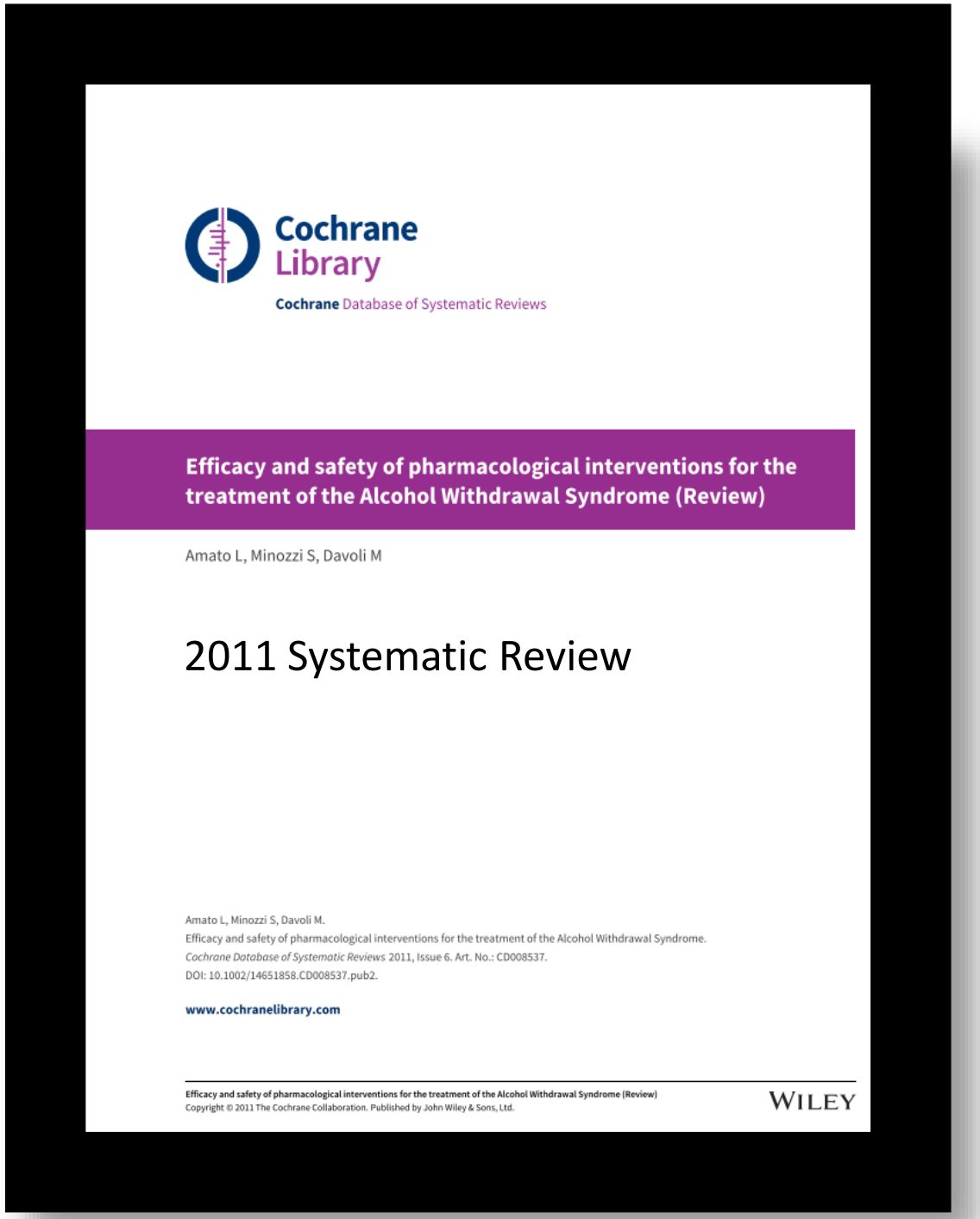
CIWA flowsheet

Scale for scoring:
Total score =
0–9: absent or minimal withdrawal
10–19: mild to moderate withdrawal
> 20: severe withdrawal

Indications for PRN medication:
a. Total CIWA-Ar score 8 or higher if ordered PRN only (symptom-triggered method)
b. Total CIWA-Ar score 15 or higher if on scheduled medication (scheduled + PRN method)
Consider transfer to ICU for any of the following: Total score above 35, q1h assess. × > 8 hr required, > 4 mg/hr lorazepam × 3 hr or 20 mg/hr diazepam × 3 hr required, or resp. distress.

Patient identification (Addressograph)	

Signature/Title	Initials	Signature/ Title	Initials



Early recognition & treatment of AWS with *benzodiazepines:*

- ↓ duration & severity of AWS symptoms
- Protective benefit against seizures
- ↓ mortality associated with DTs

Quality of Evidence:

- High 3%
- Mod 28%
- Low 48%
- Very Low 20%

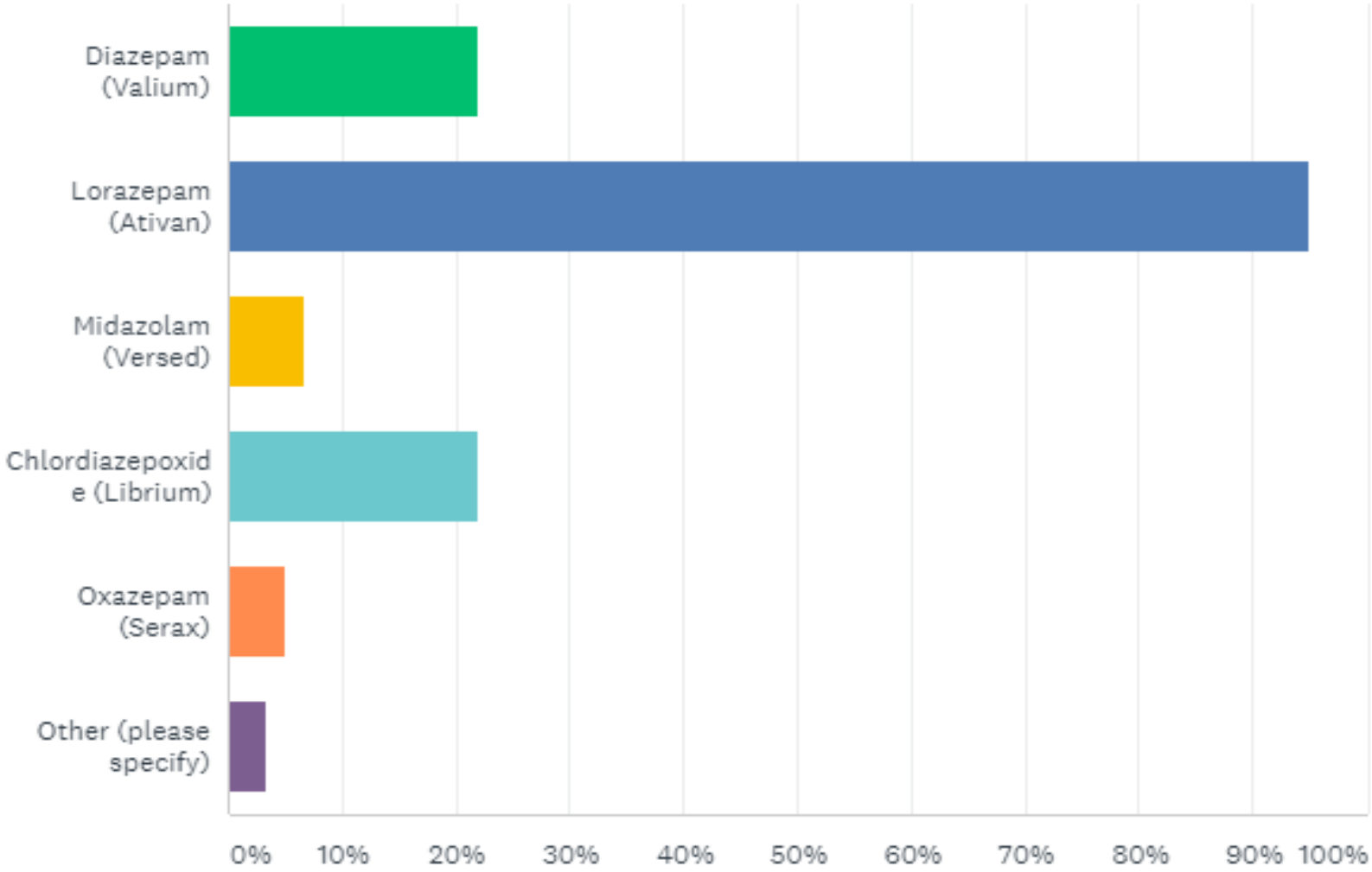
Benzodiazepines (BZD)

Generic	Brand	Onset	Safe for Liver Dysf	Half-life (hrs)	Anti-Seizure Effects
Diazepam	Valium	1-5 min IV		100	15-30 min
Midazolam	Versed	2-5 min IV		2	
Lorazepam	Ativan	5-20 min IV	Yes	14	12-24 hrs
Oxazepam	Serax	2-3 h PO	Yes	8	
Chlordiazepoxide	Librium	2-3 h PO		100	15-30 min

Repeated escalating doses as needed
No max dose
Diazepam as high as 2,000 mg/day

For moderate to severe alcohol withdrawal in the ICU, which Benzodiazepines do you primarily use (Check all that apply)

Answered: 59 Skipped: 1



Treatment Strategies - Timing

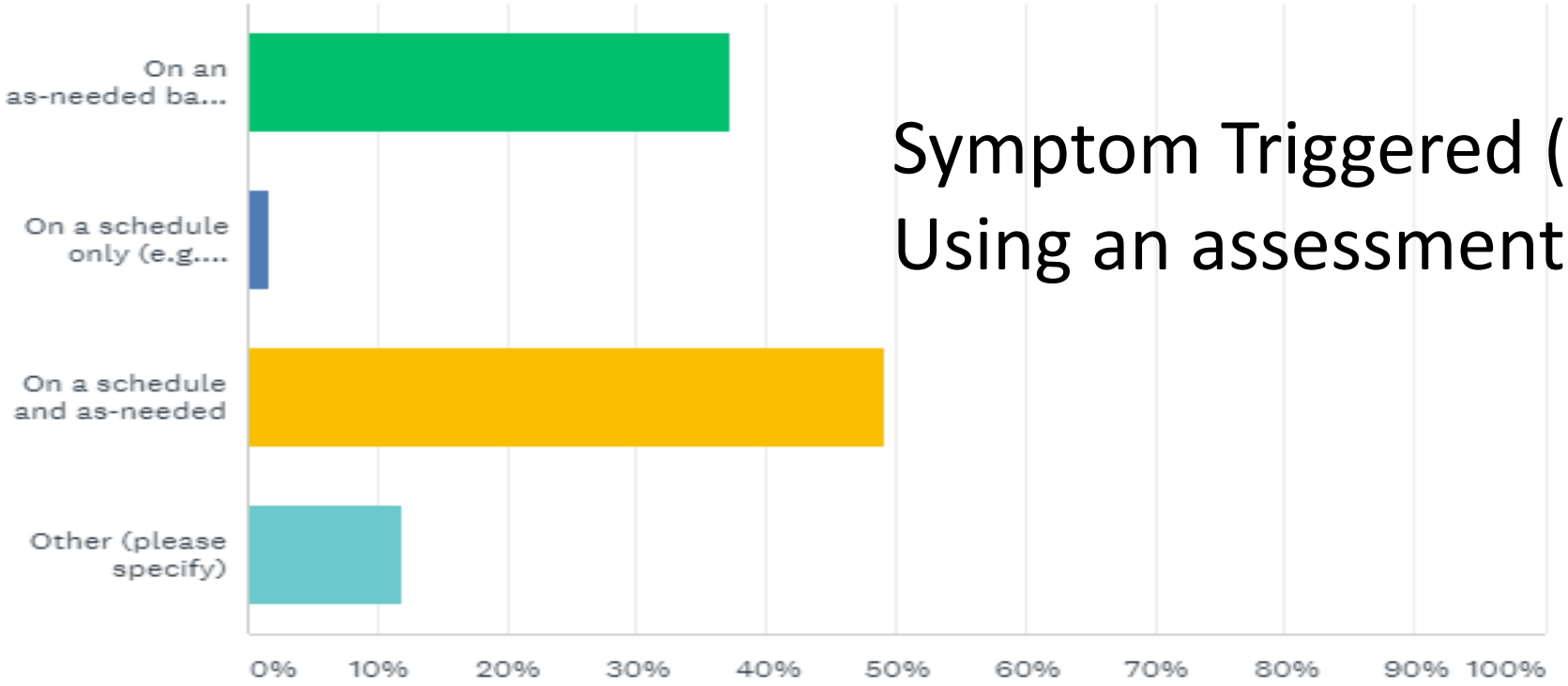
Fixed Tapered Regimen →→ **Symptom Triggered Regimen**

- Historically BZDs administered in scheduled fashion
- Gradually tapered over 4-7 days

- Use of validated assessment tool
- Early aggressive tx:
  - ↓ severity & duration AWS
  - ↓ benzo drug dosage
  - ↓ vent & ICU days

How would the Benzodiazepines be given?

Answered: 59 Skipped: 1

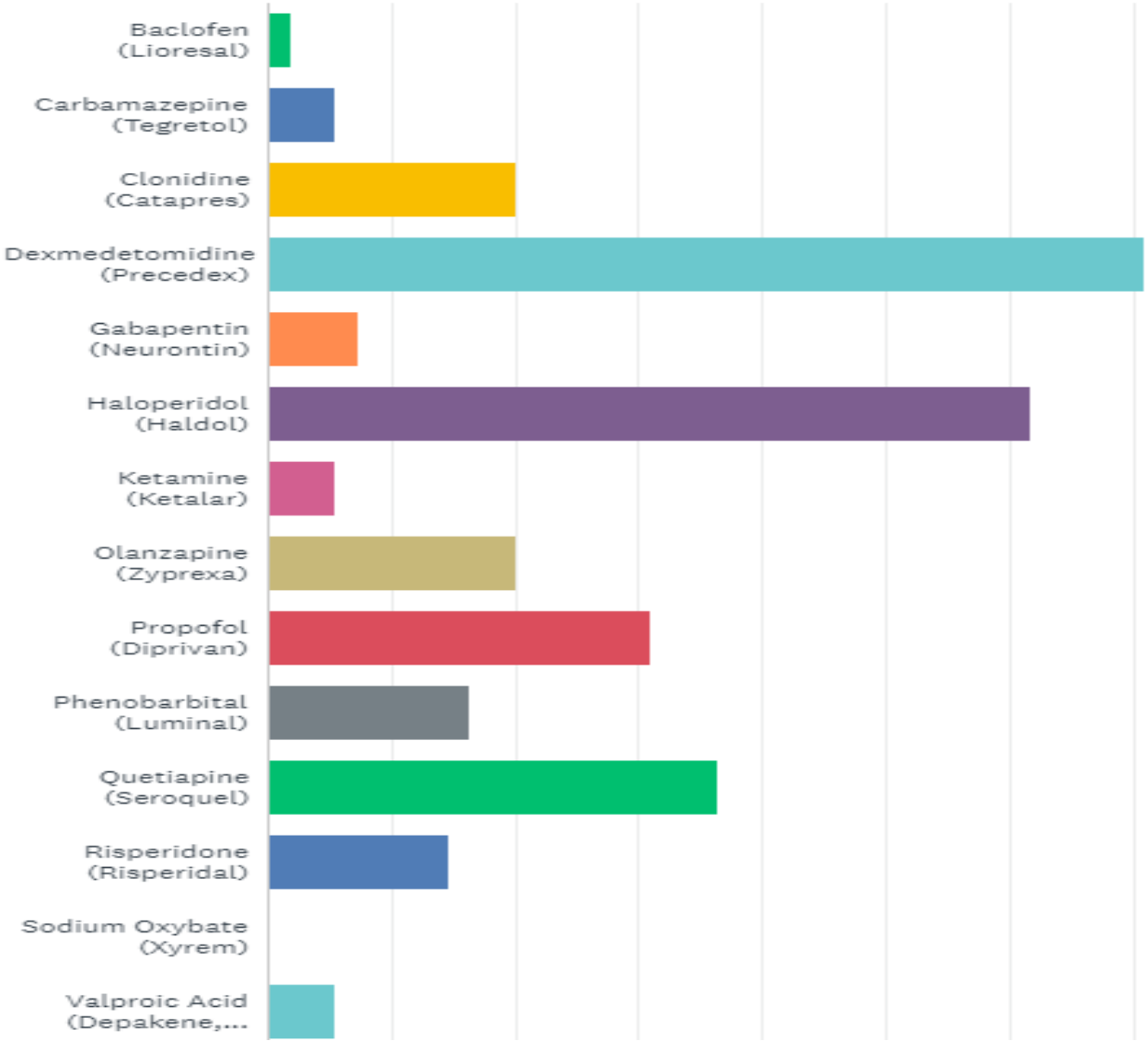


Symptom Triggered (PRN)
Using an assessment scale

ANSWER CHOICES		RESPONSES	
On an as-needed basis (PRN) only		37.29%	22
On a schedule only (e.g. every 6 hours)		1.69%	1
On a schedule and as-needed		49.15%	29
Other (please specify)	Responses	11.86%	7
TOTAL			59

What other agents do you use as Benzodiazepine adjuncts? (check all that apply)

Answered: 55 Skipped: 4



Rank Order:

1. Dexmedetomidine
2. Haloperidol
3. Quetiapine
4. Propofol
5. Clonidine or Olanzapine
6. Phenobarb

Phenobarbital

- Binds to GABA receptors → prolongs Cl^- channel opening
- Outcomes similar to benzodiazepines
- Most useful in severe AWS
- Onset 5 minutes, peaks 30 min, half life 3-4 days
- Dose: 260mg IV followed by 130mg IV q 30 min to sedation
- Caution:
  - Narrow therapeutic index, long half life, making titration difficult
  - Higher likelihood of respiratory depression and coma→ intubation

Phenobarbital

Syst Review Results:

Similar or improved outcomes compared to BZDs alone:

- AWS severity
- ↓ BZD
- ICU adm
- MV
- ICU/H LOS

Article

Hospital Pharmacy
2017, Vol. 52(9) 607–616

DOI: 10.1177/0018578717720310
journals.sagepub.com/home/hpx
SAGE

Patient Outcomes Associated With Phenobarbital Use With or Without Benzodiazepines for Alcohol Withdrawal Syndrome: A Systematic Review

2017

Drayton A. Hammond[1], Jordan M. Rowe[2], Adrian Wong[3], Tessa L. Wiley[4], Kristen C. Lee[5], and Sandra L. Kane-Gill[6]

Abstract

Purpose: Benzodiazepines are the drug of choice for alcohol withdrawal syndrome (AWS); however, phenobarbital is an alternative agent used with or without concomitant benzodiazepine therapy. In this systematic review, we evaluate patient outcomes with phenobarbital for AWS. **Methods:** Medline, Cochrane Library, and Scopus were searched from 1950 through February 2017 for controlled trials and observational studies using ["phenobarbital" or "barbiturate"] and ["alcohol withdrawal" or "delirium tremens."] Risk of bias was assessed using tools recommended by National Heart, Lung, and Blood Institute. **Results:** From 294 nonduplicative articles, 4 controlled trials and 5 observational studies (n = 720) for AWS of any severity were included. Studies were of good quality (n = 2), fair (n = 4), and poor (n = 3). In 6 studies describing phenobarbital without concomitant benzodiazepine therapy, phenobarbital decreased AWS symptoms ($P < .00001$) and displayed similar rates of treatment failure versus comparator therapies (38% vs 29%). A study with 2 cohorts showed similar rates of intensive care unit (ICU) admission (phenobarbital: 16% and 9% vs benzodiazepine: 14%) and hospital length of stay (phenobarbital: 5.85 and 5.30 days vs benzodiazepine: 6.64 days). In 4 studies describing phenobarbital with concomitant benzodiazepine therapy, phenobarbital groups had similar ICU admission rates (8% vs 25%), decreased mechanical ventilation (21.9% vs 47.3%), decreased benzodiazepine requirements by 50% to 90%, and similar ICU and hospital lengths of stay and AWS symptom resolution versus comparator groups. Adverse effects with phenobarbital, including dizziness and drowsiness, rarely occurred. **Conclusion:** Phenobarbital, with or without concomitant benzodiazepines, may provide similar or improved outcomes when compared with alternative therapies, including benzodiazepines alone.

Dexmedetomidine (Precedex)

alpha$_2$ agonist

- alpha$_2$ adrenergic agonist- ↓ sympathetic outflow – ↓ norepinephrine
- Reduces autonomic symptoms with less sedation than Clonidine
- Rapid onset (≈15 min), short half life (2 hr), titratable
- Continuous Infusion: 0.2 to 0.7 ug/kg/h titrated to effect
- Produces calm wakefulness without respiratory depression
- Adverse effects: bradycardia (titratable)
- Consistently reported to lower BZD requirements

2015 Systematic Review:

- Dexmedetomidine + BZD superior to BZD alone in ICU patients with DTs:
  - ↓ delirium ↓ CIWA & RASS scores

Haloperidol (Haldol)

Antipsychotics

- Neuroleptic antipsychotic with dopaminergic blocking activity
- Used to control severe agitation/hallucinations
- 0.5-5.0 mg IV or IM q30-60 min (not to exceed 20mg) *OR*
- 0.5-5.0 mg PO q4hr up to 30mg

Caution

  - lowers seizure threshold
  - prolongs QT interval

- Associated with higher mortality, longer delirium, ↑ risk of seizures
- Reserve for pts in AWS with underlying psychiatric disorders
- Others antipsychotics: risperidone, quetiapine, olanzapine

Anticonvulsants - Mild to Mod AWS only
Currently no role in withdrawal seizures

- "Antikindling effect" blocks progressive neuronal sensitization with repeat AWS
- **Phenytoin** (Dilantin) – ineffective→ avoid
- **Carbamazepine** (Tegretol)
  - 600-800mg po daily tapered over 5 days to 200mg
  - Superior to placebo & noninferior to BZDs
  - Side Effects: N&V, Stevens Johnson, agranulocytosis
  - Multiple drug interactions
- **Valproic Acid** (Depakote)
  - 400-500 mg po TID
  - Superior to placebo ↓ AWS symptoms & seizures
  - Caution in liver impairment (↑LFT's)
- **Under study**: gabapentin, pregabalin, tiagabine, vigabatrin, lamotrigine, topiramate, zonisamide, levetiracetam, oxcarbazepine

2014 Systematic Review

Most studies methodologically flawed

Lack of validated scale use

Underpowered to examine seizures/DTs as outcomes

Routine use NOT currently recommended

Propofol (Diprivan)

Anesthetic

- Anesthetic- GABA agonist, inhibits NMDA receptors
- Used as “Rescue” med for severe AWS → ICU on vent
- Used when high dose benzodiazepine and phenobarbital fail
- Rapid onset, short half-life, easy to titrate
- 0.5–1.25 mg/kg, up to 4mg/kg/hr, for up to 48 hrs
- Side Effect: bradycardia & hypotension
- Higher incidence of cardiovascular effects, mechanical ventilation, pneumonia

Ketamine

- Antagonizes NMDA receptor
- Few small retrospective studies for severe AWS
- Reduce BZDs, ↓ intubation, ↓ICU LOS
- Continuous Infusion: 0.15-0.3 mg/kg/hr until delirium resolved

Beta Blockers

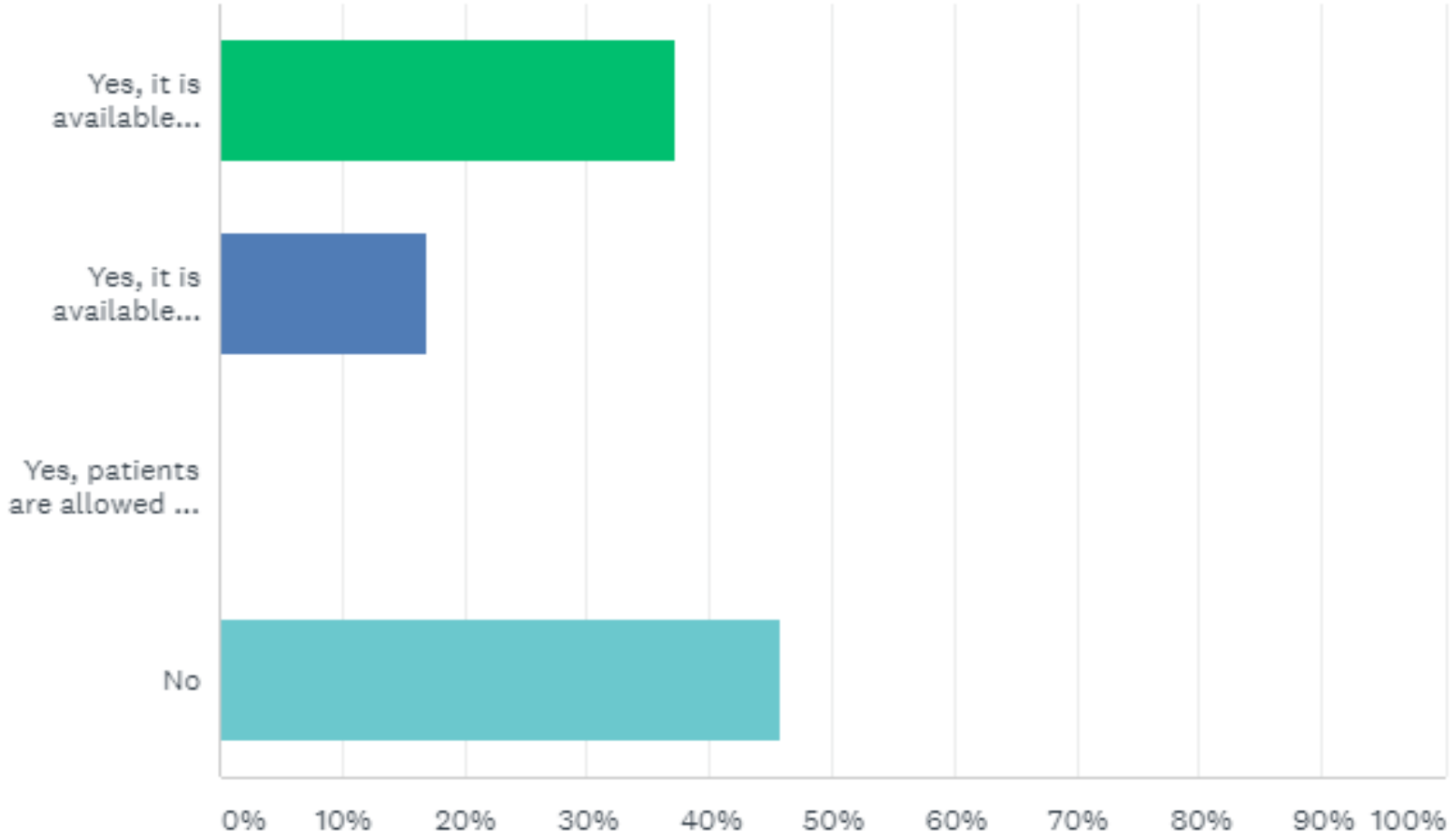
- B-adrenergic antagonists -reduce AWS autonomic symptoms
- Primarily reserved for AWS patients with coronary artery disease
- Atenolol (Tenormin) most commonly used
- Avoid Propranolol → worsens delirium

Alcohol

As Treatment

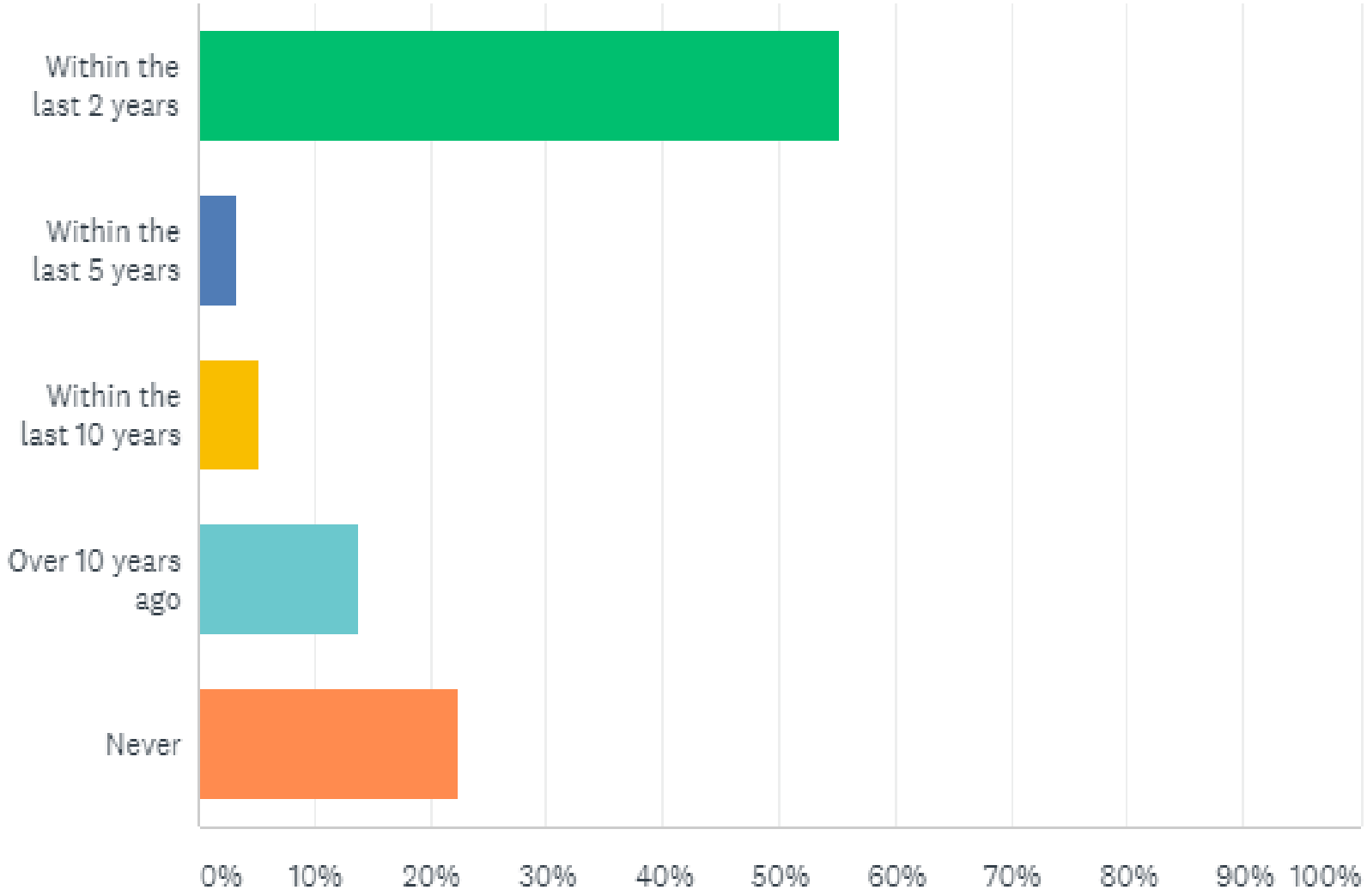
Does your institution currently allow alcohol for the management of alcohol withdrawal?

Answered: 59 Skipped: 0



When was the last time you gave alcohol for alcohol withdrawal syndrome?

Answered: 58 Skipped: 1



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Cardiac Care

Alcohol Withdrawal Prevention: A Randomized Evaluation of Lorazepam and Ethanol (AWARE) Pilot Study

Coronary Care Unit: n=59
CAGE→Beer/vodka PO/NG q4 hr vs Lorazepam
Equivalent efficacy = viable option

The Journal of TRAUMA® *Injury, Infection, and Critical Care*

2008 Journal of Trauma

Comparison of Intravenous Etha Alcohol Withdrawal Prophylaxi of a Randomized Trial

Jordan A. Weinberg, MD, Louis J. Magnotti, MD, Peter E
Thomas Schroeppel, MD, Timothy C. Fabian, MD, and Martin A. Croce, MD

Background: Although benzodiazepines are the recommended first-line a history of chronic daily alcohol consumption greater than or equal to five tion of patients who deviated from a score of 4 during the course of treatment (p =

Trauma ICU: n=50
IV ETOH vs Diazepam
ETOH No advantage

2006 JACS

An Ethanol Protocol To Pre Alcohol Withdrawal Syndro

Sharmila Dissanaike, MD, Ari Halldorsson, MD, FACS,

BACKGROUND: Alcohol withdrawal syndrome (AWS) sudden onset abstinence. It is usually agitation, and tachycardia, but, if unt

Surgical ICU: n=76
Pre-protocol IV ETOH vs Post-Protocol IV ETOH
Reduced duration of treatment = viable option

2000 Addiction Specialist:

To my consternation…. surgical textbooks have advocated giving ethanol IV for alcohol withdrawal. It is more toxic than benzodiazepines, harder to administer and requires monitoring of blood levels not to mention the fact that it condones the use of alcohol”

Alcohol

- Difficult to titration
  - short duration
  - narrow therapeutic window
  - can lower seizure threshold
- Adverse events
- Lack of efficacy compared to BZDs
- Minimal to weak research support
- Not recommended

Ethanol for alcohol withdrawal: The end of an era

J Trauma Acute Care Surg 2013

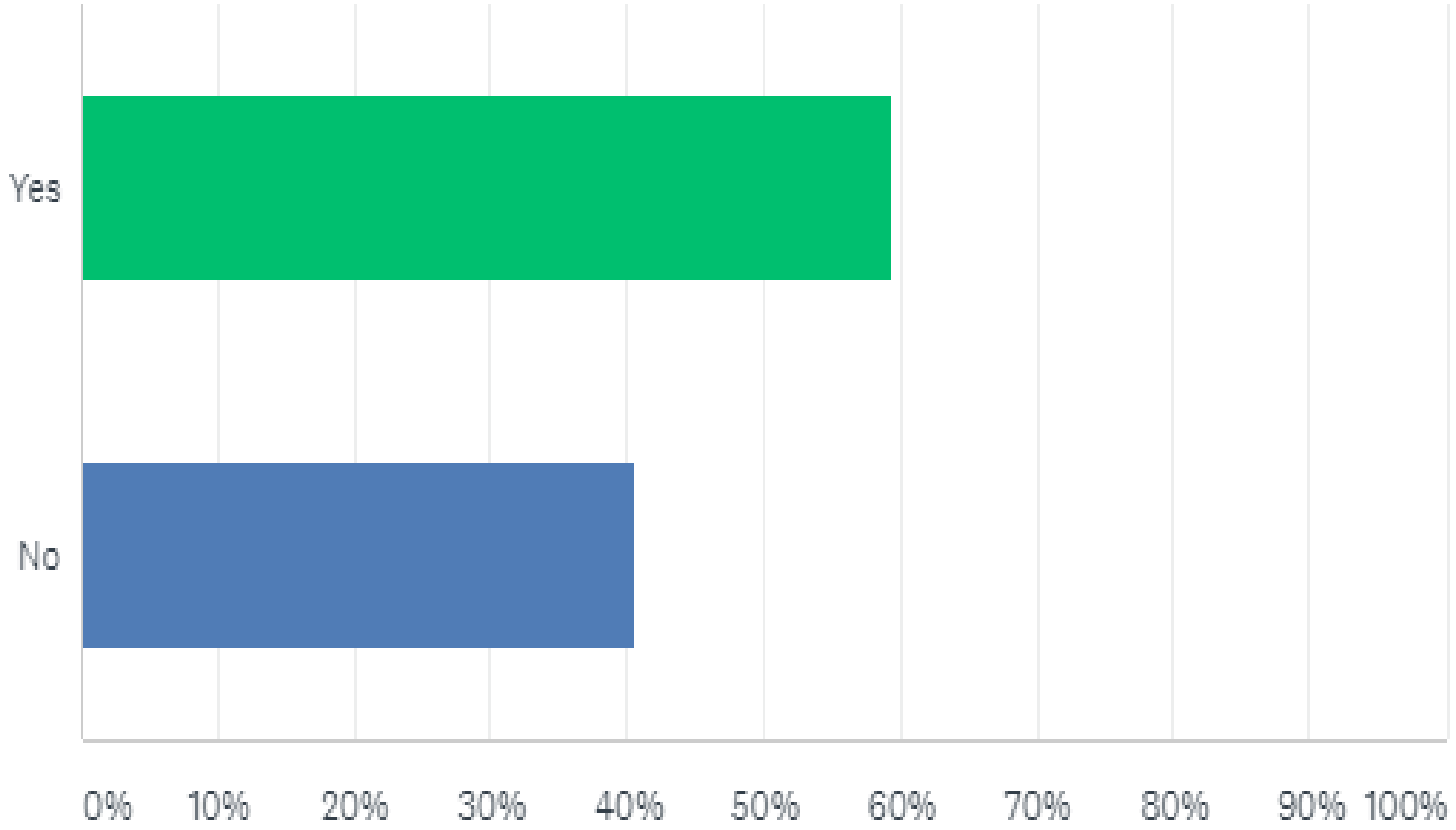
Blair Walker, MD, Mary Anderson, MD, FAPM, Lawrence Hauser, MD, FAPM,
and **Isela Werchan, MD,** *Austin, Texas*

A substantial number of patients presenting with severe trauma, other surgical emergencies, and elective surgery

effectively is imperative as the risk of going into withdra and developing withdrawal seizures or delirium tremens (D

Do you have access to a substance abuse service or specialist for AWS consults?

Answered: 59 Skipped: 0



Does your institution have a dedicated drug and alcohol withdrawal unit?

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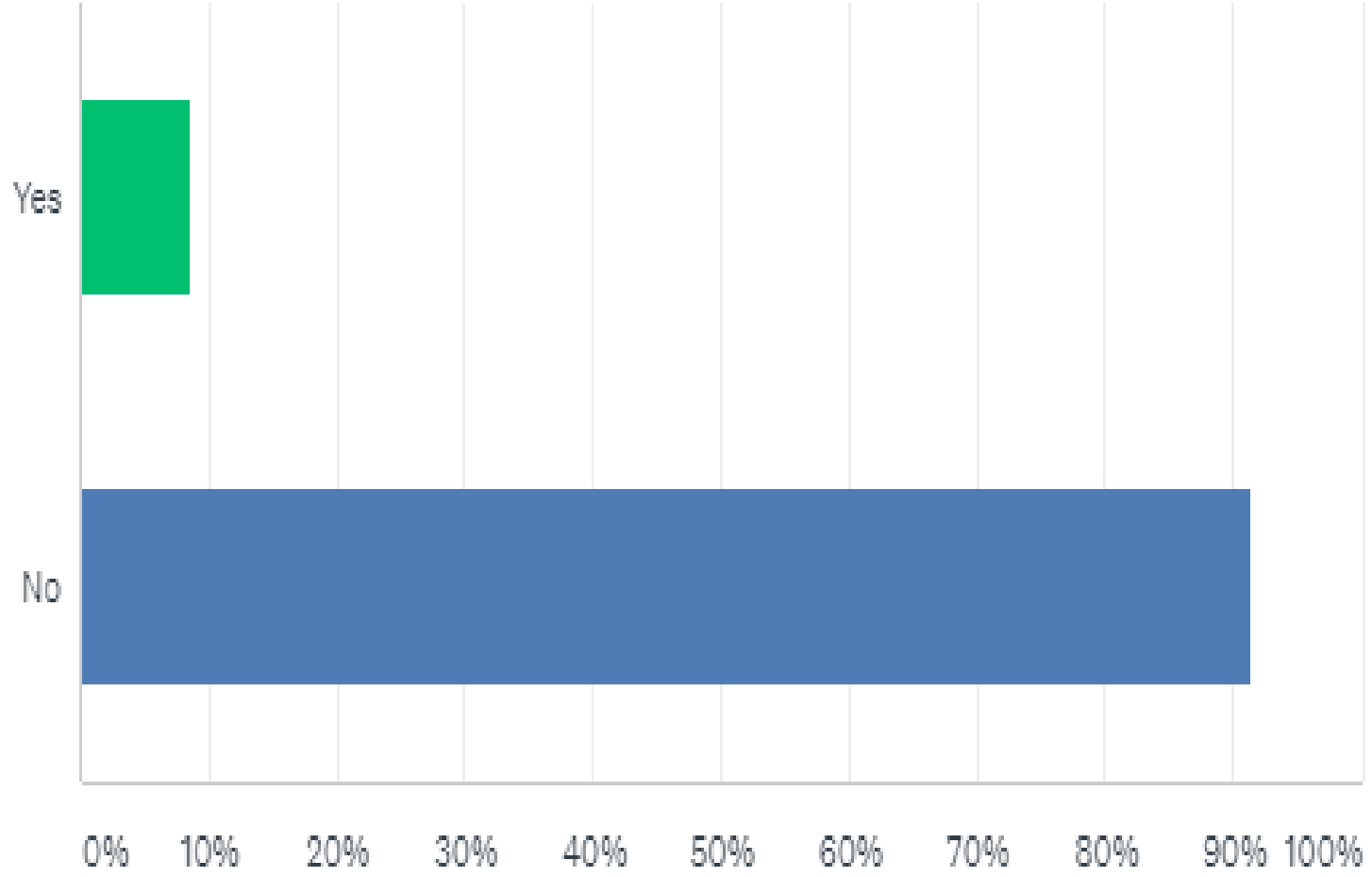

Which of the following describes your access to clinical pharmacists to assist with AWS?

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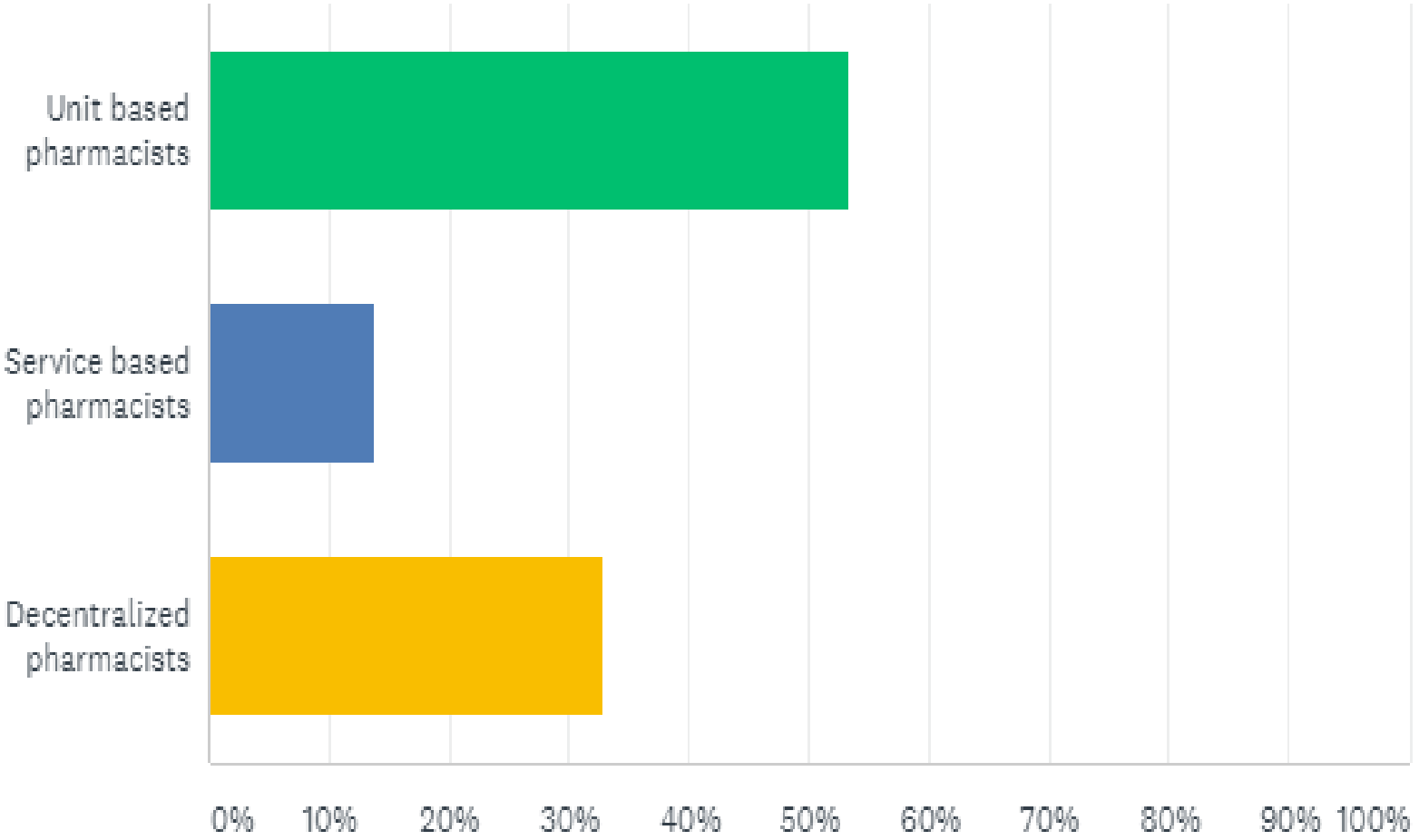

Does your ICU have an AWS protocol/guideline in place?

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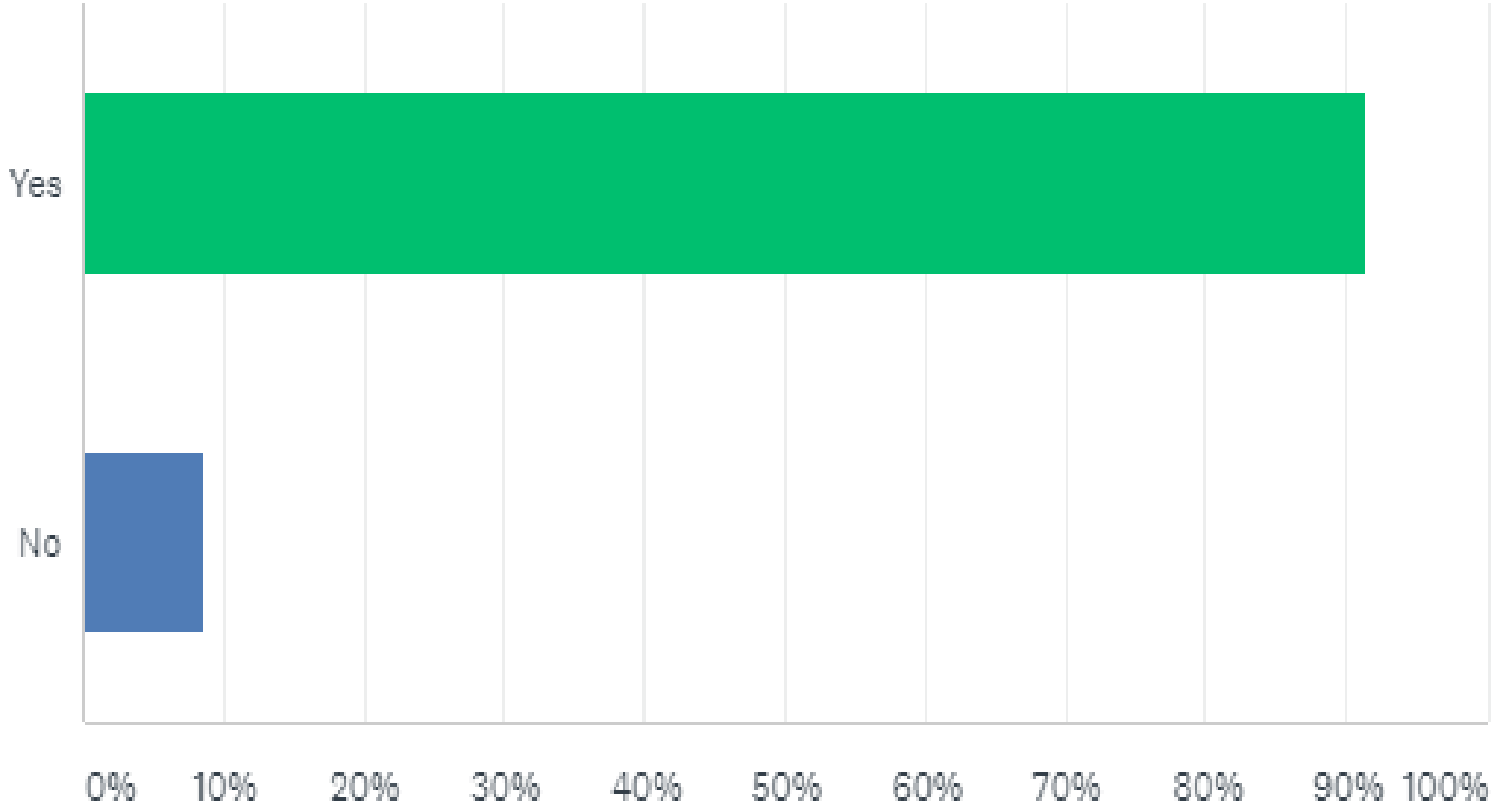


University of Michigan

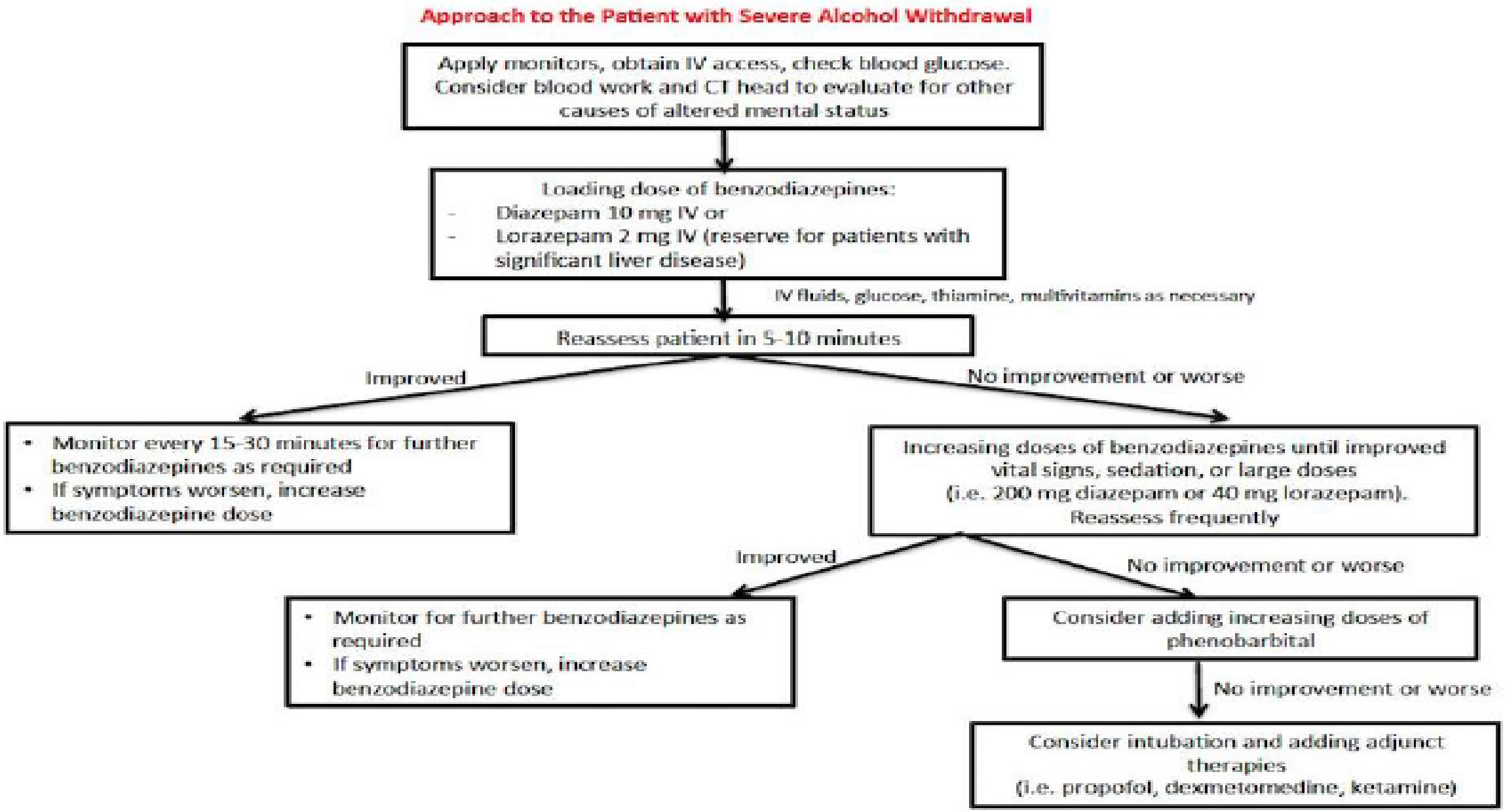
SICU Alcohol Withdrawal Protocol

Patients admitted to SICU with alcohol history at high risk for withdrawal (no detox prior to surgery):

1. Foundation enteral ativan dosing: Enteral ativan 1 mg q 4 hours RTC – hold only if too sedated
2. Initiate MAWS protocol on SICU arrival, calculate next 24 hr Ativan dose given, and increase enteral Ativan dosing, continue on a daily basis. Enteral Ativan will be weaned after SICU d/c.
3. For severe alcohol withdrawal unresponsive to MAWS protocol, initiate Severe Alcohol Withdrawal protocol below:

Algorithm for Management of Severe Alcohol Withdrawal

Algorithm for Management of Severe Alcohol Withdrawal



U of M Adjuncts

Drug	Dose	Mechanism of Action	Monitoring
Phenobarbital	130 – 260 mg IV q 20 min OR 10 mg/kg IV over 1 hr	GABA Agonist	Hypotension Respiratory depression Bradycardia Thrombophlebitis
Propofol	5-80 mcg/kg/min IV (intubated)	GABA Agonist & NMDA Receptor Antagonist	Hypotension Respiratory depression Bradycardia
Dexmedetomidine	0.2 – 1.4 mcg/kg/hr IV	Alpha2 Agonist with sedative properties	Hypotension Bradycardia Respiratory depression
Ketamine	0.2 mg/kg/hr IV	NMDA Antagonist	Hypertension Tachycardia Sialorrhea Emergency reactions Laryngospasm

https://emergencymedicinecases.com/alcohol-withdrawal-delirium-tremens/

Yanta JH et al. Alcohol withdrawal syndrome: improving outcomes through early identification and aggressive treatment strategies. Emergency Medicine Practice June 2015;17(6): 1-20. www.ebmedicine.net

AWS Guidelines

- American Society of Addiction Medicine 2004 (2019)
- Royal College of Physicians 2010
- US Department of Defense 2015

AWS Performance Improvement

- AWS Complications: (Failure to Rescue?)
  - Delirium tremens
  - Hallucinosis
  - Seizure
- AWS-related ICU admissions
- Intubations
- Vent days
- Total number of AWS meds used
- Total BZD dose
- Nosocomial pneumonia
- ICU & Hospital LOS

In Conclusion

- Best practice
  - Sedation assessment scoring tool
  - Symptom-triggered BZD escalation protocol
  - Select use of adjuncts
  - Reconsider role of Alcohol
  - Early aggressive symptom control → prevent progression