Provincial Clinical Knowledge Topic

Alcohol Intoxication Withdrawal, Adult

Emergency Department

V 1.5

Document History

Version	Date	Description of Revision	Completed By / Revised By
1.1	July 2015	Completed document (2013) reformatted into new topic template	Dr. Bullard / Carla Milligan
1.2	January 2016	Minor edits in the Rationale section and form 1 info in general care section as well as addition of CIWA-Ar Scoring Reference tool to appendix	Dr. Bullard / Sarah Searle
1.3	May 2016	Minor edits made to working group membership list	Sarah Searle
1.4	June 2017	Removed link to Center for Addiction and Mental Health assessment and documentation form on pg. 35. Documentation requirements will continue as per local practice at this time.	Dr. Bullard / Sarah Searle
1.5	February 2018	Thiamine dosing in order set updated based on additional evidence and reference included	Dr. Bullard/Sarah Searle

Important Information Before You Begin

The recommendations contained in this knowledge topic have been provincially adjudicated and are based on best practice and available evidence. Clinicians applying these guidelines should, in consultation with the patient, use independent medical judgment in the context of individual clinical circumstances to direct care. This knowledge topic will be reviewed periodically and updated as best practice evidence and practice change.

The information in this topic strives to adhere to Institute for Safe Medication Practices (ISMP) safety standards and align with Quality and Safety initiatives and accreditation requirements. Some examples of these initiatives or groups are: Health Quality Council Alberta (HQCA), Choosing Wisely campaign, Safer Health Now campaign etc.

This knowledge topic has incorporated information or content from the following sources:

- SCM Order Sets
- Provincial Order Sets
- CIWA Alcohol Withdrawal Assessment Guideline

Within this knowledge topic PICO-D questions or key clinical questions that have been used to guide research using the **P**opulation/**P**roblem, **I**ntervention, **C**omparison, **O**utcome, **D**esign format. These questions are listed in Appendix A.

Rationale

It is common for patients to present to the Emergency Department (ED) in various states of inebriation. In some cases there is clear history or evidence of underlying or associated trauma, illness or co-ingestions that compel the need for concurrent investigations and management.

For those intoxicated patients with no obvious additional condition the usual first priority is to protect the patient by supporting his/her airway, breathing and circulation (ABCs), providing the necessary level of monitoring and where necessary chemically or physically restrain the patient to protect them from harm. For unconscious or uncooperative patients laboratory testing and diagnostic imaging is often required to ensure dangerous pathologies are not missed. Otherwise the patient is managed by watchful expectation followed by a careful history and physical examination and assessment for addiction or other mental health problems.

Hazardous or harmful alcohol use among persons aged 15 years or older in Canada was reportedly 12.9%, 12.0%, and 11.2%, and in Alberta was 12.7%, 12.8%, and 8.9% in 2008, 2009, and 2010 respectively. Over a 4 year period (2008 through 2011) the rates of alcohol use exceeding the low risk drinking guidelines were 15.1%, 14.5%, 14.5%, and 14.4% across Canada and 14.3%, 14.3%, 12.3%, and 15.8% in Alberta respectively. Among those experiencing harm from alcohol use the rates were 6.8%, 6.5%, and 5.7% in Canada and 6.8%, 6.0%, and 5.4% in Alberta. In 2010 in Alberta 14.5% of males and 10% of females report exceeding low risk drinking guidelines. Those aged 15-24 are 40% more likely to be harmful drinkers and 3-5 times as likely to suffer alcohol related harm.[1] In 2011 29% of Alberta males age 12 and over and 24.8% of Canadian males compared to 13.4% of Alberta females and 11.4% across Canada reported heavy monthly use. For individuals who accessed Alberta EDs for substance-related problems, 71% were alcohol-related[2]. In 2004 3.5% of Albertans (compared to Canadian average of 2.6%) of those over 15 are alcohol dependant with 7,844 alcohol related hospitalizations or deaths. In the US it has been reported that 2.7% of annual ED visits were related to alcohol use. At the Vancouver General Hospital based on chart reviews 11% of male ED patients and 4.6% of females were identified with alcohol abuse problems. In Alberta during the 3 year period 2012 through 2014 there were 7600 emergency department visits for alcohol withdrawal at the 15 busiest EDs. Overall 50.7% of these patients arrived by EMS and 38% were admitted, with the highest admission rate in Calgary of 47.4%.

Harmful drinkers (3-4 standard drinks/day) or dependent drinkers (unable to function without alcohol), especially if they are malnourished or have decompensated liver disease are at risk to develop alcohol withdrawal symptoms. Such patients should be monitored closely and provided fluid and nutrient replacement and adequate sedation to prevent the serious side effects of withdrawal and admitted for appropriate management unless the symptoms are mild and easily controlled.

Prior to discharge, patients should be alert and oriented and have returned to their baseline ambulatory state. Additional pathology should be identified, withdrawal symptoms should be controlled, and appropriate discharge plans and follow up arranged or at least offered to each patient.

Goals of Management

1. Protect airway, prevent aspiration, support ventilation, volume resuscitate as needed
2. Rule out other causes of altered level of consciousness where appropriate
3. Ensure normothermia, expose patients and assess for trauma, injuries
4. Recognize patients exhibiting signs of alcohol withdrawal or who are at risk for withdrawal
5. Recognize that patients with co-morbidities or alternate presenting diagnoses (gastrointestinal [GI] bleed, sepsis, diabetic ketoacidosis [DKA], etc.) can precipitate or induce more severe alcohol withdrawal
6. Rule out dangerous co-ingestions
7. Prevent harm to patient or others through use of chemical or physical restraints in aggressive uncooperative patients
8. Monitor closely until patient is lucid enough to protect airway, breathe without stimulation, and answer questions appropriately
9. Prevent the onset or worsening of Wernicke's encephalopathy in harmful or dependent drinkers
10. Assess and manage alcoholic ketosis
11. Prevent or mitigate signs and symptoms of ETOH (alcohol) withdrawal (including seizures; alcoholic hallucinosis) through the use of appropriate medications
12. Provide safe and appropriate discharge planning and patient/family education

Nursing Assessment and Documentation

This section contains specific considerations related to this topic. Standard assessment and documentation practices should still be followed.

1. Triage Assessment (Influenza Like Illness [ILI] screening)
    - Vital signs, including a glucose (as indicated)
    - Canadian Emergency Department Information Systems (CEDIS) complaint: Substance misuse / intoxication; Substance withdrawal; Altered level of consciousness[3]
    - Canadian Triage and Acuity Scale (CTAS) modifiers: Level of consciousness most discriminatory[3]
    - Note: Patients often present to the ED with another chief complaint (i.e. extremity injury, abdominal pain) and signs/symptoms of alcohol withdrawal develop during ED visit.
2. Initial Assessment/Documentation
    - Past History:
      Brief alcohol use screening
        - Do you ever use alcohol?
        - On average, how many days per week do you drink alcohol?
        - On a typical day when you drink, how many drinks do you have?
        - In the last month what is the maximum number of drinks in a single day?
        - When was your last drink?

          Comments: The questions about regularity and amount of drinking help identify those at risk for withdrawal; the binge drinking question helps identify those at greater risk for GI bleeding; and the time of last drink help identify a timeline for when withdrawal symptoms may be anticipated (generally symptoms of anxiety, agitation, nausea and vomiting will begin in about 6-12 hours).
    - Systems review:
        - Vital Signs: fever
        - Respiratory: tachypnea; dyspnea

- Cardiovascular: tachycardia; signs of dehydration; diaphoresis; chest pain
- Neurological: neurological vital signs; seizure activity; irritability; tremors; confusion; hallucinations; bedside blood glucose level
- Gastrointestinal: nutrition status; nausea; vomiting; abdominal pain;
- Other: recent falls

3. Ongoing Assessment/Documentation
    - Systems Review
        - Vital Signs: fever
        - Respiratory: tachypnea; dyspnea
        - Cardiovascular: tachycardia; signs of dehydration; diaphoresis; chest pain
        - Neurological: neurological vital signs; seizure activity; irritability; tremors; confusion; hallucinations; bedside blood glucose level
        - Gastrointestinal: nutrition status; nausea; vomiting; abdominal pain;
        - Other: recent falls

Physician Assessment and Documentation

This section contains specific considerations related to this topic. Standard assessment and documentation practices should still be followed.

1. Past History
    - History of previous admissions to hospital or drug rehabilitation for alcohol and/or other drug use; history of gastrointestinal bleeding; alcohol withdrawal seizures; hallucinosis; delirium tremens
2. Review of Systems
    - Active symptoms related to liver disease such as jaundice, peripheral edema, gastrointestinal bleeding, or any other co-morbidities as these will exacerbate the risk and severity of alcohol withdrawal symptoms.
3. Social History
    - Current living situation; source of income and income supports; community-based care providers (social worker, addictions counsellor, other)
4. Physical Examination
    - Focused exam to assess for causes of alteration other than alcohol (drugs, infection, metabolic, environmental, structural [DIMES]). Specifically look for signs of trauma; stigmata of liver disease; and signs of cutaneous or pulmonary infections

Initial Decision Making

1. Is the patient unstable?
    - Hemodynamically
        - YES – Begin fluid resuscitation while looking to define the cause which could include: upper Gastrointestinal bleeding, severe nausea and vomiting, pancreatitis, or trauma related volume loss
    - Altered level of consciousness
        - YES – Consider the need for intubation to protect the airway then look to identify the cause which may be due to alcohol or other toxic ingestions, head trauma, or possibly hypercapnea due to hypoventilation
2. Is the patient stable?
    - YES – Ensure you do a thorough history and physical to try to identify any comorbidities in terms of co-ingestions, trauma, or underlying chronic diseases to assist in developing an investigation and management strategy
        - Also look for signs of alcohol withdrawal and the anticipated stage of such withdrawal symptoms to anticipate therapeutic needs
        - Nurse or physician to assess Clinical Institute Withdrawal Assessment (CIWA)-Ar score (**Appendix E**)

Order Set Components

Orders or their components have been added in **bold** text if recommended as default (e.g. **Bedrest** under General Care). All other orders and components would be selected based on the presentation needs of the patient. Orders that have more than one option for treatment have been entered in square brackets (e.g. Warfarin 5 mg [2, 2.5, 3, 4, 6, 7.5, 10 mg] PO x 1).

General Care

- Goals of Care Designation: While relevant to all presentations this is less likely to be known or something to address on presentation
- Precautions and Safety:
    - Consider need for police or security for violent patient
    - Determine whether or not patient needs certifying using a Form 1
    - Consider removing hand sanitizer from patient care space
    - Establish procedures to mitigate risk to staff for patients with unrestrained expectorations, especially if hepatitis or human immunodeficiency virus (HIV) status positive or unknown
    - Consider isolation if ILI positive or suspected tuberculosis
    - Provide Emergency Health Care under the “Adult Guardianship and Trusteeship Act” 2008 **(Appendix D)**
- Activity:
    - **Bedrest**
    - Bedrest – With Bathroom Privileges
    - Ambulate – With Assist
    - Activity as Tolerated
    - Restraints – Mechanical (soft)
        - preferred to keep patients with altered level of consciousness in a side lying position for safety

- Diet / Nutrition:
  - **NPO**
  - NPO – May Take Meds oral medications with sips
  - NPO – May Have Ice Chips
  - Clear Fluids
  - Regular Diet
  - Other

Patient Care Orders

- Vital Signs: these orders need to be re-evaluated when the patient stabilizes or by two hours, whichever occurs first. Vital signs to include: respiratory rate (RR), pulse rate (P), blood pressure (BP), temperature (T), and oxygen saturation (O_2 Sat):
  - **as per provincial guideline**
  - manual or automatic
  - every __ hourly
  - every __ min
- Neurological vital signs may be indicated and include:
  - Glasgow Coma Scale (GCS), and pupillary size and reaction to light with reassessments:
    - **as per provincial guideline**
    - every __ hourly
    - every __ min
  - Note: the physician should be notified if a patient's GCS decreases by two points.
- Ins and Outs: Measure and record output (+/- input) [1,2,4] hourly

Respiratory Care

- Note: physician should be notified if O_2 flow required to be increased by greater than 2 L to maintain the same level of oxygenation or if there is a progressive increase in the work of breathing
  - **O_2 Therapy – Titrate to Saturation greater than or equal to 90%,** unless otherwise specified
  - O_2 Therapy – Titrate to Saturation: @ ___ lpm to maintain oxygen saturation greater than or equal to 90%, unless otherwise specified.

Intravenous Orders

- Intravenous Cannula – Insert
- Saline lock
- IV bolus or rapid infusion including the following:
  - Amount (e.g. 250 mL, 500 mL, 1000 mL, 2000 mL)
  - Fluid (e.g. **0.9% NaCl infusion**, lactated ringers infusion)
  - Run time (e.g. 15 min, 30 min, 45, min, 60 min)
- IV maintenance
  - Rate in mL / hr (e.g. 75, 100,**125**, 150, 200, 250)
  - Fluid (e.g. **0.9% NaCl infusion,** lactated ringers infusion)

- Specific medications may be added to the IV bag or mini bags as per nursing and pharmacy standards:
  - thiamine 300 [or 200] mg IV (or same dose may be given PO once patient tolerating a regular diet). For prophylaxis we recommend the use of thiamine in malnourished alcoholics to prevent Wernicke's encephalopathy and the higher dose for patients with Wernicke's **(PICO 1)**

  - thiamine 300 mg IV every 8 hours X 3 days **and then** 300 mg IV/PO for another 5 days (for patients with Wernicke's encephalopathy [oculomotor dysfunction, ataxia, encephalopathy]) (**PICO 1**)

  - vitamins multiple w/minerals 2 tabs PO every 24 hrs

  OR

  - vitamins multiple 10 mL in a 1 liter bag of IV solution (or may give 1 tab PO). There is insufficient evidence to make a recommendation. And only consider for patients with obvious malnutrition **(PICO 2)**

  - folic acid 5 mg IV (or 5 mg PO). There is insufficient evidence to make a recommendation except in the case of a macrocytic anemia. **(PICO 3)**

  - magnesium sulfate 2g IV as per IV Parenteral Monograph. There is insufficient evidence to support routine use; consider if hypomagnesemic, hypokalemic or has a cardiac dysrhythmia **(PICO 4)**

Lab Investigations

Laboratory orders appear in **bold** text if recommended as usual default orders. Laboratory orders are underlined when needed to assess severity or establish a baseline. All other lab orders (e.g. investigations for possible comorbidities) are to be selected based on the presentation needs of the patient and are in regular font.

Comments regarding laboratory ordering and utilization for this patient group

- The anion gap (AG) can be calculated as: Na+ - (Cl- + HCO3-) with a normal range of generally 4 to12 mmol/L. An elevated anion gap in this population should lead clinicians to consider: alcoholic ketoacidosis or toxic alcohol ingestion as important conditions to rule out.
- The osmol gap (OG) is calculated as the difference between measured serum osmolality and calculated osmolality. Calculated osmolality = 2 x Na + glucose + urea (all measured in mmol/L). A normal gap is less than 10 mOsm/kg. Key examples of osmotically active substances are alcohols. To calculate the impact of ethanol on osmolality in Calgary they multiply the ETOH level by 1.25 whereas in Edmonton they still use 1.0 and a protocol to determine the appropriateness of toxic alcohol testing. Standardizing this approach across the province is under discussion. An unexplained gap of greater than 10 could reflect a toxic alcohol co-ingestion, however, the clinical utility of measuring the serum osmol gap progressively declines over time from methanol or ethylene glycol ingestion, as the parent alcohol gets metabolized.
- For sites without ready access to osmolality and even those who can measure osmolality the keys to determining the need for ordering toxic alcohol measurements are the clinical history and findings and corroborating evidence of recent patient access to toxic alcohols for ingestion.

- Hematology
  - **Complete Blood Count (CBC)**
  - PT INR (sensitive test of liver function; consideration to default can be considered)
  - PTT
  - Type And Screen
- Chemistry
  - **Electrolytes (Na, K, Cl, CO2)**
  - **Glucose**
  - **Creatinine**
  - **Urea**
  - ALT
  - GGT
  - Alkaline Phosphatase (ALP)
  - Bilirubin Total
  - Lipase
  - Albumin
  - Protein Total
  - Magnesium (Mg)
  - Phosphate
  - Calcium (Ca)
- Blood Gases
  - Blood Gas Venous
  - Blood Gas Arterial
- Urine Tests
  - Urinalysis Random
  - Pregnancy Test , Urine - POCT
- Therapeutic Drug Monitoring and Toxicology
  - Ethanol LEVEL
  - Acetaminophen LEVEL
  - Salicylate LEVEL
  - Osmolality
  - Methanol LEVEL
  - Ethylene Glycol LEVEL
  - Isopropanol LEVEL

Diagnostic Investigations

- Standard X-rays
  - GR Chest, 2 projections: posterior/anterior & lateral (General Radiology Chest X-ray PA/Lateral)
  - GR Chest, 1 projection: portable (General Radiology Chest X-ray Portable)
- Advanced Imaging
  - CT Head, non-enhanced

    Indications (There are no studies which specifically address the CT indications for this group of patients. The list is a composite of indications based on the variety of potential clinical presentations: **(PICO 5)**
    - Major mechanism of injury or suspected head trauma and
      - Altered mental status
      - Basilar skull fracture
      - Palpable depressed skull fracture

- Penetrating trauma to the head
  - Level of consciousness more depressed than expected based on the serum alcohol level
  - Falling GCS
  - Focal neurologic deficit
  - First time seizure

- Other
  - Electrocardiogram (ECG) – 12 Lead

Medications

Potassium chloride (malnourished alcoholics are often total body potassium depleted):

- KCl 10 mmol in 100 mL sterile water for injection x [1, 2, 3] times. Each bag infused over 1 hour.

THEN/OR

- potassium chloride SR 40 mmol PO (each tab is 1500 mg = 20 mmol). Frequency determined by ordering clinician.

OR

- potassium chloride liquid 40 mmol PO (5 mL = 10 mmol). Frequency determined by ordering clinician.

Benzodiazepines can be given using an hourly symptom-based regimen using the Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) score or consider the short scale of withdrawal severity (SHOT) to assess the need for their initiation and continuation. We recommend benzodiazepines as the sedation agent of choice **(PICO 6)**. We suggest using the CIWA-Ar score as standard tool to monitor patient agitation **(PICO 7)**. We suggest symptom triggered over fixed dosing schedules **(PICO 8)**.

The recommended goal of sedation is to achieve light somnolence OR to achieve from minimal to moderate sedation

Minimal sedation: Also known as anxiolysis – a drug-induced state during which the patient responds normally to verbal commands. Cognitive function and coordination may be impaired. Ventilatory and cardiovascular functions are unaffected

Moderate sedation: A drug-induced depression of consciousness during which the patient responds purposefully to verbal command, either alone or accompanied by light tactile stimulation. No interventions are necessary to maintain a patent airway. Spontaneous ventilation is adequate. Cardiovascular function is usually maintained[4]

- Clinical Institute Withdrawal Assessment for Alcohol: to be completed with administration of benzodiazepines and reassess at a minimum of every 1 hour. Notify physician when CIWA-Ar score is 10 or less x 3 consecutive assessments to reassess monitoring and disposition planning considerations.

Following Initial CIWA-Ar Assessment

If severe agitation or CIWA-Ar scores greater than 19 initiate:

- diazepam 20 mg [or 5 or 10 mg] IV/PO loading dose. An additional 5 to10 mg IV/PO q15 to 30 mins x 2 doses will occasionally be required for 'severely' agitated patients to achieve an acceptable level of initial control (CIWA-Ar less than 19)

OR *(preferred for the elderly, those with severe liver disease or patients with COPD)*

- LORazepam 4 mg [or 2 mg] IV/SL/PO loading dose. An additional 1 to 2 mg IV/SL/PO q15 to 30 mins x 2 doses will occasionally be required for 'severely' agitated patients to achieve acceptable level of initial control (CIWA-Ar less than 19)

If moderate agitation or CIWA-Ar scores 10 –19 initiate:

- diazepam 10 mg [or 5 mg] IV/PO loading dose to achieve an acceptable level of initial control

OR

- LORazepam 4 mg [or 2 mg] IV/SL/PO loading dose to achieve acceptable level of initial control *(preferred for the elderly, those with severe liver disease or patients with COPD)*

OR

- chlordiazePOXIDE 50 mg [or 25 mg] PO (*should not be used for elderly patients or those with hepatic impairment*)

Based on hourly CIWA-Ar Scores:

- **CIWA-Ar Score 0 – 9 (no agitation)**
  - no benzodiazepines, however, repeat CIWA-Ar score hourly and if still less than 10 after 3 hours check with physician for disposition consideration

- **CIWA-Ar Score 10 – 19 (mild to moderate agitation)**
  - diazepam 10 mg [or 5 mg] IV/PO hourly

  OR
  - LORazepam 2 mg [or 1 mg] IV/SL/PO hourly *(preferred for the elderly, those with severe liver disease or patients with COPD)*

  OR
  - chlordiazePOXIDE 25 mg [or 50 mg] PO every 2 to 4 hours (*should not be used for elderly patients or those with hepatic impairment*)

- **CIWA-Ar Score greater than 19 (severe agitation)**
  - diazepam 20 mg [or 10 mg] IV/PO q1h and then repeat CIWA-Ar

  OR
  - LORazepam 4 mg [or 2 mg] IV/SL/PO q1h and then repeat CIWA-Ar

For patients remaining in the ED and CIWA-Ar scores of 0 – 9 for 4 hours can switch to PRN orders to control residual symptoms:

- diazepam 5 -10 mg PO q6h PRN

OR

- lorazepam 2 - 4 mg PO q6h PRN (preferred for the elderly, those with severe liver disease or patients with COPD)

OR

- chlordiazepoxide 25 - 50 mg PO q6h PRN (should not be used for elderly patients or those with hepatic impairment)

For hallucinations not controlled by adequate doses of benzodiazepines:

- haloperidol 5 mg [or 1 mg or 2.5 mg or 10 mg] IM/IV/PO [q30 min, q1, 2, 4 h] PRN, possibly including:
  - benztropine 1 mg [or 2 mg] IV/IM x 1 (to help prevent dystonic reaction from haloperidol)

  OR
  - diphenhydrAMINE 50 mg [or 25 mg] IV/IM x 1 (to help prevent dystonic reaction from haloperidol)

There is insufficient evidence to recommend use of haloperidol except in cases where high benzodiazepine doses fail to control hallucinations.**(PICO 9)**

Other medications:

- metoclopramide 10 mg [or 5 mg] IV/PO now **and then** metoclopramide 10 mg [or 5 mg] IV/PO q4h PRN

OR

- ondansetron 8 mg [or 4 mg] IV/PO now **and then** ondansetron 8 mg [or 4 mg] IV/PO q8h PRN
- lidocaine viscous 2% / antacid liquid PO once [5 ml lidocaine viscous and 25 mL antacid liquid]
- tetanus-diphtheria toxoids 0.5 mL IM once if the patient has an open wound

Procedures, Policies & Guidelines

1. Physician
   - Intubation under rapid sequence induction (RSI) (medication options: propofol inj, midazolam inj, fentaNYL inj, ketamine inj, succinylcholine inj, rocuronium inj)
   - Laceration repair (length, depth, closure layers, number of sutures)

2. Nursing
   - the CIWA-Ar Score **(Appendix E)** is for consideration as an adjunct for nurse and physician use to determine the need for benzodiazepines and also monitoring the patient to help determine the need for admission or suitability for discharge
   - the level of monitoring and close observation will depend on the patient's level of consciousness or severity of their withdrawal symptoms
   - with regards to deciding when to terminate close observation:
     1. Any deterioration in the patient's condition or vital signs requires the physician be notified to reassess
     2. Intoxicated patient awake enough to undergo a full assessment by the physician (underlying injuries, the risk of co-ingestions, and the need for psychiatric assessment are examples of what needs to be explored)
     3. Intoxicated patient awake, alert, and no medical concerns identified (need to determine where the patient will be going, by what means, whether the patient is ambulatory, whether there are social issues that need addressing, and if the physician agrees to the discharge)
     4. Patients undergoing symptoms of withdrawal who have been calm and not agitated, CIWA-Ar Score less than or equal to 9 for at least 3 hours should be reassessed to determine if safe to discharge with the appropriate treatment and follow up plan.

Disposition Planning

1. Considerations for admission
   - Patients exhibiting signs of delirium tremens (DTs) which include: tachycardia, tachypnea, hypertension, low grade fever, diaphoresis, delirium and severe agitation, early consultation with a Critical Care specialist should be considered
   - Clinical Institute Withdrawal Assessment (CIWA-Ar) scores of greater than 10 without clear improvement after 4 hours of symptom-based benzodiazepine management should be consulted for admission
   - Chronic alcoholics with significant associated injuries, dangerous co-ingestions, alcoholic ketoacidosis, or significant secondary medical problems should be consulted for admission
   - Chronic alcoholics with worsening liver disease should be considered for admission or early follow up with an outpatient physician to ensure liver function is improving
   - Harmful drinkers with no social supports and no "safe" out of hospital disposition should be considered for short stay admission to try to get the necessary social supports in place. This recognizes that many of our harmful drinkers are frequent ED presenters and the social issues have been dealt with previously, however, the patient's addiction continues to pose a barrier to effective change. These decisions need to be on a case by case and visit by visit basis.
2. Considerations for discharge
   - Harmful drinkers whose Glasgow Coma Scale (GCS) is 15, CIWA-Ar scores have been less than or equal to 9 for at least 3 hours, are eating and drinking and ambulatory, with no other medical conditions requiring inpatient care should be considered for discharge (There is insufficient evidence to recommend any standard discharge medication package, however for at risk patients)
   - Regardless of a patient's track record, a non-judgmental discussion of their drinking history, a frank discussion of their medical condition and the ongoing risks if they do not change their behaviour should be undertaken and the options for detox in the immediate term and achieving and maintaining sobriety should be offered.
   - Social work should be engaged if there are problems regarding: a place to stay, appropriate clothing, where to get food, being put in contact with a social worker, and possibly transportation support.
3. Physician to consider the need for or benefits of prescribing a short course of benzodiazepines, possibly including thiamine, folate, or other medications (There is insufficient evidence to recommend any standard discharge medication package, however, at risk patients would clearly benefit from thiamine and folate until seeing their community care provider **(PICO 10)**). For patients with Wernicke's encephalopathy and being discharged from the ED, they should receive thiamine 500 mg three times a day for 5 days and thiamine 300 mg daily for another 5 days. For Wernicke prophylaxis patients should receive thiamin 500 mg daily for 5 days, then 100 mg daily for another 5 days.
4. Outpatient follow-up
   - Where possible, for patients with a primary care physician, send a visit summary requesting the patient follow up with them. For patients with no primary care physician having an alternate follow up option in the community is important
5. Patient education / discharge instructions **(Appendix C)**
   - Printed patient discharge instructions in the form of local addiction resources available and their contact number, as well as patient discharge sheet relevant to teachings about alcohol abuse, the health effects, and the benefits of stopping drinking. **(Appendix C)**
   - Appendix C is a copy of the Healthwise patient education being trialed by Health Link and being considered for access to Alberta EDs for our patients.

- AHS also has a general site license for Lexicomp which can be accessed on any AHS computer at http://krs.libguides.com. They have a full selection of discharge instructions including one for alcohol withdrawal
- The one additional set of information required at discharge are the necessary community resources in terms of detox centres, counselling options such as AA, and other resources for survival. Calgary and Edmonton examples of links and images are shown in **(Appendix F)**

Rural Considerations

1. Certain laboratory tests such as: osmolality, toxic alcohols, and arterial blood gases are not universally available and for those cases where these tests would be important the caring physician may need to consult regional or urban referral centers, rather than send blood samples out for testing due to unnecessarily long delay in reporting turnaround times
2. Patients in severe withdrawal who require careful monitoring, large doses of benzodiazepines or ICU admission will require consultation and probable transfer
3. Patients meeting criteria for requiring a head CT scan or other special testing will also require consultation, probable transfer to a suitable site for completion of these tests as well as assessment prior to consideration to transfer back to a rural site

Patient Experience and Expectations

Based on a meeting with 8 patient advisors in Calgary January 25, 2015, we received the following feedback and general recommendations regarding approaches to communication, care and patient expectations in the emergency department (ED):

1. They hoped we would be able to improve care consistency among ED providers.

> *Patient quote: "Every time I presented to the emergency department with the same condition (atrial fibrillation), each doctor provided a different treatment approach."*

2. They were supporters of care pathways, checklists, protocols, etc. wherever appropriate.

> *Patient quote: "I am a strong supporter of care pathways as whenever I/my family member receive treatment using a pathway the care seems clearer and more consistent"*

3. While none of the patients liked long waits, they could accept them better if there was clearer communication and reassessments as required.

> *Patient quote: "Nobody likes to wait and I understand that sicker patients take priority, however, there needs to be improved communication and reassessments for those patients who are waiting"*

4. They pointed out the importance of having a patient advocate accompany a sick person, but also allowing the advocate to be with the patient at decision critical points (e.g. initial assessment, treatment decision making, receiving bad news, etc.) was considered paramount.

> *Patient quote: "When I accompany my family member to the ED I am often not permitted to join them when they are moved into a treatment space. I am often told this is 'policy'."*

5. They believe that improving follow up, especially for patients being discharged from the ED and being referred to a specialist is important. This was recognized as a key safety risk for patients; having to rely on faxed referrals and a call back from the consultant's office can

lead to dangerous delays or failed connections to the detriment of the patient's health and well-being.

> *Patient quote: "The current health care system is poorly coordinated with lots of gaps and delays, especially with referrals from one physician to another."*

Preparation for Analytics

1. Key Outcomes
    - Clinical
        - Early recognition of patients with alcohol withdrawal
        - Admission of patients with persistent Clinical Institute Withdrawal Assessment (CIWA-Ar) score 10-19 after 4 hours of appropriate treatment
        - Alcoholic ketosis recognized and treated appropriately with IV fluids
    - Process
        - CIWA-Ar scores used to monitor and manage patient symptoms
        - Adult Guardianship and Trusteeship Act used to protect patients unsafe to be released from the ED but to demanding to leave
    - Patient Experience
        - Feeling treated with respect
        - Provided with community support options at time of discharge

2. Data Elements for Capture
    - Patient demographics
    - Canadian Emergency Department Information Systems (CEDIS) presenting complaint and Canadian Triage and Acuity Scale (CTAS)
    - ED time markers (triage to physician, physician to consult and then to admission or physician to discharge) and outcome markers (identified as clinical decision unit patient, consulted for admission, admitted to intensive care unit or ward, died)
    - ED diagnoses
    - Site and zone identifiers
    - Date and time of use of ETOH(alcohol) Intoxication / withdrawal order set
    - Date and time of Form 1 certification
    - Date and time of serum ETOH, osmolality & osmol gap, and toxic alcohol ordering
    - Date and time of CT head ordering
    - Date, time and dose of thiamine ordering
    - Date, time, and dose of chlordiazePOXIDE, diazepam or LORazepam ordering
    - Date, time, and dose of haloperidol ordering
    - Discharge destination (home, recommended for detox, follow up with Psychiatry or family physician
3. Proposed Reports
    - Number (%) of ED patients triaged as 'Substance misuse / intoxication' or 'Substance withdrawal' and frequency this order set is applied.
    - Number (%) of ED patients (by site/zone/hospital type or location [i.e. inner city]) for whom this order set is applied and frequency of ETOH levels ordered and of those frequency it is greater than 17 mmol/L
    - Number (%) of ETOH greater than 17 mmol/L ED patients not triaged as above (and identify the top 3-5 CEDIS complaints they were triaged under and their triage score distribution)

- Mean and median ED lengths of time for Intoxicated patients being held in the ED prior to discharge
- Mean and median ED lengths of stay for ETOH withdrawal patients (both discharged and admitted)
- Compare ED length of stays for discharged and admitted patients with ETOH withdrawal to their total benzodiazepine ED dosing
- Compare total benzodiazepine dosing between symptom-triggered (CIWA-Ar) and non-symptom triggered regimens

References

1. Report for Addiction & Mental Health, Community and Treatment Supports, Knowledge and Strategy, April, 2012. Based on Health Canada's Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) http://www.hc-sc.gc.ca/hc-ps/drugs-drogues/stat/_2012/summary-sommaire-eng.php
2. Statistics Canada Table 105-0501 – Health indicator profile, annual estimates, by age group and sex, Canada, provinces, territories, health regions (2013 boundaries) and peer groups, occasional, CANSIM (database) http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=1050501 Accessed: July 14, 2015
3. Murray M, Bullard M, Grafstein E. for the CTAS and CEDIS National Working Groups Revisions to the Canadian Emergency Department Triage and Acuity Scale Implementation Guidelines *CJEM* 2004:6(6):421-427.
4. American Society of Anesthesiologists. Policy statement on practice parameters. In ASA Standards, Guidelines and Statements American Society of Anesthesiologists, October 2007. http://www.asahq.org/.../policy-statement-on-practice-parameters/en/1. Updated October 16, 2013. Accessed July 13, 2015.

Appendix A – PICO-D Questions (Key Clinical Questions)

For Information regarding PICO-D methodology and GRADE methodology please see **Appendix B**

PICO 1: ***In chronically malnourished alcoholics presenting to the emergency department is thiamine beneficial in preventing or managing Wernicke's encephalopathy?***

Search Strategy: Searched known guidelines including National Institute for Health and Care Excellence (NICE), Scottish Intercollegiate Guidelines Network (SIGN), Agency for Healthcare Research and Quality (AHRQ), APS, and European Federation of Neurological Societies (EFNS) for thiamine, alcohol withdrawal and Wernicke's encephalopathy
Searched the Cochrane Library, Medicine and Embase for thiamine, alcohol withdrawal and Wernicke's encephalopathy

Clinical Recommendation: We recommend that patients with suspected Wernicke's encephalopathy should receive parental thiamine, which should be administered for a minimum of 5 days followed by oral thiamine treatment. Patients with harmful or depending drinking should receive prophylactic parental thiamine if they are malnourished or at risk for malnourishment, decompensated liver disease, are in the emergency department, or are admitted to hospital with an acute illness or injury. Doses should be given at the upper end of the "British national formulary" range.

Clinical Recommendation: We recommend that patients with suspected Wernicke's encephalopathy should receive parenteral thiamine 500 mg IV every 8 hours for 3-5 days, followed by 300 mg IV or oral for an additional 5 days. Consider Wernicke Korsakoff syndrome in any patient with two of the following[1:]

i) malnourishment and a history of alcohol use disorder,
ii) oculomotor abnormalities such as nystagmus or opthalmoplegia,
iii) cerebellar dysfunction (ataxia, nystagmus), iv)
iv) confusion (altered mental state or confusion)

Patients with harmful or depending drinking should receive prophylactic parental thiamine 300 mg IV and up to 300 mg daily for 4 days and then 100 mg PO daily for another 5 days. This includes patients who are malnourished or at risk for malnourishment, decompensated liver disease, are in the emergency department, or are admitted to hospital with an acute illness or injury.

Quality of Evidence: Moderate, Grade B

Strength of Recommendation: Strong, Grade 1, (Benefits outweigh risks/burdens)

References:

1. Latt N, Dore G. Thiamine in the treatment of Wernicke encephalopathy in patients with alcohol use disorders. Intern Med J 2014; 44(9):8911-15.
2. Day E, Bentham PW, Callaghan R, Kuruvilla T, George S. Thiamine for prevention and treatment of Wernicke-Korsakoff Syndrome in people who abuse alcohol. *Cochrane Database of Systematic Rev.* 2013;(7):CD004033 doi:10.1002/14651858:CD004033

Additional Reading and General References:

National Clinical Guideline Centre for Acute and Chronic Conditions. Alcohol-use disorders. Diagnosis and clinical management of alcohol-related physical complications. London (UK): NICE; 2010 Jun. (Clinical guideline; no. 100).

PICO 2: ***In chronically malnourished alcoholics presenting to the emergency department are parenteral multivitamins beneficial in preventing adverse effects?***

Search Strategy: Searched known guidelines including NICE, SIGN, AHRQ, and EFNS for multivitamin and alcohol disorders

Systematic Review Search Strategy: Searched the Cochrane Library, Medline and Embase for multivitamin and alcohol disorders

Clinical Recommendation: There is insufficient evidence to make any recommendation regarding this question. NICE, SIGN AHRQ and EFNS guidelines did not address this question and no individual studies were found to address the question.

Quality of Evidence: Very Low, Grade D

Strength of Recommendation: There is insufficient evidence to make a recommendation

PICO 3: ***In chronically malnourished alcoholics presenting to the emergency department what are the indications for supplemental folic acid?***

Search Strategy: Searched Cochrane library using the search terms "alcohol withdrawal and Folic Acid" and "Folic acid." PubMed also searched using the search terms "alcohol withdrawal and folic acid", "alcohol withdrawal and folate" and "alcohol withdrawal and vitamins" and limited the search results to systematic review.

Clinical Recommendation: There is insufficient evidence to make a recommendation for routine folate supplementation. A non-systematic review[1] of vitamin treatment for alcoholics stated that the prevalence of folate deficiency was no different in alcoholics presenting to the ED then the other patients in the ED[2]. Two studies found a high prevalence of folate deficiency in homeless alcoholics who ate less than one meal a day[3, 4]. The review concluded that due to the lack of evidence that folic acid supplements maintain folate levels in chronic alcoholics, there is no evidence for the use of routine administration of folate to alcoholic patients in the ED.

Quality of Evidence: Very Low, Grade D

Strength of Recommendation: There is insufficient evidence to make a recommendation

References:

1. Krishel S, SaFranek D, Clark RF. Intravenous vitamins for alcoholics in the emergency department: A review. *J Emer Med* 1998 16(3):419-424
2. Schwab RA, Powers RD. Prevalence of folate deficiency in emergency department patients with alcohol-related illness or injury. *Am J Emerg Med* 10:203-207
3. Herbert V, Zalusky R, Davidson C. Correlation of folate deficiency with alcoholism and associated macrocytosis, anemia and liver disease. *Ann Intern Med.* 1963; 58(6):977-988. doi: 10.7326/0003-4819-58-6-977
4. Eichner, ER, Buchanan G, Smith JW, et al. Variations in hematologic and medical status of alcoholics. *Am J of Med Sci* 1972 263(1): 35-42

PICO 4: ***In chronically malnourished alcoholics presenting to the emergency department is parenteral magnesium sulphate beneficial in preventing adverse effects?***

Search Strategy: Searched Guideline International Network (GIN) guidelines library for guidelines on alcohol. Through GIN identified the NICE, AHRQ/SIGN and National Health and Medical Research Council (NHMRC). Additional searched the EFNS guidelines and identified evidence based practice guidelines for alcohol withdrawal delirium published in the Archives of Internal Medicine.

Clinical Recommendation: There is insufficient evidence to support the routine use of magnesium in at risk patients for alcohol withdrawal. EFNS guideline states that magnesium deficiency could contribute to poor recovery from Wernicke's encephalopathy in alcohols. There is no evidence that magnesium therapy specifically benefits the delirium in alcohol withdrawal. Magnesium should be provided for demonstrated hypomagnesemia, and it is also safe and reasonable to include it in IV fluids given for volume repletion provided renal function is normal and levels are monitored (grade C recommendation).
Hypomagnesemia is associated with malnutrition and alcohol dependence and is associated with cardiac dysrhythmias, neuromuscular irritability and is also associated with and can worsen the effects of hypokalemia and hypocalcaemia.

Quality of Evidence: Very Low, Grade D

Strength of Recommendation: There is insufficient evidence to make a recommendation

References:

1. Mayo-Smith MF, Beecher LH, Fischer TL, Gorelick DA, et al; for the Practice Guidelines Committee, American Society of Addiction Medicine. Management of Alcohol Withdrawal Delirium: An Evidence-Based Practice Guideline. *Arch Intern Med.* 2004; 164(18):2068-2068. doi: 10.1001/archinte.164.18.2068-a

Additional Readings and General References:

Galvin R, Brathen A, Ivashynka M, HIllborn R, Tanasescu R, Leone M. EFNS guidelines for diagnosis, therapy and prevention of Wernicke encephalopathy *Eur J Neurol* 2010; 17 (12):1408-1418

PICO 5: ***In emergency patients at risk for alcohol withdrawal are there identifiable clinical indicators that can assist in determining the need for a head CT scan?***

Search Strategy: Searched GIN guidelines library for guidelines on alcohol withdrawal. Searched known guidelines including NICE (2011), SIGN (2004), AHRQ (2004), American Society of Addiction Medicine (ASAM 2004), EFNS (2010), the Canadian CT Head Rule, and the New Orleans criteria.
Cochrane library searched for systematic reviews using "CT scan", "alcohol withdrawal" and "alcohol withdrawal and CT scan". Also search PubMed and Medline using the search terms "CT scan and alcohol withdrawal"

Clinical Recommendation: There is insufficient evidence and no studies which effectively address this question given the numbers of competing pathologies these patients can present with. It is unlikely an evidence-based answer will be forthcoming for this question and consensus and clinical impression will be the necessary features of such decision making.

Quality of Evidence: Very Low, Grade D

Strength of Recommendation: There is insufficient evidence to make a recommendation

PICO 6: ***For the management of harmful or dependent drinkers are benzodiazepines safe and effective in preventing alcohol withdrawal symptoms (seizures, hallucinations, and delirium tremens)?***

Search Strategy: Searched the Cochrane Library. Searched PubMed for "Alcohol AND benzodiazepines" and limited to systematic reviews

Clinical Recommendation: We recommend benzodiazepines in the treatment of alcohol withdrawal seizures. A systematic review published in Cochrane identified 64 randomized controlled trials or controlled clinical trials comparing benzodiazepines to placebo, other drugs, other benzodiazepines, or diazepines combined with other drugs. Benzodiazepines were more effective in reducing alcohol withdrawal seizures compared to placebo (RR 0.16 (0.04 to 0.69)), but no differences were found between benzodiazepines and other drugs, between benzodiazepines, or diazepines combined with other treatments. Benzodiazepines were not ever associated with an increase in adverse events in any of the comparisons.[1]
A similar meta-analysis identified three studies which found benzodiazepines to be superior to placebo for treating alcohol withdrawal symptoms (OR=3.28 (95% CI 1.30–8.28).[2] An additional meta-analysis identified six studies which found benzodiazepines to be more effective than placebo in reducing symptoms of alcohol withdrawal, including seizures and delirium. [3] Finally, a Cochrane review on systematic reviews of pharmacological treatments for alcohol withdrawal found benzodiazepines performed better than antipsychotics for treating seizures RR 0.24 (95% CI 0.07 to 0.88).[4]

Quality of Evidence: High, Grade A

Strength of Recommendation: Strong, Grade 1

References:

1. Amato L, Minnozzi S, Vecchi, S, Davoli M. Benzodiazepines for alcohol withdrawal. *Cochrane Database Syst Rev*: 2010(3) CD005063. doi: 10.1002/14651858.CD005063.
2. Holbrook AM, Crowther R, Lotter, A, Cheng C, King D. Meta-analysis of benzodiazepine use in treatment of acute alcohol withdrawal. *CMAJ* 1999; 160:160: 649-655.
3. Mayo-Smith MF. Pharmacological management of alcohol withdrawal. *JAMA.* 1997; 278(2):144-151. doi: 10.1001/jama.1997.03550020076042.
4. Amato L, Minnozzi S, Vecchi, S, Davoli M. Efficacy and safety of pharmacological interventions for the treatment of the Alcohol Withdrawal Syndrome. *Cochrane Database Syst Rev*: 2011(6) CD008537 doi: 10.1002/14651858.CD008537.

PICO 7: ***In patients with suspected or anticipated alcohol withdrawal is there a tool to support clinical judgment in determining patient severity?***

Search Strategy: Searched known guidelines including NICE, SIGN, AHRQ, and EFNS for assessment and severity tools/measures

Clinical Recommendation: We suggest that the CIWA-Ar be used to when managing patients with acute alcohol withdrawal to correctly assess the person's symptoms since they guide the use of the 'as required' treatment in all three dosing regimen.[1] A case series identified the CIWA-Ar as being valuable in identifying patients in early withdrawal who required drug therapy to avoid complications. The CIWA-Ar is a 10 point tool has become the one of the widely used observer-rated measures of alcohol withdrawal severity.

It is noteworthy that the recently revised version of CIWA-Ar, the CIWA-Ad, has been demonstrated to have good inter-rater reliability for use by nurses, the K-value for the entire AAS scale being

0.6447.[2] The CIWA-Ar has been found to be useful for assessing and monitoring patients. Scores were significantly higher in patients who developed complications (confusion, hallucinations or seizures) compared to those patients who did not develop complications (mean highest score 21.8 [SD1.2] versus 15.6 [0.55], MD6.10; 95%CI 5.67 to 6.53; p less than 0.00001) 48 Level 3.[3]

Quality of Evidence: Low, Grade C

Strength of Recommendation: Weak, Grade 2

References:

1. National Clinical Guideline Centre for Acute and Chronic Conditions. Alcohol-use disorders: Diagnosis and clinical management of alcohol-related physical complications, NICE; 2010 Jun. (Clinical guideline; no.100).
2. Foy A, McKay S, Ling S et al. Clinical use of a shortened alcohol withdrawal scale in a general hospital. *Intern Med J*. 2006; 36(3):150-154.
3. Foy A, March S, Drinkwater V. Use of an objective clinical scale in the assessment and management of alcohol withdrawal in a large general hospital. *Alcohol Clin Exp Res*. 1988; 12(3):360-364.

PICO 8: ***In patients in acute alcohol withdrawal what is the clinical efficacy and safety of symptom triggered compared with fixed schedule or front end loading treatment regimens?***

Search Strategy: Searched the Cochrane Library. Searched PubMed for "alcohol withdrawal" and fixed versus symptom triggered treatment

Clinical Recommendation: We suggest that symptom triggered management is generally superior. One systematic review assessing benzodiazepine (fixed schedule) versus Benzodiazepine (symptom-triggered) recommended symptom triggered regimens over fixed schedule. The review identified three trials which found a small benefit of symptom triggered Benzodiazepine regimens regarding CIWA-Ar score compared to fixed schedule at 48 hours after treatment initiation (MD -5.70, CI -11.02 to -0.38).

Quality of Evidence: High, Grade A

Strength of Recommendation: Weak, Grade 2

Reference:

1. Amato L, Minnozzi S, Vecchi, S, Davoli M. Benzodiazepines for alcohol withdrawal. *Cochrane Database Syst Rev*: 2010(3) CD005063. doi: 10.1002/14651858.CD005063.

PICO 9: ***In alcohol withdrawal hallucinosis inadequately controlled with benzodiazepines is haloperidol a safe and effective therapeutic adjunct?***

Search Strategy: Searched known guidelines including NICE, SIGN, AHRQ, and EFNS for assessment and severity tools/measures

Clinical Recommendation: Insufficient evidence is available to make a recommendation. Haloperidol use is warranted if the patient's hallucinations are not being controlled by standard benzodiazepine therapy, but not alone as its mechanism of action does not target $GABA_A$ or NMDA receptors. Use with care in patients with a long QTc as haloperidol can increase QTc greater than 25% above baseline, increasing the risk of torsades de pointes, therefore patients receiving the drug should have ECG monitoring.

Quality of Evidence: Very Low, Grade D

Strength of Recommendation: There is insufficient evidence to make a recommendation

References:

1. DeBellis R, Smith BS, Choi S, Malloy M. Management of Delirium Tremens *J Intensive Care Med* 2005*;* (20):164-173
2. Nobay F, Simon BC, Levitt MA, et.al. A prospective, double-blind, randomize trial of midazolam versus haloperidol, versus lorazepam in the chemical restraint of violent and severely agitated patients. *Acad Emerg Med* 2004;(11):744-749

Additional Readings and General References:

Mayo-Smith MF, Beecher LH, Fischer TL, Gorelick DA, et al; for the Practice Guidelines Committee, American Society of Addiction Medicine. Management of Alcohol Withdrawal Delirium: An Evidence-Based Practice Guideline. *Arch Intern Med.* 2004; 164(18):2068-2068. doi: 10.1001/archinte.164.18.2068-a

National Clinical Guideline Centre for Acute and Chronic Conditions. Alcohol-use disorders: Diagnosis and clinical management of alcohol-related physical complications, NICE; 2010 Jun. (Clinical guideline; no.100).

PICO 10: *When discharging alcohol withdrawal patients from the ED to their home or a community based setting, what is the most appropriate regimen of discharge medications?*

Search Strategy: First searched Guidelines and Systematic reviews and found nothing to answer the question. Then searched Medline using the terms “patient discharge” and Emergency service, hospital” and “alcoholism”. Searched PubMed for “alcohol withdrawal” and “discharge” and still no literature identified to be able to answer the question.

Clinical Recommendation: There is insufficient evidence to make a clinical recommendation

Quality of Evidence: Very Low, Grade D

Strength of Recommendation: There is insufficient evidence to make a recommendation

Appendix B – PICO-D Methodology and GRADE Terminology

Key components of high quality and trustworthy clinical guidance include: i) recommendations that are clearly stated and based on scientific evidence of benefits, harms and where possible, costs, and ii) a guideline rating system that is used to communicate quality and reliability of both the evidence and the strength of its recommendations. In the development of these guidelines, clinical questions were formulated based on the PICO-D format as supported by Sackett[1] and Guyatt[2] in their User's Guide to the Medical Literature to define the clinical question. The GRADE terminology, where possible, is used to address the questions regarding Quality of Evidence and Strength of Recommendations. The components of PICO-D format and the GRADE methodology are described below.

PICO-D

P - Population, Patient, or Problem: This element defines the group of patients or characteristics of the patients.
I - Intervention, Prognostic Factor, and Exposure: This element defines the main intervention being considered.
C - Comparison: This element defines the main alternative to compare with the intervention, such as comparison of two drugs or tests, or a medication to no medication or placebo.
O - Outcome: This defines what you are trying to accomplish, measure, improve or affect.
D - Design: The type of question (related to diagnosis, harm/etiology, prognosis, or therapy) will define which study design is best suited to provide evidence to answer the clinical question.

Definitions of Study Types[2, 3]

1. **Meta-analysis:** a statistical technique that summarizes the results of several studies in a single weighted estimate, in which more weight is given to results of studies with more events and sometimes to studies of higher quality.
2. **Systematic Review:** attempts to collate all empirical evidence that fits pre-specified eligibility criteria to answer a specific research question using explicit, systematic methods selected with a view to minimizing bias. This provides more reliable findings from which to draw conclusions. (Antman 1992, Oxman 1993). The key characteristics of a systematic review are: i) clearly stated objectives with pre-defined eligibility criteria for studies; ii) an explicit and reproducible methodology; iii) a systematic search that attempts to identify all studies meeting the eligibility criteria; iv) an assessment of validity for the included studies, (e.g. through the assessment of risk of bias; and v) a systematic synthesis and presentation, of the characteristics and findings of the included studies.[4]
3. **Randomized Controlled Trial (RCTs):** a trial in which participants are randomly assigned to two or more groups: at least one (the experimental group) receiving an intervention that is being tested and another (the comparison or control group) receiving an alternative treatment or placebo. This design allows assessment of the relative effects of interventions.
4. **Controlled Clinical Trial (CCTs):** a trial in which participants are assigned to two or more different treatment groups in a non-randomized or quasi-randomized method. Examples of quasi-randomized allocation are birthdate and medical record numbers. Studies in which the randomization process is not explicitly stated as randomized are considered CCTs. CCTs are more likely to suffer from bias than RCTs.
5. **Observational Studies:**
   a. **Cohort Study[2]:** an observational study in which a defined group of people (the cohort) is followed over time. The outcomes of people in subsets of this cohort are compared, to examine people who were exposed or not exposed (or exposed at different levels) to a particular intervention or other factor of interest. A prospective cohort study assembles participants and follows them into the future. A retrospective (or historical) cohort study

identifies subjects from past records and follows them from the time of those records to the present.

b. **Case control study:** a study design that examines a group of people who have experienced an event (usually an adverse event) and a group of people who have not experienced the same event, and looks at how exposure to suspect (usually noxious) agents differed between the two groups. This type of study design is most useful for trying to ascertain the cause of rare events, such as rare cancers.
c. **Case Series:** analysis of series of people with the disease (there is no comparison group in case series).

GRADE Methodology

Whenever possible answers are identified from recent high quality guidelines or high quality systematic reviews and recommendations provided are based on GRADE definitions. Where guidelines or systematic reviews are not available to answer certain questions rapid reviews are undertaken and/or a consensus approach used to try to answer clinically relevant questions. **Only where the evidence is supportive and the benefits clearly outweigh the harm is a "we recommend" strength of recommendation applied.**

Table 1. GRADE Quality of Evidence[2]

High GRADE A	We have high confidence that the true effect lies close to that of the estimate of the effect.
Moderate GRADE B	We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low GRADE C	Our confidence in the effect estimate is low: The true effect may be substantially different from the estimate of the effect.
Very low GRADE D	We have very low confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

Table 2. GRADE Strength of Recommendations[2]

Strong GRADE 1	Strong recommendation, with desirable effects clearly outweighing undesirable effects/burdens (or vice versa). **Wording of Recommendation:** We recommend in favor of / We recommend against…..
Weak GRADE 2	Weak recommendation, with desirable effects closely balanced with undesirable effects. **Wording of Recommendation:** We suggest in favor of / We suggest against …..
Insufficient evidence or no consensus	**Wording of Recommendation:** There is insufficient evidence or the confidence in the effect estimates is so low that the panel is unable to make a recommendation regarding….

References:

1. Sackett D, Richardson WS, Rosenburg W, Haynes RB. *How to practice and teach evidence based medicine.* 2nd ed. Churchill Livingstone; 1997.
2. Guyatt GH, Oxman AD, Vist GE, et al; for the GRADE Working Group. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*. 2008; 336(7650):924-926.
3. Clinical Questions, PICO & Study Designs: Formulating a Well Built Clinical Question. Dahlgren Memorial Library/ Georgetown University Medical Center. http://researchguides.dml.georgetown.edu/ebmclinicalquestions. Updated February 3, 2015. Accessed January 2015.
4. Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Appendix C – Patient Education and Discharge Material

Link to Health Wise patient education – Alcohol Detoxification and Withdrawal – After Your Visit: https://myhealth.alberta.ca/health/AfterYourVisit

Appendix D – Adult Guardianship and Trusteeship Act

Link to the Alberta Guardianship and Trusteeship Act (2013)

http://www.qp.alberta.ca/documents/Acts/A04P2.pdf

Appendix E – CIWA-Ar Scoring Reference

Alcohol Withdrawal Assessment Scoring Guidelines (CIWA-Ar)[1]

Nausea/Vomiting Rate on scale 0 – 7
0 – None
1 – Mild nausea and vomiting
2
3
4 – Intermittent nausea
5
6
7 – Constant nausea and frequent heaves and vomiting

Tremors Patient to extend arms & spread fingers
Rate on scale 0 – 7
0 – No Tremor
1 – Not visible but can be felt fingertip to fingertip
2
3
4 – Moderate with arms extended
5
6
7 – Severe, even with arms not extended

Anxiety Rate on scale 0 – 7
0 – No anxiety, patient at ease
1 – Mild anxious
2
3
4 – Moderately anxious or guarded, so inferred anxiety
5
6
7 – Equivalent to acute panic states seen in severe delirium or acute schizophrenic reactions

Agitation Rate on scale 0 – 7
0 – Normal Activity
1 – Somewhat normal activity
2
3
4 – Moderately fidgety and restless
5
6
7 – Paces back and forth or constantly thrashes about

Paroxysmal Sweats Rate on scale 0 – 7
0 – No sweats
1 – Barely perceptible sweating, palms moist
2
3
4 – Beads of sweat obvious on forehead
5
6
7 – Drenching sweats

Orientation and Clouding of Sensorium
Ask what day is this? Where are you? Who am I?
Rate on scale 0 – 4
0 – Orientated
1 – Cannot do serial additions or is uncertain about the date
2 – Disorientated to date by no more than 2 calendar days
3 – Disorientated to date by more than 2 calendar days
4 – Disorientated to place/and or person

Tactile disturbances – Ask have you experienced any itching, pins &needles, burning or numbness, or a feeling of bugs crawling on or under your skin
0 – None
1 – Very Mild itching, pins & needles, burning or numbness
2 – Mild itching, pins & needles, burning or numbness
3 – Moderate itching, pins & needles, burning or numbness
4 – Moderate hallucinations
5 – Severe hallucinations
6 – Extremely severe hallucinations
7 – Continuous hallucinations

Auditory Disturbances – Ask Are you more aware of sounds around you? Are they harsh? Do they startle you? Do you hear anything that disturbs you or that you know isn't there?
0 – None Present
1 – Very middle harshness or ability to startle
2 – Mild harshness or ability to startle
3 – Moderate harshness or ability to startle
4 – Moderate hallucinations
5 – Severe hallucinations
6 – Extremely severe hallucinations
7 – Continuous hallucinations

Visual disturbances – Ask: Does the light appear to be too bright? Is its color different than normal? Does it hurt your eyes? Are you seeing anything that disturbs your or that you know isn't there?
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 Ask: Does your head feel different than usual? Does it feel like there is a band around your head? Do not rate dizziness or lightheadedness.
0 – Not Present
1 – Very mild
2 – Mild
3 – Moderate
4 – Moderate severe
5 – Severe
6 – Very severe
7 – Extremely severe

Assess and rate each of the 10 criteria on the CIWA Scale. Each criterion is rated on a scale from 0 – 7 except for "orientation and clouding of sensorium". Add up the scores for all 10 criteria. This is the total CIWA–Ar score for the patient at that time. Anxiolytic medication should be started for any patient with a total CIWA-Ar score of 10 or greater

1. Sullivan JT, Sykora K, Schneiderman J, Naranjo CA, Sellers. Assessment of alcohol withdrawal: the revised Clinical Institute Withdrawal Assessment for Alcohol scale (CIWA-Ar). *Br Journal of Addict*. 84(11):1353-1357.

Link to CIWA-Ar Alcohol withdrawal Scoring Tool: ciwa-ar-alcohol-withdrawal

Appendix F – Addiction Resources

You can access addiction resources via https://myhealth.alberta.ca/Pages/default.aspx which allows you to search for 'addiction services' by city or town and enter a postal code number to indicate types of help available. It is somewhat challenging to use and only appears to include AHS options so groups like AA are not identified.

If you follow the link to the City of Calgary – Calgary Street Safety Guide you will see what community supports they have available http://calgarystreetguide.ca/

Currently each zone, urban, regional and rural site have local approaches and resources available within the community to assist patients requiring social assistance, detoxification help, and other needs. These can be provided at a local level with implementation of this knowledge topic.

Appendix G – Acknowledgements

We would like to acknowledge the contributions of the Provincial Clinical Knowledge Working Group members as follows. Your participation and time spent is appreciated.

Emergency Department Alcohol Intoxication Withdrawal Knowledge Topic Working Group Membership

Name	Title	Role	Zone
Knowledge Lead			
Michael Bullard	Physician	Knowledge Lead	Provincial
Working Group Members			
Albert Harmse	Physician	Working Group Member	North Zone
Richard Ibach	Physician	Working Group Member	North Zone
Carol Holmen	Physician	Working Group Member	Calgary Zone
Vincent Joanis	Physician	Working Group Member	Calgary Zone
Dan Banmann	Physician	Working Group Member	South Zone
Kathryn Dong	Physician	Working Group Member	Edmonton Zone
Pat San Agustin	Physician	Working Group Member	Edmonton Zone
Bjug Borgundvaag	Physician	Working Group Member	Ontario
Brian Holroyd	Physician	Working Group Member	Edmonton Zone
Tim Graham	Physician	Working Group Member	Edmonton Zone
Tom Rich	Physician	Working Group Member	Calgary Zone
Alexis Mageau	Registered Nurse	Working Group Member	Calgary Zone
Louise O'Shaughnessy	Registered Nurse	Working Group Member	Calgary Zone
Margaret Dymond	Registered Nurse	Working Group Member	Edmonton Zone
Elan Heinrichs	Registered Nurse	Working Group Member	Central Zone
Monique Fernquist	Registered Nurse	Working Group Member	South Zone
Multidisciplinary			
Vijay Daniels	Physician	Content Expert	Calgary Zone
Robert Hayward	Physician	Content Expert	Edmonton Zone
Vince DiNinno	Physician	Content Expert	South Zone
Bill Anderson	Physician - Diagnostic Imaging Representative	Content Expert	Provincial
Stafford Dean	DIMR representative	Content Expert	Provincial
Christopher Naugler	Laboratory Representative	Content Expert	Provincial
Jennifer Shiu	Pharmacist	Content Expert	Provincial
Steven Freriks	Pharmacist	Content Expert	Provincial
Carol Connolly	Director	Knowledge Management	Calgary Zone
Kathleen Addison	Senior Director	HIM	Calgary Zone
Michael Trew	Addiction and Mental Health	SCN Representative	Provincial

For questions or feedback related to this knowledge topic please contact Clinical Knowledge Topics by emailing ClinicalKnowledgeTopics@albertahealthservices.ca