

2019 Transition to Residency Survival Guide

ISSUE NO 1 | 2019 | VOLUME 1

T₂R

Survival Guide

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T2R Survival Guide

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PGY1 Survival Series

Join us every Wednesday

July 10 – August 28

1:00 – 4:00 p.m.

Rm. 146

Medical Sciences Building

July 10	Shock and Hypotension
July 17	Acute Dyspnea
July 24	Neurological Emergencies
July 31	Chest Pain
August 7	The Dying Patient
August 14	Abdominal Pain and GI Bleeds
August 21	Abnormal Metabolic Lab Values
August 28	Altered Mental Status

For more information please contact **Kimberly Trudgeon, Educational Developer, Postgraduate Medical Education** at 519-661-2111 ext. 87537
or kimberly.trudgeon@schulich.uwo.ca

T2R THANK YOU TO OUR 2019 PRESENTERS

WEEK 1	July 10, 2019 Hypotension & Shock	Dr. Shane Freeman , Emergency Medicine Resident Susan Whitehouse RN , CCOT, LHSC Dr. Tarek Hassan El-Chabib , Family Medicine Resident Dr. Allison Mackenzie , Anesthesiology Resident Dr. Shane Freeman , Emergency Medicine Resident Dr. Ron Butler , Critical Care & Cardiac Surgery Recovery Unit (CSRU)
WEEK 2	July 17, 2019 Acute Dyspnea	Dr. Cory Yamashita , Assistant Professor, Program Director Respiriology Dr. Amanda Grant-Orser , Resident, Respiriology Dr. Duncan Sutherland , Resident, Nuclear Medicine
WEEK 3	July 24, 2019 Acute Neurological Emergencies	Dr. Mary Jenkins , Associate Professor of Neurology, Program Director Dr. Jennifer Mandzia , Assistant Professor of Neurology Susan Whitehouse , RN CCOT, LHSC Dr. Mimma Anello , Neurology Resident Dr. Robin Bessemer , Neurology Resident Dr. Palak Shah , Neurology Resident
WEEK 4	July 31, 2019 Chest Pain	Dr. Allison McConnell , Associate Professor of Emergency Medicine Dr. Jennifer McGuire , Emergency Medicine Resident Dr. Erik Leci , Emergency Medicine Resident Dr. Pavel Antiperovitch , Cardiology Resident
WEEK 5	August 7, 2019 The Dying Patient	Dr. Mike Shkrum , Professor Pathology and Laboratory Medicine Dr. Kyra Harris-Schulz , Associate Professor, Family Medicine Dr. Michael Rieder , Assistant Professor, Paediatrics and Coroner Dr. Laura Callan , Radiation Oncology Resident Dr. Syed Hussaini , Medical Oncology Resident
WEEK 6	August 14, 2019 Abdominal Pain & GI Bleeding	Dr. Julie Ann Van Koughnett , Assistant Professor, Surgery/Oncology Dr. Amin Sandhu , Assistant Professor, Gastroenterology Dr. Mandark Gandhi , Resident, Internal Medicine Dr. Beidi Cai , Internal Medicine Resident Dr. Jenn Koichopolos , General Surgery Resident Dr. George Pang , General Surgery Resident Dr. Eric Walser , General Surgery Resident
WEEK 7	August 21, 2019 Lab Values, Dosing & Drugs	Dr. Blair Wyllie , Assistant Professor of General Internal Medicine Dr. Kate Ower , Associate Professor, Anesthesia & Perioperative Medicine Dr. James Jae , Internal Medicine Resident Dr. Nam Yashpal , Anesthesia Resident
WEEK 8	August 28, 2019 Altered Mental Status	Dr. Viraj Mehta , Associate Professor Psychiatry Dr. Mark Watling , Associate Professor of Psychiatry Dr. Jonathan Gregory , Psychiatry Resident Dr. Israel Spivak , Psychiatry Resident Dr. Rachel Kyle , Internal Medicine Resident

A warm T2R thank you and congratulations to all Survival Series Faculty & Resident Presenters. We are full of gratitude for your commitment to PGME education and investing your time and sharing your expertise with our Transition to Residency Residents. Please know you are valued and appreciated!

T₂R WEEK 1: HYPOTENSION & SHOCK

SHOCK: insufficient oxygen delivery to tissues causing end-organ damage

RECOGNISING SHOCK

ABCs first!

Vital signs

- tachycardia
- hypotension
- tachypnea
- fever

End of the bed test

- is blood perfusing vital organs

Pitfalls

- medications (e.g. beta blockers)
- baseline vital signs (e.g. hx HTN)
- extremes of age
- consider medical history, recent meds and procedures

TYPES OF SHOCK

Sepsis (distributive)

- old definition = SIRS + suspicion for infection
- new definition = qSOFA + suspicion for infection
- early fluids and early antibiotics save lives!

Hypovolemic/hemorrhagic

Obstructive

- never miss tension pneumothorax, PE, tamponade

Cardiogenic

Anaphylactic (distributive)

SIRS: \geq 2 of HR $>$ 90 bpm, RR $>$ 20 or PaCO₂ $<$ 32, T $>$ 38 or $<$ 36, WBC $>$ 12 or $<$ 4, 10% bands

qSOFA: \geq 2 of RR $>$ 22, sBP $<$ 100 mmHg, altered GCS (screening for outcome not diagnosis)

INITIAL MANAGEMENT

1. Monitor, IV access (14, 16 gauge or cortis)
2. Oxygen (NP/FM/NRBT/NIVV)
3. Investigations
 - STAT bloodwork (CBC, lytes, urea, cr,mg, phos, CK.Trop, liver profile, lactate , G&S)
 - STAT ECG, CXR (portable)
4. IV fluids (NS or RL)
5. Consider empiric antibiotics
- 6.Call for help!

EMPIRIC ANTIBIOTICS

Source	Antibiotic	Dose
Undifferentiated	Piperacillin-tazobactam	4.5g IV
Pneumonia	Ceftriaxone+ azithromycin	1g IV 500mg PO
	Levofloxacin	500mg IV/PO
Genitourinary	Piperacillin-tazobactam	4.5g IV
	Ceftriaxone	1 g IV
Intra-abdominal	Piperacillin-tazobactam	4.5g IV
	Ceftriaxone + Metronidazole	1g IV 500mg IV
Skin	Ancef	1g IV
Meningitis	Ceftriaxone + Vancomycin	2g IV 1g IV
	+Acyclovir	1g IV
	+/- Ampicillin	2g IV
?MRSA	Add vancomycin	1g IV

Note: may need to substitute ceftrizone +/- flagyl for ? penicillin allergy, fluoroquinolone +/- flagyl for true penicillin allergy

HELP!

1. Your senior/Consultant
2. CCOT – 33333 (if admitted)
3. PRE-ARREST -55555
4. CODE BLUE/MED EMERGENCY -55555
5. ICU – 19994 (if not admitted)



Call the Critical Care Outreach Team (CCOT) if there is Serious Concern about the patient or

Acute change in: Signs:

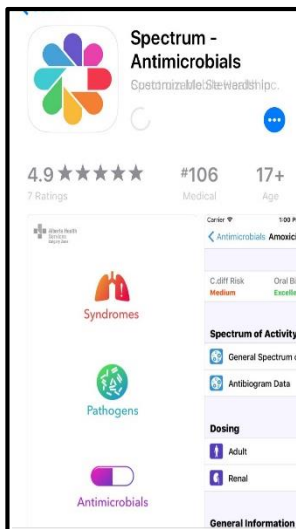
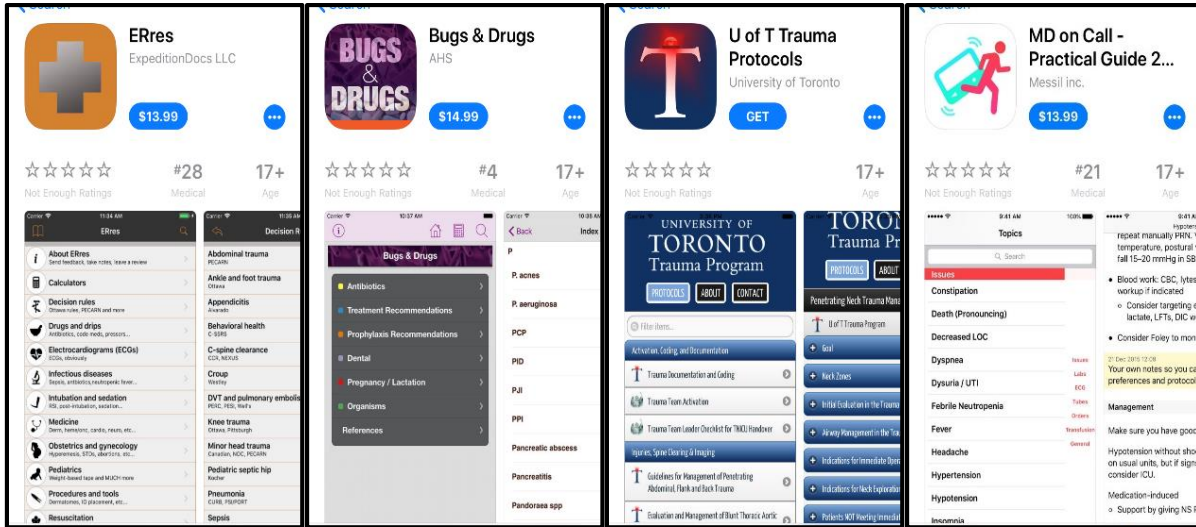
A irway	• Threatened Stridor Excessive secretions
B reathing	Respiratory rate \leq 8 or \geq 30 Distressed breathing Saturations $<$ 90% on \geq 50% O ₂ or 6 litres/min
C irculation	Systolic blood pressure \leq 90mmHg or \geq 200mmHg or decrease $>$ 40 mmHg Heart rate \leq 40 or \geq 130
N eurology	Decreased level of consciousness
O ther	Urine output $<$ 100mL over 4hrs SERIOUS CONCERN ABOUT THE PATIENT NEED MEDICAL ASSISTANCE

CALL 33333 to activate the CCOT

T₂R WEEK 1: HYPOTENSION & SHOCK

HELPFUL RESOURCES

1. Helpful Smart Phone Apps



2. Helpful Websites

- <https://lifeinthefastlane.com/>
- <https://blood.ca/en/hospitals/transfusion-practice>

T2R WEEK 2: ACUTE DYSPNEA

RECOGNIZE RESPIRATORY DISTRESS

Listen to your patient and look for signs of respiratory distress. Take a FULL set of vital signs.

Watch specifically for the following: Tachypnea, pursed-lips, one word (or few words) speech, use of accessory muscles, tripod position, stridor, wheezes, poor airflow, anxiety, obtunded (late sign), cyanosis (late sign).

DIFFERENTIAL DIAGNOSIS IS BROAD!

Treat most likely, rule out most dangerous, reassess and refine treatment

1. Pulmonary: Asthma, COPD, PTX, Pneumonia, Pulmonary Effusion, Pulmonary Embolism
2. Cardiac: CHF, Acute MI, Arrhythmias, Tamponade
3. Other: ENT, Neurologic, Metabolic, Sepsis, Pain/Anxiety, MANY others

Empiric medications

Lasix 40 IV (edema, crackles)
Salbutamol 4 puffs/2.5mg inh, Ipratropium 2-4 puffs/250mcg inh nebulas (wheeze)

pH	PaCO2	Cause
Low	Up	Resp acidosis
High	Low	Resp alkalosis
Low	Low	Metabolic acidosis
High	High	Metabolic alkalosis

A DIFFERENT APPROACH



Think of the **life-threatening causes first** and attempt to rule them out.

If your patient is **hypoxic**, give supplemental O2 right away!

You may need to initiate treatment before you have all the information. O2, inhalers, lasix, will often help and delaying treatment can lead to harm. Exam History, investigations, and responses to treatment will help you refine Dx.

WHAT ABOUT SUBACUTE DYSPNEA?

Most common Causes:

COPD, CHF, CAD/Angina, ILD, Asthma, Obesity, Deconditioning

Order an exercise stress test when: Cardiac Risk factors + exertional pain or response to NTG

Order spirometry when: suspected asthma, or adult smoker with chronic cough/wheeze/SOB

Escalation of O2

Nasal prongs → Facemask/Venturi masks (colour-coded) → NRB Facemask

BiPap/CPAP: Best evidence in COPD and pulmonary edema. Patient must be alert, cooperative, able to clear secretions

Intubation WHEN low/decreasing GCS, failing BiPap/CPAP, worsening gases or clinical status

REASSESS YOUR PATIENT

Reassess the vitals, physical exam, and symptoms frequently.

VBG's and ABG's are best used for **trending**, especially to gauge **response to therapy**.

You can calculate the compensation/concomitant metabolic disturbance here:

<http://www.medcalc.com/acidbase.html>

HELP!

1. Your senior (call early!)
2. CCOT – 33333 (if admitted)
3. ICU – 19994 (if not admitted)
4. RT: Part of the CCOT Team, Can bring useful skills, equipment and mobilize resources

Because **CRITICAL CARE** is a **NEED** not a place

Call the Critical Care Outreach Team (CCOT) if there is Serious Concern about the patient or

Acute change in: Signs:

A irway	• Threatened Stridor Excessive secretions
B reathing	Respiratory rate ≤ 8 or ≥ 30 Distressed breathing Saturations $< 90\%$ on $\geq 50\%$ O ₂ or 6 litres/min
C irculation	Systolic blood pressure ≤ 90 mmHg or ≥ 200 mmHg or decrease > 40 mmHg Heart rate ≤ 40 or ≥ 130
N eurology	Decreased level of consciousness
O ther	Urine output < 100 mL over 4hrs SERIOUS CONCERN ABOUT THE PATIENT NEED MEDICAL ASSISTANCE

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London Health Sciences Centre

T₂R WEEK 3:

ACUTE NEURO EMERGENCIES

INITIAL MANAGEMENT OF FIRST-TIME SEIZURE

Goal: ensure patient safety, explore triggers

ABCs, IV, O₂, Monitor.
Point-of-care glucose.
Blood work including extended electrolytes.
Neuroimaging and electroencephalography (EEG).

Status epilepticus: defined as *5 minutes of continuous seizure activity, or ≥ 2 convulsive seizures within 5 minutes without recovery to baseline consciousness in-between.*

MANAGEMENT OF STATUS EPILEPTICUS

ABCs, IV, O₂, Monitor.

Start with **IV lorazepam 2 mg per injection** q 2 minutes to a maximum of 0.1 mg/kg.
Be ready to protect the patient's airway.

Load with an anticonvulsant drug:

Phenytoin (Dilantin):

Loading dose of 15–20 mg/kg

Max infusion rate: 50 mg/min (1 g: 20 min)

25 mg/min in elderly/cardiac Hx

Call CCOT (33333)/ICU (19944) (patient will most likely require intubation, midazolam infusion, phenobarbital, or propofol to stop seizure).

INITIAL MANAGEMENT: ACUTE STROKE

ABCs, O₂, Monitor. Point-of-care glucose

Stroke symptoms? Face, Arm, Leg or Speech

Last Seen Normal? ≤ 6 hours

Call CCOT (33333) to screen patient

Do not activate code stroke before calling CCOT.

PROCESS WILL SOON BE CHANGING AND RESIDENT WILL CALL STROKE NEUROLOGY DIRECTLY, STAY TUNED!!

INITIAL MANAGEMENT OF SUSPECTED CNS INFECTION

ABCs, IV × 2, O₂, Monitor.
Blood cultures, basic blood work.
CT head when necessary.

Empiric antimicrobial therapy (DON'T DELAY)

Acyclovir 10 mg/kg IV Q8h

Ceftriaxone 2 g IV Q12h (give first)

Vancomycin 1 g IV Q12h

±Ampicillin 2 g IV q4h (if EtOH / ↓immune)

Dexamethasone 10 mg IV q6h x 4 d.

Start **before or with** empiric antibiotics.

Lumbar Puncture → CSF analysis, viral PCRs.

Discontinue unnecessary therapy as cultures and CSF results return.

DIFFERENTIAL OF DELIRIUM:

Infectious (UTI, pneumonia, encephalitis)

Withdrawal (ethanol, barbiturates, benzodiazepines)

Acute metabolic (electrolyte, glucose, hepatic, renal)

Trauma (head injury, postoperative)

CNS (stroke, hemorrhage, tumour, seizure)

Hypoxia (heart failure, pneumonia, pulmonary embolus)

Deficiencies (B12, folate, thiamine)

Endocrinopathies (thyroid, glucose, adrenal)

Acute vascular (shock, MI, hypertensive emergency)

Toxic (ethanol, anaesthetics, anticholinergics, narcotics)

Heavy metals

LP Profiles

Study	Bacterial	Viral	SAH
RBC's	<5 per mm ³	<5 per mm ³	>50 per mm ³
WBC's	↑, PMNs	↑, lympho	Slightly ↑
Glucose	↓	N	N
Protein	↑	↑	↑
Gram Stain	±	N	N

n.b. to correct for traumatic (bloody) tap, subtract 1 WBC for every 700 RBCs

T₂R WEEK 4:

CHEST PAIN

WORK UP FOR CARDIAC COMPLAINTS

Vitals – ABCs
Cardiac Monitors, Oxygen, IV Access
ECG, CXR

Focused History & Physical
Investigations

Rule out dangerous causes
Consider common causes

LIFE THREATENING CAUSE OF CHEST PAIN

Myocardial infarction
PE
Aortic Dissection
Tamponade
Tension pneumothorax
Esophageal rupture

INITIAL MANAGEMENT OF ACUTE CORONARY SYNDROME

- Oxygen, telemetry
- ASA 160mg to chew
- 2nd antiplatelet loading dose:
Clopidogrel 300mg OR Ticagrelor 180mg
- Anticoagulation → UFH or LMWH
- Statin – e.g. Lipitor 40mg
- Beta-blocker/ACE inhibitor (when stable)

APPROACH TO NARROW COMPLEX

- Irregular or regular
 - Regular – Sinus tachycardia, atrial tachycardia, atrial flutter, AVnRT, AVRT
 - Irregular- atrial fibrillation, multifocal atrial tachycardia, flutter with variable block
- P waves – present, absent, inverted, multiple morphologies, retrograde

MANAGEMENT OF PULMONARY EDEMA

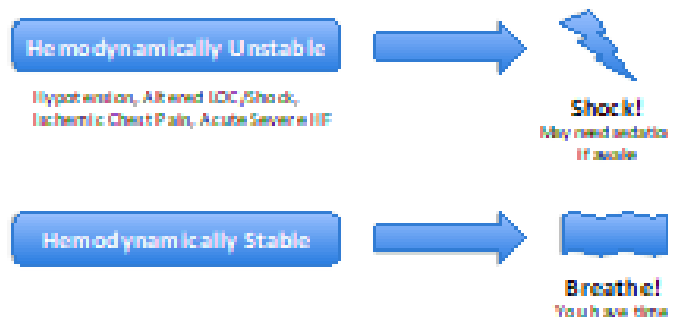
Lasix
Nitro
Oxygen
Positive pressure - BiPap

COMMON ETIOLOGIES OF NARROW COMPLEX ARRHYTHMIAS

- Consider and treat the underlying cause
 - Ischemia
 - Pain
 - PE
 - Fever
 - Infection
 - Volume overloaded/depleted
 - Hyperthyroidism
 - Anemia
 - Medication overuse
 - Medication withdrawal

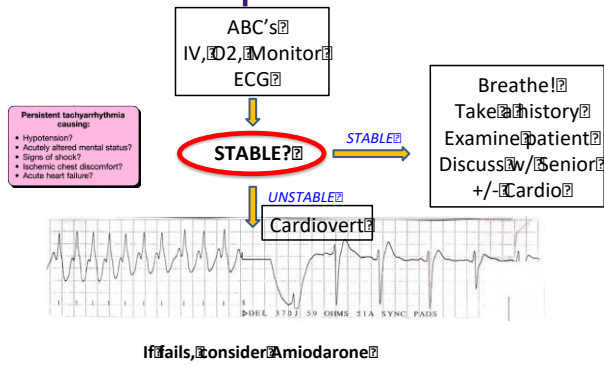
APPROACH TO ARRHYTHMIA

Approach



T2R WEEK 4: CHEST PAIN

Wide Complex Tachy - ACLS Simplified



NEED HELP-CALL:

1. Your senior
2. CCOT – 33333 (if admitted)
3. ICU – 19994 (if not admitted)



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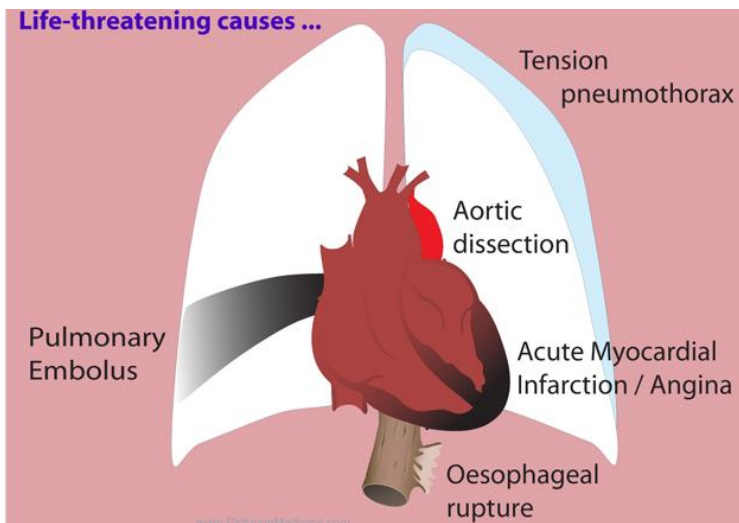
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CALL **33333** to activate the CCOT



Critical Care Outreach Team



REMEMBER YOU CAN ALWAYS CALL AND ASK FOR HELP

WELLS CRITERIA

- Suspect DVT (3.0)
- Alternate diag less likely than PE (3.0)
- HR > 100 (1.5)
- Immobiliz/sx in last 4 weeks (1.5)
- Previous DVT/PE (1.5)
- Hemoptysis (1.0)
- Malignancy (trt or last 6 months) (1.0)

**0-2 low risk, 3-6 moderate, > 6 high
(or 0-4 low, > 4 high)**

T₂R WEEK 5: THE DYING PATIENT

GOALS OF CARE CONVERSATIONS

1. Understand your patient's goals and values
2. Understand patient/physician/system barriers to having these crucial conversations
3. Try to understand the patient's experience in the system and family's journey
4. Coordinate the opinions of all members of the team, meet beforehand to ensure you are all on a similar page; clarify goals of meeting
5. Ensure a private location where there are few distractions-give the family your full attention
6. Respond to emotional reactions-do not ignore them
7. Discuss and Document!

CLINICAL UNCERTAINTY

What can you do?

1. Acknowledge uncertainty to yourself and your patient.
2. Look to those above you for help
3. DEBRIEF! How did you handle it, what could you have done better?
4. Remember..."I don't know."
- "I'll look into it and we can discuss it tomorrow/at your next visit."

"PERSONALIZED MEDICINE"

TIPS

1. Medical care and expertise needs to be central to this approach
2. Being able to explain complex situations to your patient and their family is essential-utilize their context as the basis for the explanation-take into consideration age, gender, socio-economic status, faith/religion, "lived experience"
3. Know the patient
4. Know the family
5. Know yourself-what impact does this kind of conversation have on you?
6. Personalized Medicine can lead to boundary challenges, how will you monitor this?
7. How do you balance your own personal feelings in developing this type of connection with patients/families?

PALLIATIVE SYMPTOM MANAGEMENT

Dyspnea

1. Opioids are first line-lower doses and longer intervals than for analgesia e.g. Morphine Sulphage 2.5mg PO q8h regular and q2h PRN
2. Benzodiazepines might be useful adjuncts; EOL-Midazolam 1-2.5mg SC q2h PRN
Chronic-Lorazepam 0.5-1.0mg SL q2-4h PRN

Terminal Secretions

1. Non-pharmacologic-education, repositioning
2. Atropine 1% ophthalmic drops 1-2 drops q2h PRN
3. Glycopyrrolate 0.2-0.4mg SC q4h PRN
4. Scopolamine 0.2-0.4mg SC q4h PRN

Delirium Management Options

Severity	Haldol (SC/IV/PO)	Nozinan (SC/IV)
Mild	1mg q8-12h 1mg q1h PRN	6.25-12.5mg q8-12h 6.25-12.5mg q1h PRN
Moderate	2-2.5mg q8-12h 2-2.5mg sc q30min PRN	12.5mg q8-12h 12.5-25mg SC q30min PRN
Severe	2.5-5mg STAT repeat q30min PRN (upto 4x) Regular dose based on previous 24hrs	25mg STAT may repeat q30min PRN (upto 4x) Regular dose based on previous 24hrs

The "Surprise" Question

Ask yourself, "...would you be surprised if this patient died within a year's time..."

If you would not be surprised, then the patient and family would benefit from a Palliative Care Approach

Caring for dying patients is a core part of our discipline, understanding how it may impact you, recognizing the signs of burnout, and making sure you continue to be "human" will ensure you are doing your best.

T₂R WEEK 6: ABDOMINAL PAIN & GI BLEEDING

SMALL BOWEL OBSTRUCTION

Common risk factors: surgical history, hernia, malignancy, IBD

Typical presentation: abdominal pain, obstipation, nausea, vomiting

Signs of bowel compromise/ischemia Include: tachycardia, fever, elevated WBC, constant pain, peritonitis

Initial management: IV fluids, NG, labs, imaging

Important tips:

- Even if patients haven't had surgery, they can be obstructed.
- Always check for hernias and include DRE
- Patients arrive dehydrated, give them fluids
- Replace losses from NG tube

AORTIC ANEURYSM/DISSECTION

Consider diagnosis when:

- Classic aneurysm triad: hypotension, abdo pain, pulsatile mass
- Severe abdo/ back pain, especially with known aneurysm

What to do:

- ABCs / IV access/ resuscitation with early blood products
- Early Vascular Surgery consult is key
- CT scan if patient is stable

BOWEL ISCHEMIA

Patients at risk?

Elderly, history of CV disease, poor perfusion

Classic presentation: Diffuse abdominal pain out of proportion to objective signs.

Signs: Fever, tachycardia, elevated lactate
Elevated lactate despite good resuscitation

If suspected:

- May be a surgical emergency
- Important to have a high level of suspicion
- Bowel necrosis can occur within hours
- Order CT and call General Surgery

GI BLEEDS

Resuscitation First!

Watch vital signs, establish good IV access, give crystalloid → blood, reverse coagulopathies, and call for CCOT/ ICU if you need it.

Differential Diagnosis:

- Organized into upper and lower GI bleeds
- Differentiate melena from hematochezia
- Look for clues in risk factors (NSAIDs, cirrhosis, known diverticulosis, GERD)

Treatment

- Begin empiric treatment as appropriate (Pantoprazole +/- octreotide, antibiotics)
- Call GI for endoscopic treatment
- If endoscopy fails, then IR embolization or surgical intervention may be warranted.

APPENDICITIS

VERY COMMON!

8% of general population
most often in 10-30 year olds

If suspected:

- CBC, lytes, Cr, **CRP, urine dip, beta-hcg**
- If wide ddx, add LFTs, lipase, blood gas, lactate
- **US** (children/young), **CT, MRI** (pregnancy)
- **Antibiotics** (ceftriaxone + metronidazole, or pip-tazo for sicker patients)
- **Surgery** within 24-72hrs of sx onset

Because **CRITICAL CARE** is a **NEED** not a place

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London Health Science Centre

Critical Care Outreach Team

T₂R WEEK 7:

ABNORMAL LAB VALUES, DOING & DRUGS

POTASSIUM DISORDERS

HYPERKALEMIA

Goal: (1) Know when to suspect hyperkalemia, (2) Identify signs of hyperkalemia, (3) Know when to initiate emergency management

Medical emergency when $K > 6.5$ and/or ECG changes

ECG changes: **peaked T waves**, PRi prolongation, QRS widening, dropped P waves, Torsades, PEA/VF

Signs/symptoms very non-specific, so need high index of suspicion, especially in patients at risk (e.g. CKD, CHF, use of ACEI/ARB, K-sparing diuretics)

MANAGEMENT OF HYPERKALEMIA

1. **STAT ECG**
2. **Stabilize myocardium**: calcium gluconate 1-2 amps IV
3. **Shift potassium**: insulin 10-20 units + D50W 1 amp; salbutamol 10-20mg nebulized or 0.5-2.5mg IV
4. **Stop any offending agents** and treat underlying cause(s)

N.B. Kayexalate has traditionally been used, but little evidence of benefit

HYPOKALEMIA

Goal: (1) Know when to suspect hyperkalemia, (2) Identify signs of hyperkalemia, (3) Know when to initiate emergency management

Obtain a STAT ECG if $K < 2.8$, and consider checking magnesium, as deficiency can lead to hypokalemia.

ECG changes: **U waves, T wave inversion**, PRi/QTc prolongation, VT, VF

Consider possible causes: renal losses (thiazides, Mg deficiency), non-renal losses (vomiting, diarrhea, sweat), redistribution (\uparrow insulin, metabolic acidosis)

MANAGEMENT OF HYPOKALEMIA

1. **STAT ECG** if $K < 2.8$
2. **Replace potassium**: oral (40-100 mmol/day), IV (10 mEq bolus, 20-40 mEq/L in infusion)
3. **Correct magnesium** if applicable
4. **Treat underlying cause(s)**

CLINICAL PEARL

SADMANS: medications to hold during acute illness

S: sulfonylureas
A: ACE inhibitors
D: diuretics
M: metformin
A: ARBs
N: NSAIDs
S: SGLT2 inhibitors

T₂R WEEK 7:

ABNORMAL LAB VALUES, DOING & DRUGS ANION GAP METABOLIC ACIDOSIS

ANION GAP METABOLIC ACIDOSIS

Goal: Identify Acidosis

Obtain Blood Gas (ABG)

If pH is less than 7.35 and HCO₃ is less than 22, then diagnosis of Metabolic acidosis is made.

Check the Gaps- Anion & Osm

Anion Gap of 10 to 14 is normal

Osm Gap of <10 is normal

AG= Na - [Cl + HCO₃]

AGMA- KULT

1. Ketosis (DKA, EtOH, Starvation)
2. Uremia (Renal Failure)
3. Lactic Acidosis
4. Toxins (Ethylene glycol, paraldehyde, methanol, salicylate)

Osm Gap = Measured Osm - 2[Na] +Glu+Urea+1.25 [EtOH]

Two salt and a sugar bun. Always correct for EtOH !

If there is high Osm Gap, look for toxic alcohol or glycol.

Treat the underlying Cause !

NAGMA

ABCD

- ADDISONS
- BICARB LOSS (GI, RENAL- RTA)
- CHLORIDE ELEVATION - GI, RENAL -RTA
- DRUGS (ACETAZOLAMIDE)

MANAGEMENT

Always treat underlying cause of metabolic acidosis.

If high Osm gap is found, look for volatile alcohol and call for help.

May need decontamination, fomepizole, dialysis. Involve CCOT/ Nephrology

If pH is 7.1 to 7.2 consider with HCO₃ / THAM

COMPLICATIONS OF HCO₃ Rx

(i) Generation of CO₂ during the buffering process resulting in entry of CO₂ into the cell and aggravation of intracellular acidosis

(ii) a reduction in ionized calcium as blood pH is increased.

REFERENCES

thoracic.org AGMA

lifeinthefastlane.com AGMA and NAGMA

Treatment of acute Non ion gap metabolic acidosis; Kraut et al 2014

T2R WEEK 7: ABNORMAL LAB VALUES, DOING & DRUGS EARLY MANAGEMENT OF HYPONATREMIA

ASSESS VOLUME STATUS

Symptoms: headaches; altered LOC, mentation; seizures

Acute: <48 hrs duration; Chronic: >48 hrs.

Symptomatic and acute hyponatremia can be corrected more rapidly (1 mmol/L per hour). Otherwise, avoid raising Na > 8-10 mmol/L per day. Risk of Osmotic demyelination. Greater risk in menstruating women and after surgery.

Severe Hyponatremia:

Serum Na < 125 mmol/L regardless of symptoms; serum Na < 135 n presence of neurological symptoms/signs

ASSESS VOLUME STATUS

History of renal or extra-renal losses – thiazide diuretics, diarrhea...etc. Hypotension, tachycardia. (Hypovolemia)

History of CHF, cirrhosis or nephrotic syndrome; presence of peripheral edema, ascites ..etc. (Hypervolemia)

Pulmonary, CNS or drugs that may cause SIADH (also consider CSW for CNS conditions)

SIADH and CSW two risky conditions.
Assess urine output and urine Na/Osm.

MANAGEMENT

Goal is to prevent worsening hyponatremia and to avoid Osmotic demyelination by over-correcting.

Hypovolemic HypoNa: replace Na and water
Hypervolemic HypoNa: Na/Water restriction +/- diuretics

If severe symptoms, consider 3% NaCl
SIADH: water restriction <750ml/day
CSW: Saline replacement

OTHER MANAGEMENT & MONITORING

Always assess ABCs first.

Move to monitored unit if concerned or if LOC altered.

Frequent monitoring of Na

Reassess impact of intervention on Na and symptoms

**** remember to assess underlying problems esp CNS

HELP!

1. Your senior
2. CCOT – 33333
(if admitted)
3. ICU – 19994
(if not admitted)

Because **CRITICAL CARE** is a **NEED** not a place

Call the Critical Care Outreach Team (CCOT) if there is Serious Concern about the patient or

Acute change in:	Signs:
A irway	• Threatened Stridor Excessive secretions
B reathing	Respiratory rate ≤ 8 or ≥ 30 Distressed breathing Saturations $< 90\%$ on $\geq 50\%$ O_2 or 6 litres/min
C irculation	Systolic blood pressure $\leq 90\text{mmHg}$ or $\geq 200\text{mmHg}$ or decrease > 40 mmHg Heart rate ≤ 40 or ≥ 130
N eurology	Decreased level of consciousness
O ther	Urine output $< 100\text{mL}$ over 4hrs SERIOUS CONCERN ABOUT THE PATIENT NEED MEDICAL ASSISTANCE

CALL 33333 to activate the CCOT

London Health Sciences Centre

Critical Care Outreach Team

Resources

MDCalc

<http://www.mdcalc.com/sodium-correction-rate-in-hyponatremia/>

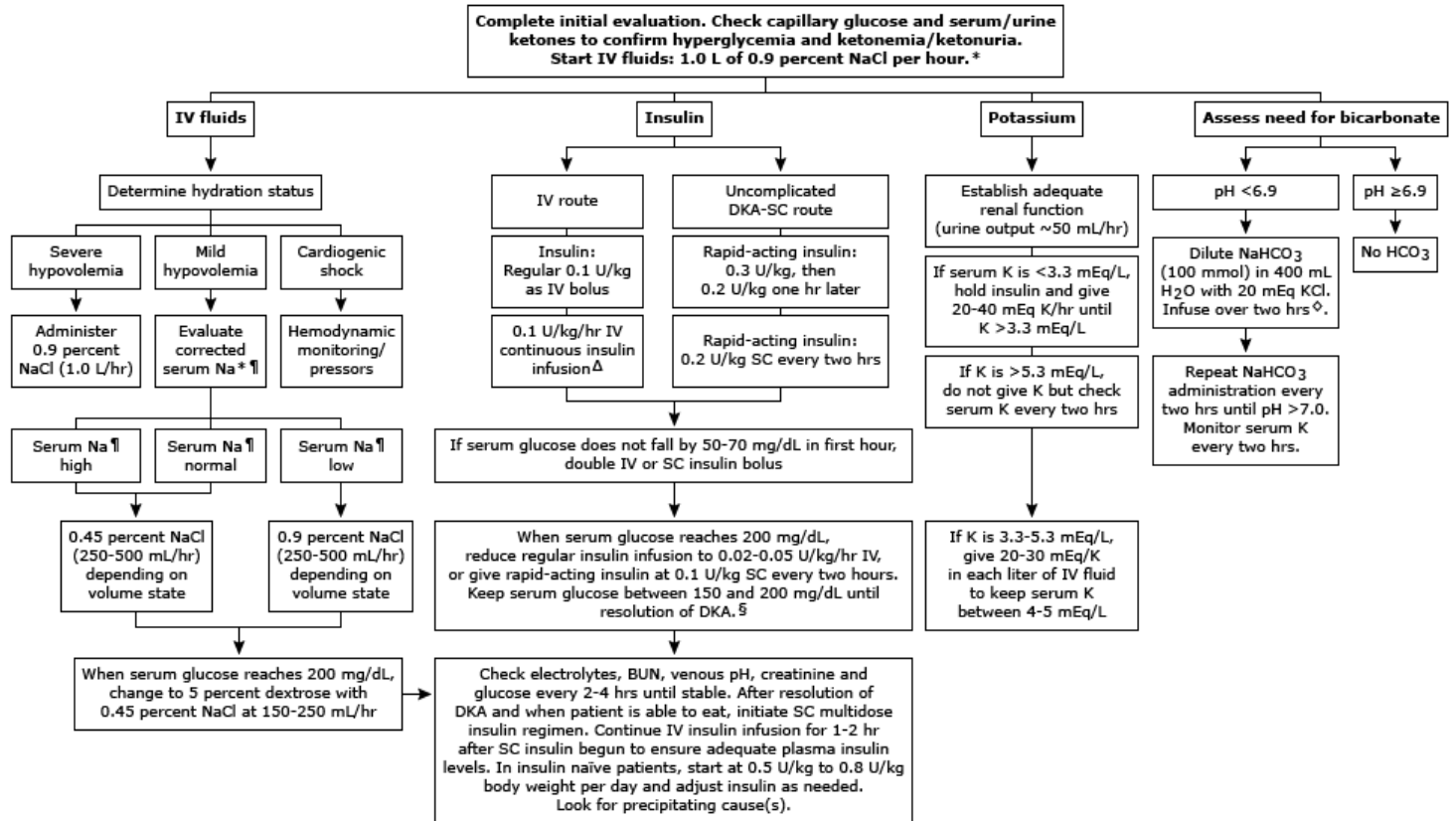
European Guidelines on Hyponatremia <http://www.eje-online.org/content/170/3/G1.full>

Excellent blog/JC on hyponatremia

<http://www.nephjc.com/hyponatremia/>

T₂R WEEK 7: ABNORMAL LAB VALUES, DOING & DRUGS GLUCOSE MANAGEMENT

DKA



American Diabetes Association from *Diabetes Care* Vol 29, Issue 12, 2006. Modifications from *Diabetes Care*, Vol 32, Issue 7, 2009.

INPATIENT DIABETES MANAGEMENT

Medication Management on admission:

Diabetes Type	Normal Diet	NPO
Type 1 or Type 2 on Insulin	Continue basal bolus regimen, consider dose reduction	DO NOT stop basal insulin Give 1/3-1/2 of bolus dose and sliding scale If NPO for prolonged time, think about D5 infusion and insulin infusion
Type 2 on OHG	Can continue at home regimen, but consider holding OHG based on comorbidities (actual or anticipated). POC glucose and consider insulin if needed for control during acute illness	Hold all oral medications. POC glucose and consider insulin

When to hold medication

Medications Causing Hypoglycemia	Common medications that are renally closed
<ul style="list-style-type: none"> Sulfonylureas <ul style="list-style-type: none"> (gliclazide, glyburide) Insulin Repaglinide 	<ul style="list-style-type: none"> **Metformin (hold) Gliclazide (hold) Sitagliptin (dose reduce/hold) Liraglutide (hold) Insulin (dose reduce)

T2R WEEK 8: ALTERED MENTAL STATUS

DELIRIUM

Is a Medical emergency! Diagnosis:

- Acute change in mental status, with fluctuations
- Inattention
- Disorganized thinking
- Altered LOC

Differential Diagnosis (DIMS)

Drugs	Infections	Metabolic	Structural
Medications New, changed or held meds? Anticholinergic meds? Withdrawal/OD Benzodiazepine Alcohol Opioids	Urinary (UTI, pyelo, stone) Respiratory (PNA, URTI) Skin (cellulitis) Wound Ulcer CNS (meningitis, encephalitis) Abdo (gastro, appy, chole, diverticulitis)	Glucose - ↑ or ↓ Electrolyte -Na (↑ or ↓) -Ca (↑ or ↓) Renal Hepatic Hormonal -Thyroid	CNS (CVA, bleed, TBI) Cardiovascular (CHF, MI, htn crisis) Respiratory (PE, shunting, pHTN) Abdo (Constipation) Urinary (retention) Pain or Injury (Fall/fracture, untreated pain)

Initial Work-up and Management

Goal:

- ensure patient safety and medical stability
- Identify/treat etiology

Assess the patient:

- hx/px (don't forget full skin and neuro exams)

Identify cause(s):

- med review
- POC glucose
- BW: lytes, CBC, U/Cr, Ca/mg/phos, tsh
- +/- ck, trop, lfts, keytones, abg, osm, tox,
- ECG
- CXR
- +/- other testing based on hx/pe

Treat specific causes

Medical Restraints: start LOW, go SLOW

Physical Restraints: only if absolutely necessary; consider Geri-Chair

Frequent re-assessment.

Review and ask for help!

APPROACH TO SUSPECTED OVERDOSE

Immediate Mx:

- Stabilize patient (ABCs, vitals, IVs, POC glucose, monitor, ECG)
- Brief Hx/Phx
- Universal antidote (D.O.N.'T.)
 - **D**extrose (1 amp 50%)
 - **O**₂
 - **N**aloxone (0.2-0.4mg IV q5min)
 - **T**hiamine (50-100mg IV)
- Restraints as necessary

Work-up:

- DIMS
- For ?OD: Serum/urine tox screen (acetaminophen, salicylates, ethanol, urine tox), anion gap, osmolar gap

Treatment:

- Supportive (Consider intubation, telemetry, vasopressors)
- ↑ Elimination (irrigation) or ↓ Absorption (charcoal)

- **Call Poison Control**

Disposition

- ICU/Medicine/Psych/Home

CHEMICAL RESTRAINTS

Medication options:

- Olanzapine 2.5-5mg PO/IM q4-6h
 - max 20mg/24hr
- Loxapine 10-20mg PO/IM q4-6h
 - max 80mg/24hr
- Quetiapine 12.5-50mg PO q4-6h
- Haldol 0.5-5mg PO/IM q4-6h
 - max 20mg/24hr
- Lorazepam 0.5-2mg PO/IM q4-6h
 - max 8mg/24hr

Tips:

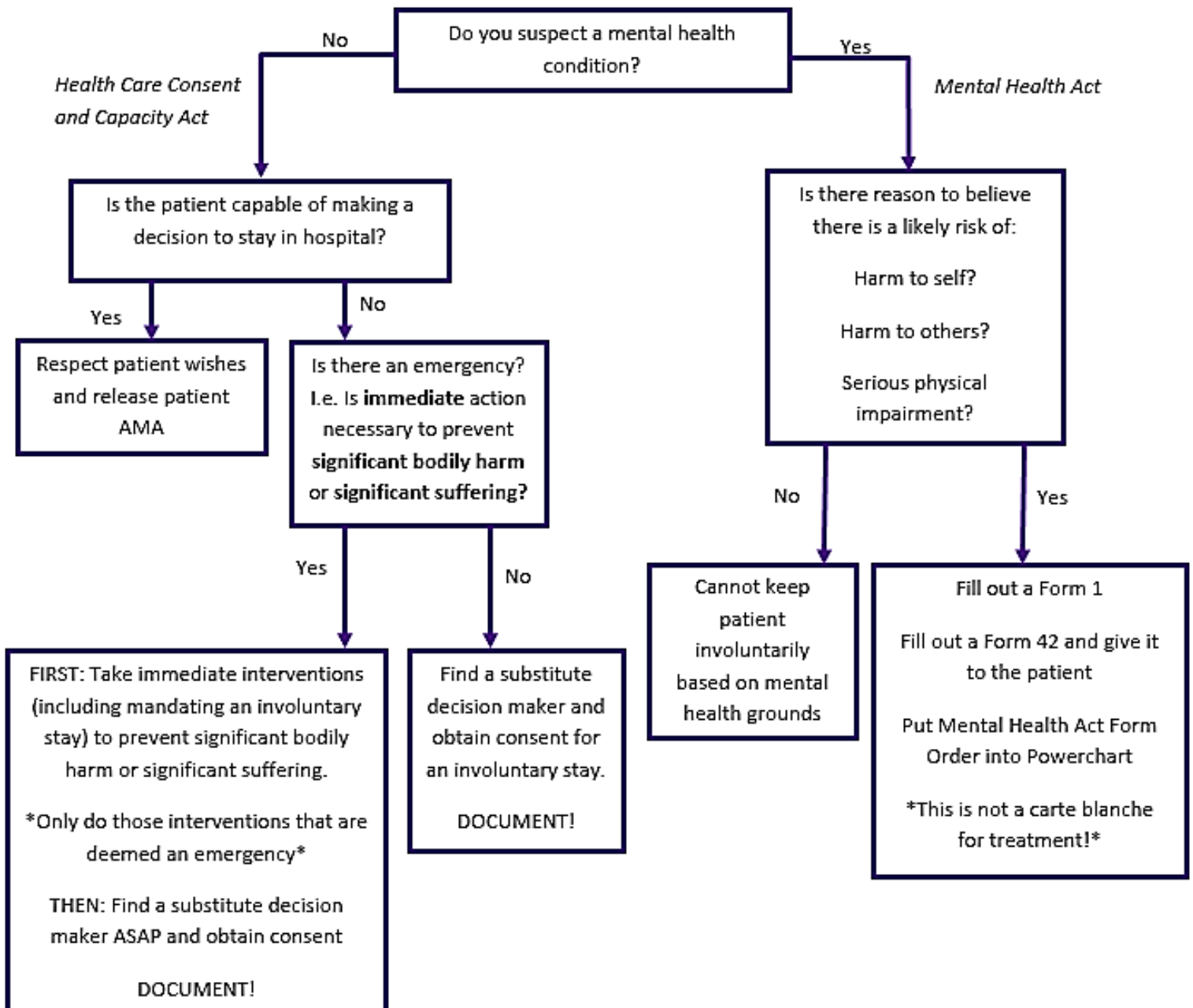
- Only use the low end of dose range for older patients.
- Do NOT use benzodiazepines in delirious patients
- Be mindful of long QTc and extrapyramidal side-effects.
- IM formulations helpful in extremely agitated patients.

T2R WEEK 8: ALTERED MENTAL STATUS

RESTRAINTS AND INVOLUNTARY STAYS

When can restraints be used? Only when there is risk of significant physical harm and immediate action is necessary to prevent this.

HOW DO YOU KEEP SOMEONE INVOLUNTARILY IN HOSPITAL?



2019 T2R

LIVESTREAM LINKS

<p>JULY 10</p>	<p>HYPOTENSION & SHOCK</p> <p>Welcome and introduction to the 2019 Transition to Residency Program. This session will be focused on Shock – how to recognize shock, including early signs; how to differentiate between different types of shock; how to apply basic initial management for patients experiencing shock; identify how, when and who to call for help (including an introduction to the Critical Care Outreach Team CCOT) https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R07102019HypotensionShock</p>
<p>JULY 17</p>	<p>ACUTE DYSPNEA</p> <p>Welcome to the second session of Transition to Residency. This session will be focused on recognizing and managing shortness of breath in patients, with an overview of interpreting basic CXR and ABG data, calculating blood gas, recognizing the cause of and intervening appropriately for patients experiencing shortness of breath, and working in a multidisciplinary approach with a presentation from Respiratory Therapy. https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R07172019AcuteDyspnea</p>
<p>JULY 24</p>	<p>ACUTE NEURO EMERGENCIES</p> <p>Welcome to the third session of Transition to Residency. This session will provide information on general approach and management of acute neurological emergencies, including identification, investigation and management of seizures, acute and emergent management of strokes including a multidisciplinary approach with CCOT, investigation and management of acute reduction in level of consciousness, recognizing patient safety issues, and how, when and who to call for help in a neurological emergency. https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R24072017NeuroEmergencies</p>
<p>JULY 31</p>	<p>CHEST PAIN</p> <p>Welcome to the fourth session of Transition to Residency. This session will be focused on the variety of causes of chest pain, as well as the intervention required. An algorithm will be provided on how to approach chest pain. Topics will include determining the appropriate investigations and approach for a sudden onset of shortness of breath and chest pressure, interpreting the results of diagnostic tools such as an ECG and lab work, managing symptoms of shortness of breath and chest pain, initiating acute management, composing a differential diagnosis, and determining how, when and who to call for help. https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R31072019ChestPain</p>
<p>AUGUST 7</p>	<p>THE DYING PATIENT</p> <p>Welcome to the fifth session of Transition to Residency. This session will provide a variety of lenses on how to manage a dying patient. You will learn about a palliative approach to care, including communicating with patients and families, and end of life symptom management; about how to manage an acutely dying patient, including interpretation of resuscitation status; about how to fill out a coroner's report, and how you will interact with the coroner; and what the role pathology has following patient death, including the requisition of an autopsy. https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R07082019TheDyingPatient</p>
<p>AUGUST 14</p>	<p>ABDOMINAL PAIN & GI BLEEDS</p> <p>Welcome to the sixth session of Transition to Residency. This session will be split into two topics, causes and management of Abdominal Pain, and causes and management of GI Bleeds. The Abdominal Pain section will include information on a systematic approach to an abdominal examination, information on acute appendicitis, mechanical bowel obstructions and pseudo-obstructions, and differential diagnosis for patients who present with RUQ pain. The GI Bleed will cover signs and symptoms of aortic aneurysms, differentiating between Upper and Lower GI Bleeds, how to identify emergent situations, and how to initiate interventions including massive transfusion protocols. https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R08142019AbdominalPainGIBleeds</p>
<p>AUGUST 21</p>	<p>METABOLIC LAB VALUES, DOSING, & DRUGS</p> <p>Welcome to the seventh session of Transition to Residency. This session will include three components. The first is recognizing abnormal laboratory results that will require urgent intervention, including describing and implementing urgent management plans for patients with metabolic derangements, and recognizing the consequences of inadequate management. This session will also offer information on how to properly determine interventions and dosing for these patients. Finally, we will offer a section on safety and management of patients on opioids. https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R21082019MetabolicLabValuesDosingDrugs</p>
<p>AUGUST 28</p>	<p>ALTERED MENTAL STATUS</p> <p>Welcome to the final session of Transition to Residency. This session will provide an overview of the approach to management of a patient who presents with an altered mental status. Reviewing protocol around altered level of consciousness, including identification, management and diagnostic framework, reviewing types, causes and interventions for delirium, recognizing and intervening for patients with symptoms of a drug overdose, identification of patients with mental health concerns, including involuntary admission with the mental health act, and how, when and who to call for help. https://livestream.com/SchulichSchoolofMedicineandDentistry/T2R28082019AlteredMentalstatus</p>

2019 T2R OWL RESOURCES

PRESENTATIONS, SUMMARIES, SUMMARY CARDS



OWL

**T2R Recordings + Summary Sheets + Summary Cards + Slides
can all be found on OWL**

- ✓ Log in to OWL at <https://owl.uwo.ca/portal> using your UWO credentials.
- ✓ Choose *Postgraduate Medical Education* from the bar across the top.
- ✓ Once in the site, click on *Trans. To Residency* on the left hand side.
- ✓ You will see *Transition to Residency – T2R 2019: Topic Title* for each session.

OWL ACCESS HELP:

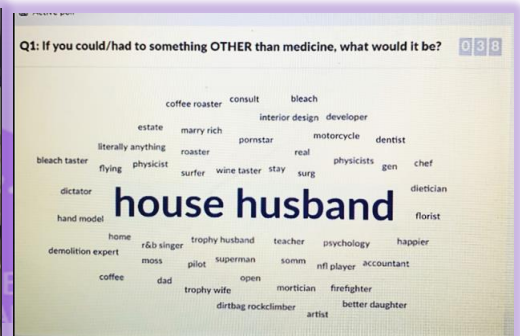
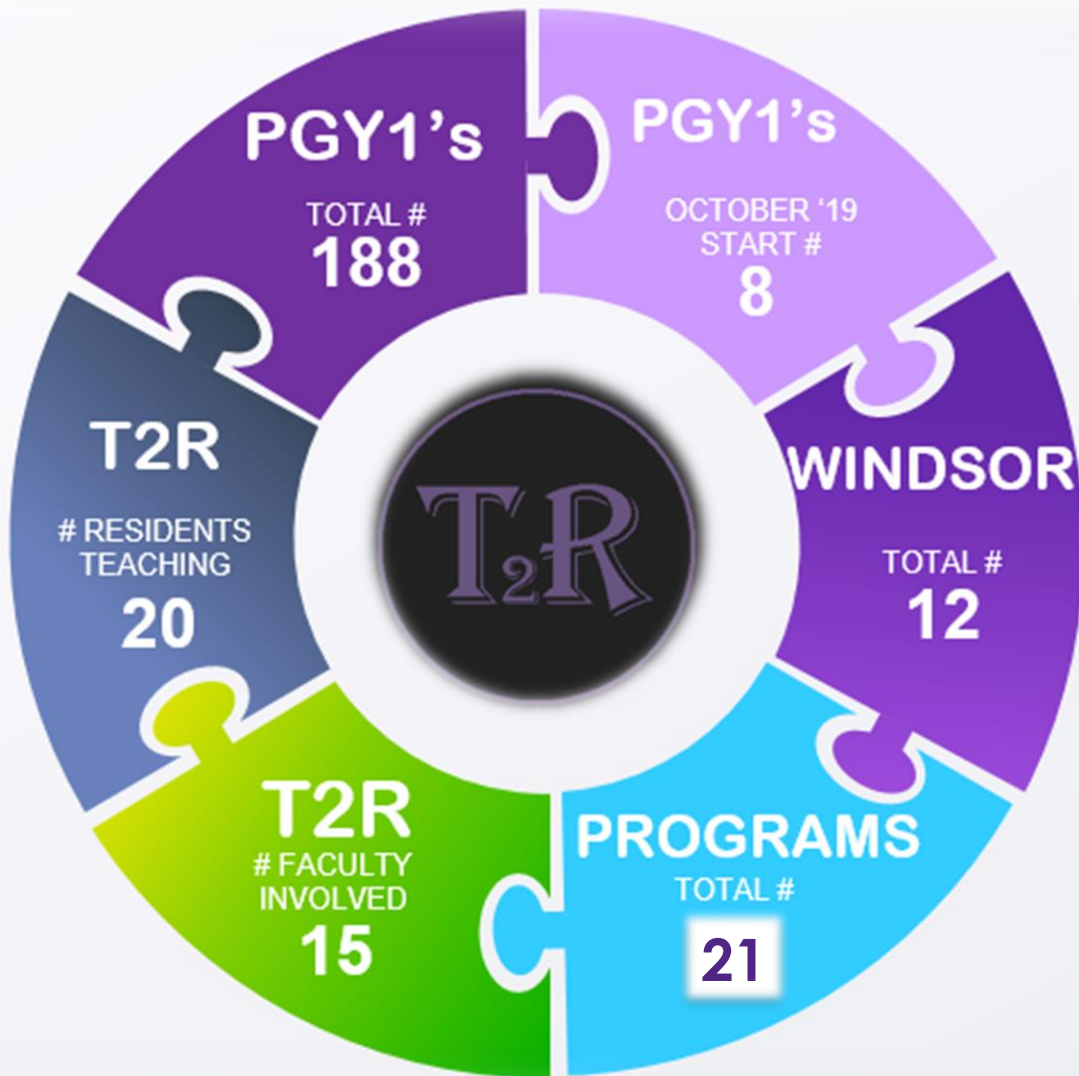
If you have trouble accessing your OWL account, please contact Western's Helpdesk at 519-661-3800 or x83800 or at <http://itshelp.uwo.ca>

WESTERN CREDENTIALS HELP:

If you have not activated your Western Identity (and received your Western Credentials), you may do so using the link below and following the ITS instructions. <http://www.uwo.ca/its/identity/activation.html>

T2R 2019

SUMMARY



T2R 2020

NEEDS YOUR HELP!

WHO:

FACULTY & RESIDENTS

WHAT:

T2R 2020 FACILITATORS

WHEN:

**Wednesday's
July & August 2020**

WHY:

BUILD SKILLS + SHARE KNOWLEDGE

COMMITMENT:

- ✓ 2-3 Planning meetings
- ✓ Develop & Refine content
- ✓ Share personal relatable experiences
- ✓ Incorporate Case-Teaching
- ✓ Communicate promptly with the team
- ✓ Complete presentation one week prior to session
- ✓ Offer mentorship
- ✓ Learn effective presentation skills

LEARN

+

GROW

+

SHARE

GET

INVOLVED

STAY TUNED:

More information
to come in 2020

**BUILD
RELATIONSHIPS
&
CREATE IMPACT**

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