Prescribing for Older Adults in the Emergency Patient

This flipchart is designed to be a quick resource for appropriate medication management of common geriatric conditions. Medications and doses listed are intended for more urgent and acute treatment and not necessarily for long-term use. Examples provided are not an exhaustive list.

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INTRODUCTION – POLYPHARMACY

Polypharmacy is the use of more medications than is clinically necessary and is an important consideration in older adults.

POLYPHARMACY CAN LEAD TO:

- Increased ER visits
- Increased risk for adverse drug reactions
- Falls
- Delirium
- Functional decline
- Decreased appetite, weight loss
- Swallowing difficulties
- Increased drug-drug interactions
- Changes in kidney and liver function (due to pharmacokinetic changes)
- Increased health care costs

A reduction in polypharmacy can improve patient outcomes

ACTION:

- Re-evaluate ALL patient medications
- Re-evaluate medication doses – ensure elder-friendly dosing
- Assess medications for appropriateness for continued use
- Recognize medication interactions which can lead to cumulative adverse drug events (including delirium and falls)

RESOURCES:

BC Guidelines: www.BCguidelines.ca

http://polypharmacy.ca/

www.deprescribing.org

"It is an art of no little importance to administer medicines properly, but it is an art of much greater and more difficult acquisition to know when to suspend or altogether to omit them."
Phillipe Pinel (1745-1826)

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ACUTE ANXIETY

IS DRUG WITHDRAWAL CAUSING ANXIETY?

- May manifest as insomnia, agitation, headache, myalgia or other pain, dizziness, nausea, vomiting
- Onset of withdrawal is often 24-48 hours after large dosage decrease or abrupt discontinuation of medication

MEDICATIONS WHICH MAY CAUSE ANXIETY SYMPTOMS UPON WITHDRAWAL:

- Anticholinergics (See Appendix)
- SSRIs (citalopram, paroxetine, sertraline, etc.)
- TCAs (amitriptyline, nortriptyline, imipramine, doxepin, etc.)
- Trazodone (particularly higher doses)
- Alcohol
- Sedatives/Hypnotics (less frequently with zopiclone, zolpidem)
- Benzodiazepines (such as diazepam, lorazepam)
- Opioids (such as morphine, hydromorphone, etc.)

IS A NEW MEDICATION OR DOSE CHANGE CONTRIBUTING TO ANXIETY?

Medication-related anxiety is often dose-related

Medications associated with causing anxiety: (bolded = more common)

- Anticholinergics (See Appendix)
- Carbamazepine
- **Digoxin (toxicity)**
- Felodipine
- Isoniazid
- **Levodopa (Sinemet®, Prolopa®), pramipexole, ropinirole** or may be related to resurgence of symptoms
- **Levothyroxine** (if dose too high)
- **Stimulants such as methylphenidate (Ritalin®), dextroamphetamine, pseudoephedrine, caffeine**
- NSAIDs (particularly indomethacin)
- **Prednisone,** hydrocortisone (systemic), methylprednisolone
- **Salbutamol (and salmeterol, formoterol, indacaterol and terbutaline)**
- SSRIs – particularly **fluoxetine (Prozac®)**
- **Theophylline** (particularly with higher doses)

SHORT-TERM ACUTE MANAGEMENT:

- Maximize use of non-pharmacological approaches
- Older adults can be very sensitive to effects of benzodiazepines
- Consider remote and recent past use of benzodiazepines for both benefit and side effect history
- **Clonazepam** 0.25 mg PO up to maximum BID PRN
- **Lorazepam** 0.5 mg PO up to maximum BID PRN

DO NOT USE:

- Diazepam
- Chlordiazepoxide
- Flurazepam
- Alprazolam (Xanax®)
- Buspirone (Buspar®)

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DELIRIUM - CAUSES

- In older patients, it is important to search out and remove the potential causes of delirium.
- Confusion in older adults is often delirium but mislabeled as dementia.

PRISM-E:

PRISM-E is an acronym that can assist the clinician in identifying and resolving all the underlying factors that contribute to the onset and perpetuation of delirium.

P	• Pain (Acute & Chronic) • Poor nutrition
R	• Restraint • Retention (Urinary)
I	• Infection • Illness • Immobility • Intake
S	• Sensory change • Sleep disturbances • Skin
M	• Medication (new, withdrawal or change in dose) • Metabolic • Mental status
E	• Environment • Elimination

MEDICATIONS THAT CAN CONTRIBUTE TO DELIRIUM:

- Includes non-prescription as well as prescription medications
- Consider with any medication change (not just listed below)
- Often dose related or if recent changes in renal or hepatic function
- Consider recently initiated medications, dosage change in current medications and discontinued medications, and particularly with CNS drugs that cross the blood-brain barrier
- **Alcohol, illicit drugs**
- **Anticonvulsants** (such as phenytoin, carbamazepine, gabapentin, pregabalin)
- **Anticholinergics** (such as benztropine, scopolamine, dimenhydrinate)
- **Antidepressants** (including SSRIs and particularly TCAs such as amitriptyline)
- **Antiemetics** (such as dimenhydrinate, metoclopramide)
- **Antihistamines (sedating)** such as chlorpheniramine, diphenhydramine)
- **Antiparkinsonian medications** containing levodopa (such as Sinemet®)
- **Antipsychotics** (such as olanzapine, quetiapine, risperidone, methotrimeprazine)
- **Sedatives (**such as zopiclone, zolpidem)
- **Benzodiazepines** (such as alprazolam, clonazepam, diazepam, lorazepam)
- **Corticosteroids** (more common with higher doses)
- **Digoxin** (with high doses/levels)
- **Muscle relaxants** (such as cyclobenzaprine (Flexeril®), methocarbamol (Robaxin®), baclofen)
- **Narcotics** (more so with high doses)
- **NSAIDs** (most common with indomethacin)
- **Urinary antispasmodics** (such as oxybutynin, tolterodine, solifenacin)

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RESOURCES:

Best Practice Guideline for Accommodating and Managing Behavioural and Psychological Symptoms of Dementia in Residential Care:
https://www.health.gov.bc.ca/library/publications/year/2012/bpsd-guideline.pdf

Rx Files: www.rxfiles.ca

CAM & PRISM E Tools:
https://www2.gov.bc.ca/assets/gov/health/practitioner-pro/bc-guidelines/cogimp-appendix-c.pdf

FHA Regional Pre-Printed Orders for Delirium (For Geriatrics in Acute Care)

DELIRIUM & AGITATION - TREATMENT

CLINICAL PEARLS:

- Use relevant non-pharmacological approaches (family members present, quiet environment, glasses and hearing aids in, etc.)
- Use PRISM-E to help identify factors contributing to underlying delirium. Cause(s) of delirium must be investigated and removed if possible.
- Do not use benzodiazepines or sedative-hypnotics as first choice in older adults for agitation or delirium

Refer to Regional Preprinted Orders for Delirium (for Geriatrics in Acute Care) and FH Clinical Practice Guideline: Delirium in Hospitalized Older Adults

Antipsychotics:

- Are not recommended for use solely as a sedative/hypnotic
- May be used to manage agitation, aggression, and behaviour on PRN basis for short-term use
- Unlikely to benefit wandering patients or those with disruptive vocalizations
- May lower seizure threshold (<1% seizure risk)
- May affect body's ability to regulate temperature
- **Incidence of extrapyramidal symptoms (EPS):** haloperidol > loxapine > risperidone> olanzapine (Zyprexa®)> quetiapine (Seroquel®)
- **Patients with Lewy Body Dementia or Parkinson's:** Quetiapine is preferred
- **All** antipsychotics may prolong QTc – use caution in patients with other QTc prolonging medications or who have QTc > 450 msec (avoid if > 500 msec)

Medication (as per PrePrinted orders for Delirium)	**Suggested Geriatric Starting Dose (unless patient on established regimen already)**
Quetiapine	6.25 to 12.5 mg PO q4h prn x 3 days then reassess ▪ maximum 50 mg/24 hrs
Haloperidol	0.25 mg PO/SC/IM q1h prn x 2 days then reassess • maximum 1.5 mg/24 hours
Alternative delirium treatment options:	
Risperidone **NOTE: Dissolvable tablet or liquid available*	0.125 to 0.25 mg daily to bid prn PO/SL ▪ avoid total doses greater than 2 mg/day
Olanzapine *NOTE: Dissolvable tablet available	1.25 to 2.5mg q4h prn PO/SL ▪ avoid total doses greater than 10 mg/day
Loxapine	2.5 mg PO/IM/SC q4h prn up to 10 mg per 24 hours ▪ may be alternative for patients not responding to above agents (limited evidence for first-line use)

Antipsychotic agents have been associated with an increased risk of stroke, myocardial infarction and death in older adults. Obtain consent from substitute decision maker when possible.

MONITOR:

- Improvement in target symptom(s)
- Sit to stand BP daily x 3 days

RESOURCES:

Rx Files: www.rxfiles.ca

FHA Regional Pre-Printed Orders for Delirium (for Geriatrics in Acute Care)

BC Guidelines: https://www.bc-cpc.ca/cpc/wp-content/uploads/2018/09/SMGs-interactive-final-Nov-30-compressed.pdf
(content is relevent although these guidelines are referenced for palliative care)

DRUG WITHDRAWAL

CLINICAL PEARLS:

- Withdrawal symptoms often manifest after large dose reductions or abrupt discontinuations after prolonged use
- This may be important if an older patient's medication supply has "run out"
- The longer the half-life of the drug, the longer the time until symptoms of drug withdrawal occur
- Typically, withdrawal symptoms occur within 24 to 48 hours, but consider within 5 to 10 days since last dose

SYMPTOMS ARE OFTEN VARIED AND NON-SPECIFIC:

CNS	Autonomic	Other
• Agitation, Anxiety • Depression • Dizziness • Dysphoric mood • Grand mal seizures • Hypersomnia (withdrawal from stimulants) • Insomnia • Psychotic symptoms • Restlessness • Hallucinations • Vivid dreams	• Autonomic hyperactivity, Tachycardia • Diarrhea • Fever • Nausea & vomiting • Piloerection • Pupillary dilation • Sweating • Tremor	• Fatigue • Increased appetite • Lacrimation, rhinorrhea • Malaise • Myalgias • Psychomotor agitation or retardation • Yawning

MEDICATIONS

- Alcohol
- Antidepressants (all classes)
- Antipsychotics (all classes and generations)
- Barbiturates (ie: phenobarbital, Fiorinal®)
- Benzodiazepines
- Beta blockers
- Clonidine – more pronounced after long-term or higher dose therapy
- Nicotine
- Non-prescription medications (such as dimenhydrinate**,** diphenhydramine, chlorpheniramine)
- Opioids
- Sedatives/Hypnotics
- Stimulants (such as methylphenidate (Ritalin®) and caffeine)

HOW TO MANAGE:

- Management depends on medication that is causing withdrawal symptoms
- Includes supportive care
- If offending medication reinstituted, will need to withdraw more gradually than in a younger patient
- For alcohol withdrawal – use lower doses of benzodiazepines to control withdrawal symptoms (ie may consider lorazepam 1-2 mg instead of 2-4 mg dose listed on Alcohol Withdrawal Protocol)
- For nicotine withdrawal, may use patches, lozenges and gum

RESOURCES:

FHA Regional Pre-Printed Alcohol Withdrawal Protocol

FHA Regional Pre-Printed Orders for Nicotine Replacement Therapy

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ELECTROLYTE IMBALANCES

CLINICAL PEARLS:

- Polypharmacy can lead to increased risk of electrolyte imbalance

HYPONATREMIA – MEDICATION CAUSES:

- Antihypertensives: ACE inhibitors, ARB's, clonidine, methyldopa, **thiazide diuretics** (HCTZ, chlorthalidone, indapamide, metolazone), loop diuretics (furosemide, ethacrynic acid)
- Antidepressants: **SSRIs** (citalopram, escitalopram, sertraline, fluoxetine, paroxetine, fluvoxamine), TCAs (amitriptyline, nortriptyline, imipramine, doxepin, etc), MAOIs (phenelzine, tranylcypromine), buproprion, mirtazapine, venlafaxine, duloxetine, trazodone
- Antineoplastics (chemo meds) – cyclophosphamide, methotrexate, cisplatin
- ADH analogues (desmopressin (DDAVP®))
- Analgesics (particularly NSAIDs, Opioids)
- Anticonvulsants (**carbamazepine**, levetiracetam, valproic acid)
- Parkinson's medications (levodopa, pramipexole, amantadine, bromocriptine)
- Antiarrhythmics: amiodarone, propafenone
- Antipsychotics (first generation and atypicals)
- Sulfonylurea hypoglycemics (tolbutamide, chlorpropamide, glyburide, glimepiride)
- Ciprofloxacin
- Tacrolimus

HYPERKALEMIA - MEDICATION CAUSES:

(Potential higher in those with renal dysfunction)

- Beta blockers (those with Beta-2 activity such as labetalol, propranolol)
- ACE inhibitors (enalapril, fosinopril, perindopril, ramipril, trandolapril, etc.)
- ARBs (candesartan, valsartan, irbesartan, etc.)
- K-sparing diuretics (Amiloride; Triamterene; Spironolactone)
- K supplements (including salt-substitutes)
- NSAIDs (diclofenac, ibuprofen, indomethacin, etc.)
- Co-trimoxazole (specifically the trimethoprim component)
- Ketoconazole
- Cyclosporine, Tacrolimus
- Digoxin (in acute toxicity)
- Heparin, LMWH (dalteparin, enoxaparin, etc.)
- Herbal Supplements: alfalfa, ginseng, licorice root, dandelion, hawthorn, nettle

HYPOKALEMIA - MEDICATION CAUSES:

- Diuretics: thiazides (hydrochlorothiazide, chlorthalidone, indapamide, metolazone), loop (furosemide, ethacrynic acid)
- Beta agonists (high dose) such as salbutamol, salmeterol, terbutaline, dobutamine
- Sorbitol (often found in liquid medications including acetaminophen)
- Laxatives (in general), including senna, PEG3350®, Fleet®
- Insulin overdose
- Na Polystyrene sulfonate (Kayexylate®, Solystat®**)** overuse
- Corticosteroids (prednisone, fludrocortisone)
- OTC decongestant products containing pseudoephedrine
- Antineoplastics (chemo meds) – cisplatin
- Amphotericin B
- Aminoglycosides (gentamicin, tobramycin)
- High doses: theophylline, vitamin B12, folic acid, penicillin

FALLS

Medications are among the most common causes of increased falls risk in older adults and are the most modifiable risk factor.

HOW CAN MEDICATIONS INCREASE RISK OF FALLS?

- Dizziness
- Hypotension, including orthostatic/postural
- Drowsiness
- Confusion, delirium, “muddled”, incoherent, cognitive impairment
- Parkinsonian symptoms (EPS)
- Balance and gait disturbances
- Visual disturbances (blurred, double vision, halos)
- Hypoglycemia
- Arrhythmia
- Functional incontinence & continence issues

CLINICAL PEARLS

- Additive side effects from multiple medications increase risk of falls
- Ask about dizziness or light-headedness upon sitting or standing - Monitor for orthostatic hypotension (i.e. obtain sit-to-stand BP and HR)
- Consider recent medication changes - dose changes, additions, discontinuations
- Higher likelihood with higher doses or new medications added to regimen
- Ask about increased urinary frequency, incontinence, diarrhea, which could be medication-related

WHAT MEDICATIONS CAN INCREASE RISK OF FALLS?

- **Polypharmacy – More than 3 - 5 prescription medications** (regardless of type of med) increases risk of falls
- **Anticholinergic medications** – see Appendix
- **Diabetic medications:** Oral hypoglycemics, particularly sulphonylureas, insulin
- **Psychoactive or psychotropic drugs**
  - use of psychotropic medications, especially when combined with a cardiovascular medication, is clearly associated with increased falls
  - Antidepressants
  - Antipsychotics
  - Sedative/hypnotics (benzodiazepines, zopiclone, OTC sleep aids)
  - Antihistamines (diphenhydramine, dimenhydrinate, chlorpheniramine, hydroxyzine)
  - Anticonvulsants (including gabapentin, phenytoin, levetiracetam)
- **Alcohol** (more than 1 or 2 drinks/day)
- **Analgesics -** NSAIDs, Opioids
- **Muscle relaxants** (methocarbamol, cyclobenzaprine)
- **Parkinson’s medications** (levodopa, pramipexole, ropinirole)
- **Alpha blockers** (tamsulosin, terazosin)
- **Betahistine** (Serc®)
- **Cardiovascular meds**
  - Antihypertensives
  - Antiarrhythmics

INSOMNIA

CLINICAL PEARLS:

- Address other causes of insomnia, such as nocturia or pain, before automatically starting a sleeping pill
- Assess caffeine and stimulant use (such as oral decongestants)
- Ask about OTC sleep aids such as diphenhydramine - Avoid use
- Reserve sedative/hypnotics for situations where poor-quality sleep or daytime functioning are affected
- **Antipsychotics are <u>not recommended</u> for use solely as a sedative/hypnotic**

IS YOUR PATIENT CONFUSED?

- Confusion in an older person may be a symptom of withdrawal from a sedative <u>or</u> alternatively due to the sedative itself

WHAT SHOULD YOU USE FOR YOUR GERIATRIC PATIENT?

- If a patient does not currently use a sleeping pill, may not need to prescribe
  - If patient needs, use the smallest dose possible & use <u>HS PRN only</u> (don't automatically give)
- If chronic, regular sedative used, continue current medication to avoid withdrawal

Medication	Comments
Zopiclone 2.5 or 3.75 mg po HS PRN	May repeat same dose in 1 hour if unable to sleep *Health Canada Warning November 2014: maximum dose in elderly is 5mg nightly*
Melatonin 3 mg po HS	May increase to 6 mg if lower dose not effective Administer 2-3 hours before bedtime for maximum effect
Trazodone 25 mg po HS	May be helpful if agitation is contributing to insomnia Note: may cause dizziness, postural hypotension at higher doses in elderly
Benzodiazepines **Lorazepam** 0.5 mg po HS PRN **Oxazepam** 7.5 or 10 mg po HS PRN	use only for patients intolerant to zopiclone, using at home regularly or if otherwise clinically indicated ▪ *older adults are more sensitive to the effects of benzodiazepines on the CNS & more prone to side effects (such as confusion, amnesia, decreased daytime ability and mobility, cognitive impairment)*

DO NOT USE:

▪ **Antidepressants** *(*amitriptyline & other tricyclic antidepressants, mirtazapine) **(these are not indicated for sleep alone)**
▪ **Non-Prescription Medications (mostly antihistamines) (**dimenhydrinate, diphenhydramine (Nytol®, Sleep-Eze®, Sominex®, Unisom®**,** Tylenol Nighttime®)
▪ **Antipsychotic Medications (**haloperidol, quetiapine, risperidone, olanzapine)
▪ **Longer-acting Benzodiazepines (**flurazepam, bromazepam, alprazolam, diazepam, chlordiazepoxide, clonazepam)
▪ **Ultra-short acting Benzodiazepines** (triazolam, midazolam)
▪ **Zolpidem** (Ambien®**)** may cause complex sleep behaviours & has insufficient evidence in elderly

RESOURCES

BC Guidelines: https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/sleep-complaints

NAUSEA AND VOMITING

CLINICAL PEARLS:

- Determine cause of nausea (N), vomiting (V) before treating these symptoms
- Any medication change may cause N&V (i.e.-new or discontinued or dose change)
- Avoid giving dimenhydrinate automatically with morphine and other opioids. Consider starting with a lower dose of opioid and giving anti-nauseant only if needed.
- Avoid combining use of prokinetic agents (metoclopramide, domperidone) with anticholinergics (dimenhydrinate) as these reduce effects of each other.
- Onset and duration of action of many medications may be delayed and unpredictable in older adults (especially IM route)
- Reassess effects of medication and discontinue if ineffective

MEDICATION CAUSES:

Nausea more likely upon starting these agents (typically resolves with continued use):	Nausea more likely with chronic use, high doses, or toxicity
▪ Antibiotics ▪ Antidepressants ▪ Cholinesterase inhibitors (such as Donepezil, Galantamine, Rivastigmine) ▪ Cytotoxics (Chemotherapy) and radiation ▪ Iron ▪ NSAIDs ▪ Opioids ▪ Potassium ▪ Theophylline	▪ Anticonvulsants ▪ Digoxin ▪ Opioids ▪ Theophylline

MEDICATION WITHDRAWAL CAUSING NAUSEA & VOMITING:

- Opioids
- Benzodiazepines
- Alcohol

MEDICATION MANAGEMENT:

Cause	Comments	Medication
Chemically Induced (Medications or Toxins) **Opioid-induced**	Tolerance to N&V from medications develops quickly – may only need short course of anti-emetic	**Dimenhydrinate** 12.5 to 25 mg q6h prn PO/IV/SC **Prochlorperazine** 2.5 to 5 mg PO q8h prn
GI dysmotility **If bowel obstruction suspected:** AVOID prokinetic agents	May be caused by drugs such as opioids or anticholinergics	**Metoclopramide** 5 to 10 mg q6 to 8h prn PO/SC/IV **Domperidone*** 5 to 10 mg PO q6 to 8h prn **Ondansetron*** 4 mg PO/IV q8 to 12h prn
Vertigo	Often see autonomic symptoms such as pallor, diaphoresis, salivation as wel	No optimal agents available Could trial: **Dimenhydrinate** 12.5 to 25 mg PO/IV/SC q6h

		prn OR **Betahistine** (Serc®) 8 mg PO TID PRN
GERD/Irritation	May be caused by drugs such as ASA, NSAIDs, iron, potassium, some antibiotics, alcohol	**Antacid** 15-30 mL PO QID PRN H2 antagonist – **Ranitidine** 150 mg PO BID or 50 mg IV q12h PPI – **Pantoprazole** 40 mg PO daily
Chemotherapy Induced		**Ondansetron*** 4 to 8 mg PO/IV q12h prn +/- **Dexamethason**e 4 mg PO/IV q12h

**use caution in patients with other QTc prolonging medications or who have QTc > 450 msec (avoid if > 500 msec)*

RESOURCES

Rx Files: www.rxfiles.ca

ACUTE PAIN

FOR CURRENT OPIOID USER:

- Order usual opioid dose, and supplement with immediate release (IR) opioid for breakthrough acute pain.
- Best to use the same opioid when possible for both regularly scheduled and PRN doses – easier to monitor and titrate

WHAT SHOULD YOU START WITH FOR YOUR GERIATRIC PATIENT?

For opioid naïve/new opioid starts, use low dose to start; only use immediate release medications (not long acting)

- **Acetaminophen** 650 to 975 mg PO/PR QID prn (lower dose for long-term use)
- **Morphine** 1 to 2.5 mg PO q3 to 4h prn OR 0.5 to 2 mg SC/IV q3 to 4h prn
- **Hydromorphone** 0.5 to 2 mg PO q3-4h prn OR 0.25-1 mg SC/IV q3 to 4h prn
- Ensure any patient taking narcotics is ordered a bowel protocol

CAUTIOUS USE:

Medication	Comments
NSAIDs & COXIBs Use lowest dose for short term only **Ibuprofen** 200 to 400mg PO q6-8h prn (maximum 1200 mg/day) **Diclofenac** 25-50 mg PO or PR q12h prn (maximum 100 mg/day) **Naproxen** 250 mg PO q8h prn (maximum 750 mg/day) **Celecoxib** 100mg PO daily to BID (maximum 200 mg/day)	AVOID in patients with : ▪ Hypertension ▪ CHF ▪ Renal impairment (eGFR < 40) ▪ Gastric reflux or GERD ▪ Past GI bleed Cardiovascular risk: Naproxen is considered the NSAID with the safest cardiovascular profile NSAIDS may cause confusion (rarely) May cause dizziness, vertigo, drowsiness, headache in increasing order of frequency: **Ibuprofen < Diclofenac < Naproxen < Ketorolac < Indomethacin** COXIBs have equal efficacy and similar renal/CV toxicity to other NSAIDs
Tylenol #3® tablets 1 to 2 tablets PO q4 to 6h prn **Tramacet** 1 to 2 tablets PO q6h prn contains 37.5mg tramadol **Oxycodone** 2.5-5mg PO q4-6h prn (Percocet®) contains 5mg oxycodone	Caution if previous constipation or bowel obstruction with codeine Tramadol has serotonin & norepinephrine effects (consider interactions with antidepressants) – maximum dose 300mg per day Each tablet of Tylenol#3, Tramacet or Percocet contains ~ 325 mg acetaminophen

DO NOT USE:

- Muscle relaxants (Cyclobenzaprine (Flexeril®), methocarbamol (Robaxacet®, Robaxin®), diazepam
    - Use smallest dose for short time only if absolutely necessary due to risk of delirium
- Pentazocine, Meperidine
- Fentanyl Patch - do not use for opioid naïve; also is acutely not effective due to long onset of action
- Buprenorphine Patch (Butrans®) - do not use for acute pain due to long and delayed duration of action
- 222's® and 282's® (ASA with Codeine tablets)

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PNEUMONIA

Older adults require more time to develop a fever and may only increase temperature by 2.5^0 C or less
Symptoms may be non-specific (i.e. change in mental status, falls, confusion, fatigue, failure to thrive).

CLINICAL PEARLS:

- Symptoms in the elderly could include classic respiratory symptoms but often include atypical symptoms such as mental status changes, falls, increased HR, hypotension, increased or decreased temp, increased or decreased WBC
- Viral causes of community acquired pneumonia (CAP) are common – not always bacteria
- *Streptococcus pneumoniae* is still the most common pathogen for bacterial pneumonia
- Need to ensure more frequent INR monitoring if patient on warfarin and given fluoroquinolones (such as levofloxacin or moxifloxacin) or co-trimoxazole
- Moxifloxacin and clarithromycin may affect QTc – use caution in patients with other QTc prolonging medications or who have QTc > 450 msec (avoid if > 500 msec)
- Azithromycin may affect QTc but to a lesser extent than clarithromycin

TREATMENT:

- Empiric treatment of CAP for older adults is the same as for the younger adult
- May **use** ceftriaxone IV or amoxicillin-clavulanate PO as first line therapy
- Note the addition of macrolide is no longer routinely suggested unless high risk of Legionella (ie recent cruise) or severe CAP
- May use moxifloxacin (if has a severe beta lactam allergy)
- Oral moxifloxacin has good bioavailability (90%) and could be considered in patients able to swallow & functioning GI tract
- For **aspiration pneumonia** coverage of anaerobes is **controversial** and may be relevant in patients with putrid sputum, lung abscess, necrotizing pneumonitis or empyema – may also be more significant in witnessed aspiration
- Refer to current local antibiogram and Antimicrobial Stewardship Handbook on Community Acquired Pneumonia and Aspiration Pneumonia (on FHA intranet)
- Treatment duration is minimum 5 days – may discontinue after 5 days if afebrile for 48 hrs and not greater than 1 CAP-associated sign of clinical instability
- Oral antibiotics can be used for low & moderate severity CAP patients admitted to hospital

RESOURCES:

FHA Pre-Printed Orders for Pneumonia-Community Acquired

Fraser Health Antimicrobial Stewardship

Bugs and Drugs: www.bugsanddrugs.org

Spectrum App (free download http://spectrum.md/)

URINARY TRACT INFECTION

- Older adults require more time to develop a fever and temperature may only increase by less than 2.5^0 C
- Although symptoms of an infection in older patients may often be non-specific (i.e. change in mental status, falls, confusion, fatigue, failure to thrive), it is important not to treat for a UTI unless UTI symptoms present (dysuria, frequency, urgency, hematuria, and/or suprapubic pain)
- Consider treatment if symptomatic AND bacteria ≥ 100 mega CFU/L AND pyuria ≥ 10 WBCs per HPF **(don't treat asymptomatic bacteriuria)**

CLINICAL PEARLS:

- **Avoid catheterization in elderly unless absolutely necessary** – regular and frequent toileting may help prevent incontinence – create a toileting schedule
- Symptoms in the elderly could include classic urinary symptoms but often include atypical symptoms such as mental status changes, weakness, falls, new or increased incontinence, increased HR, hypotension, increased or decreased temp, increased or decreased WBC

TREATMENT:

- Obtain urinalysis and culture before antibiotic therapy initiated
- Revisit antibiotic therapy when culture available
- Refer to current local antibiogram and Antimicrobial Stewardship Handbook on Urinary Tract Infections (on FHA intranet)

EMPIRIC THERAPY for cystitis (Not urosepsis or pyelonephritis):	**Nitrofurantoin**	**Co-trimoxazole**	**Amoxicillin-clavulanate**
Usual Dose	100mg po bid	i DS tablet po bid	875/125mg po bid
Need to Adjust for Decreased Renal Function	eGFR < 40 mL/min: not effective	eGFR < 30 mL/min: 1 DS tablet daily	eGFR < 30 mL/min 500/125mg po bid
Suggested duration of therapy			
Uncomplicated (female, no urologic abnormalities, no stones, no catheter)	X 5 days	X 3 days	X 5 days
Complicated (male, urologic abnormalities, stones)	X 7 days	X 7 days	X 7 days

CATHETER-ASSOCIATED UTI:

- Consider treatment if symptomatic – first line treatment:
  - Amoxicillin-clavulanate 875/125 mg po bid x 7-10 days
  - Cefixime 400mg po daily x 7-10 days
- These patients will have high incidence of bacteriuria **(don't treat asymptomatic bacteriuria)**
- Remove and replace catheter (if it is needed) and treat empirically
- Obtain mid-stream urine specimen after catheter removed and/or replaced since bacteria may adhere to old catheter

RESOURCES

Bugs and Drugs: www.bugsanddrugs.org

Spectrum App (free download http://spectrum.md/)

Fraser Health Antimicrobial Stewardship

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APPENDIX A: ANTICHOLINERGIC SIDE EFFECTS

CLINICAL PEARL: consider cumulative effect of multiple medications

	Mild	Moderate	Severe
CNS	• Drowsiness • Fatigue • Mild amnesia • Inability to concentrate	• Excitement • Restlessness • Confusion • Memory impairment	• Profound restlessness and disorientation; Agitation • Hallucinations; Delirium • Ataxia, Muscle Twitching; Hyperreflexia; Seizures • Exacerbation of cognitive impairment (in dementia)
Eyes	• Inability to accommodate • Vision disturbances • Dizziness	• Vision disturbances • Dizziness	• Increase risk of accidents; Falls • Exacerbation of acute angle closure glaucoma
Mouth	• Dry mouth	• Disturbing dry mouth • Speech problems • Decrease Appetite	• Difficulty chewing, swallowing, and speaking • Impaired perception of taste & texture of food • Mucosal damage • Dental/periodontal disease • Malnutrition
GI		• Esophagitis • Decrease Gastric secretions • Decrease Gastric emptying • Decrease Peristalsis; Constipation	• Fecal impaction • Altered medication absorption • Paralytic ileus; Pseudo-obstruction
CVS		• Increase HR	• Conduction disturbance; SVT • Exacerbation of angina • CHF
Urinary	• Urinary hesitancy	• Urinary hesitancy	• Urinary retention; UTI
Skin	• Decrease Sweating	• Decrease Sweating	• Thermoregulatory impairment leading to hyperthermia

MEDICATIONS WITH ANTICHOLINERGIC (Ach) SIGNS & SYMPTOMS

This list is not all inclusive but includes many commonly used anticholinergic medications

Medications with Ach activity that may cause delirium		Medications with some *in vitro* Ach activity
• Tricyclic antidepressants (amitriptyline, nortriptyline, imipramine, doxepin, etc.) • Hyoscine, atropine, scopolamine • Dimenhydrinate ,Diphenhydramine Chlorpheniramine • Antipsychotics (Clozapine, Olanzapine, Prochlorperazine) • Benztropine • Oxybutynin, Darifenacin, Solifenacin • Muscarinic antagonists (Ipratropium, tiotropium,etc) • Tolterodine, Fesoterodine • Methocarbamol • Paroxetine	• Disopyramide (Rythmodan®) • Quinidine • Amantadine • Cyclobenzaprine (Flexeril®) • Meperidine • Loxapine • Belladonna • Methotrimeprazine • Hydroxyzine	• Cimetidine • Theophylline • Digoxin • Nifedipine • Furosemide • Ranitidine • Isosorbide • Warfarin • Dipyridamole (Persantine®) • Codeine • Captopril • Loratadine • Alprazolam • Risperidone, Paliperidone

RESOURCES

Rx Files: www.rxfiles.ca

Anticholinergic Burden Scale: http://www.miltonkeynesccg.nhs.uk/resources/uploads/ACB_scale_-_legal_size.pdf

APPENDIX B: EXTRAPYRAMIDAL SYMPTOMS "EPS"

WHAT DO THEY INCLUDE?

- Dystonia – involuntary sustained muscle contractions that result in twisting and repetitive movements or abnormal postures
- Akathesia – motor restlessness
- Parkinsonism – akinesia, bradykinesia
- Tardive Dyskinesia – delayed onset and may be non-reversible - involuntary movements such as lip-smacking

COMMON MEDICATIONS WHICH CAN CAUSE:

- Antipsychotics (haloperidol > loxapine > risperidone > olanzapine > quetiapine)
- Metoclopramide – dose-related – ensure dose appropriate for renal function

HOW TO TREAT?

- **In older patients, dose reduction (if clinically appropriate) or removal of the offending medication is the first line therapy**
- Although EPS can be reversed with anticholinergic medications, these may cause undesirable side effects in elderly (see Appendix - Anticholinergic Side Effects)

APPENDIX C: GERIATRIC RESOURCES

Other Geriatric Resources within FHA:

Geriatric Medicine Consult

Geriatric Emergency Nurse Clinician

Clinical Pharmacist

Delirium Watch, CAM-I scoring

FHA Intranet Resources:

VCH Antipsychotic Guidelines for BPSD Management (in depth review)

BC Guidelines (www.bcguidelines.ca)

Antimicrobial stewardship: FHA Local Antibiograms, Antimicrobial Stewardship Handbook, Spectrum App

FHA Protocols & Clinical Practice Guidelines: Alcohol Withdrawal, Community Acquired Pneumonia, Delirium (Geriatrics-Acute Care), Nicotine Replacement

Other:

STOPP Criteria for Inappropriate Medications (Screening Tool of Older Persons' potentially inappropriate Medications)

BEERS Criteria for Potentially Inappropriate Medication Use in Older Adults 2015 (American Geriatrics Society)

Geri-Rx Files: Assessing medications in older adults, First Edition. May 2014.

Choosing Wisely: https://choosingwiselycanada.org/

Abbreviations Used:

ACE	Angiotensin-converting Enzyme
ADH	Anti-Diuretic Hormone
ARB	Angiotensin II receptor blockers
COX-2	Cyclooxygenase-2
CVS	Cardiovascular System
EPS	Extrapyramidal Symptoms
NSAID	Non Steroidal Antiinflammatory Drug
OTC	Over the Counter (ie- does not require a prescription)
SSRI	Selective serotonin re-uptake inhibitors
TCA	Tricyclic Antidepressant
UTI	Urinary Tract Infection

PAH site 2017 ANTIBIOGRAM Hospital-wide

PAH site 2017 ANTIBIOGRAM Hospital-wide (% Susceptible[a])		GRAM POSITIVE												GRAM NEGATIVE																	ANO$_2$		YEAST
		Coagulase Negative Staphylococcus	*Enterococcus faecalis*	*Enterococcus faecium*	*Staphylococcus aureus* (MSSA + MRSA)	***MRSA*** (Methicillin Resistant *Staph. aureus*)	***MSSA*** (Methicillin Susceptible *Staph. aureus*)	*Staphylococcus lugdunensis*	*Streptococcus agalactiae* (Group B)	*Streptococcus anginosus group*[g]	*Streptococcus pneumoniae*[i]	*Streptococcus pyogenes* (Group A)	*Viridans group Streptococcus*[e,g]	*Acinetobacter baumannii*[a]	*Citrobacter freundii*[b,e]	*Enterobacter aerogenes*[b,e]	*Enterobacter cloacae*[b,j]	*Escherichia coli*	*Haemophilus influenzae*[j]	*Klebsiella oxytoca*	*Klebsiella pneumoniae*	*Morganella morganii*[b,e]	*Proteus mirabilis*	*Proteus vulgaris*[b,e]	*Providencia species*[b,e]	*Pseudomonas aeruginosa*	*Salmonella species*[a]	*Serratia marcescens*[b,e]	*Stenotrophomonas maltophilia*[a]	*Bacteroides fragilis group*[a]	*Clostridium species*[a]	*Candida albicans*[a]
Number of isolates		32	174	96	417	131	288	47	130	188	98	34	195	118	248	205	120	898	90	31	130	237	60	40	62	100	189	268	165	77	63	88
Penicillins	Cloxacillin	56	R	R	68	R	100	98			N	N		R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	R		
	Penicillin (IV)	N			N	R	N		100	100	100	100	83	R	R	R	R	R	N	R	R	R	R	R	R	R		R	R	R	79	
	Penicillin (Oral)										89																					
	Ampicillin/Amoxicillin	N	99	9	N	R	N		100	100	100	100	84	R	R	R	R	41	69	R	R	R	52	R	R	R	92	R	R	R			
	Amoxicillin-Clavulanate					R								R	R	R	R	84	86	97	98	R	94	R	R	R		R	R				
	Piperacillin-Tazobactam					R									N	N	N	96		97	98		100		N	94		N	R	91			
Cephalosporins	Cephalexin - 1st gen	56	R	R	68	R	100	98			N	100		R	R	R	R	50[d]	N	26[d]	92[d]	R	52[d]	R	R	R		R	R	R			
	Cefazolin - 1st gen	56	R	R	68	R	100	98			N	100		R	R	R	R	74	N	26	92	R	58	R	R	R		R	R	R			
	Cefuroxime - 2nd gen		R	R							100			R	R	R	R		86			R		R		R		R	R				
	Cefixime - 3rd gen		R	R		R					N				N	N	N	85		99	96	N	96	N	N	R		N	R	R			
	Cefotaxime / Ceftriaxone - 3rd gen		R	R		R			100	100	100	100	100		N	N	N	86	100	99	95	N	98	N	N	R	99	N	R	R			
	Ceftazidime - 3rd gen		R	R		R					N	N			N	N	N					N		N	N	94		N		R			
Carbapenems	Ertapenem - restricted		R	R		R								R	98	99	98	99		99	99	99	99	99	99	R		99	R				
	Imipenem - restricted			N		R																				94			R	96	92		
	Meropenem - restricted		N	N		R								97	98	99	99	99		99	99	99	99	99	99	97		99	R	91	100		
AMGs	Gentamicin	N			N	N	N				R	R	N	97	96	100	98	90	N	97	98	85	98	98	79	93		100	R	R			
	Tobramycin	N	R	R	N	N	N				R	R	N	97	94	97	98	88	N	100	98	89	98	100	79	99		83	R	R			
	Amikacin	N	R	R	N	N	N				R	R	N	97	100	100	100	100	N	100	99	100	100	100	100	98		100	R	R			
FQs	Ciprofloxacin	N	56[d]	6[d]	N	N	N				N	N		96	95	95	98	76	100	100	97	84	98	98	90	84	76	98	R	R			
	Levofloxacin		60[d]	6[d]					100[d]		99								100										89				
	Moxifloxacin	N	N	N	N	N	N				99			N	N	N	N	N	100	N	N	N	N	N	N	N	N	N	N	R			
Miscellaneous	Erythromycin[f]	56			55	11	76	89	50		86	77		R	R	R	R	R		R	R	R	R	R	R	R		R	R	R			
	Clindamycin	69	R	R	70	47	81	89	48	71	93	77	50	R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	45	47		
	Tetracycline[h]	84	22[d]	9[d]	94	87	97				90											R	R	R	R			98[d]				
	Linezolid - restricted	100	95	100	100	99		100						R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	R			
	Metronidazole	R	R	R	R	R	R				R	R		R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	99	100		
	Nitrofurantoin-simple cystitis only[d]	100	99	17	99	99	100				R	N		R	92	15	54	97	R	74	40	R	R	R	R	R		R	R	R			
	TMP-SMX or Cotrimoxazole	84	R	R	91	92	91	100			87	R		97	88	96	96	76		100	93	77	88	90	90	R	97	100	98	R			
	Vancomycin	100	99	49	100	100	100	100	100	100	100	100	100	R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	R			
	Fosfomycin[i]																	99		96	94		86										
	Fluconazole																															100	
	Micafungin - restricted																															100	

This susceptibility chart is provided as a guide to empiric therapy until culture and susceptibility results are available.

KEY

R = Intrinsically resistant

= Susceptibility not tested

N = Not recommended

NOTES:

a. This antibiogram includes only the first isolate of a specific organism from any patient.

b. *Serratia, Providencia, Morganella, Citrobacter freundii, Enterobacter, and P. vulgaris* carry inducible cephalosporinases (AmpC) that cause *in-vivo* resistance to 3rd generation cephalosporins.

c. Susceptibility for *S. maltophilia* represents minocycline.

d. For urinary tract isolates only.

e. Combined from all FH sites.

f. Susceptibility to erythromycin for these organisms is the same as for azithromycin/ clarithromycin.

g. Excluding *Streptococcus anginosus group.*

h. Organisms susceptible to tetracycline are also susceptible to doxycycline. However, some organisms that are nonsusceptible to tetracycline may be susceptible to doxycycline.

i. Fosfomycin testing was calculated from a limited number of *E. coli* (n=7245), *K. oxytoca* (n=207), *K. pneumoniae* (n=944), and *P. mirabilis* (n=508) isolates from all FH sites.

j. Combined with Rest of FH

Developed by:
Dr. Neil Mina, FH Medical Microbiologist and
Bryna Yao, FH Regional LIS Coordinator

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Residential Care Locations All Fraser Health sites 2017 ANTIBIOGRAM Hospital-wide

Residential Care Locations All Fraser Health sites 2017 ANTIBIOGRAM Hospital-wide (% Susceptible[a])		GRAM POSITIVE				GRAM NEGATIVE			
		Enterococcus faecalis	*Staphylococcus aureus* (MSSA + MRSA)	***MRSA*** (Methicillin Resistant *Staph. aureus*)	***MSSA*** (Methicillin Susceptible *Staph. aureus*)	*Escherichia coli*	*Klebsiella pneumoniae*	*Proteus mirabilis*	*Pseudomonas aeruginosa*
Number of Isolates		77	233	108	125	368	68	150	80
Penicillins	Cloxacillin	R	54	R	100	R	R	R	R
	Penicillin (IV)		N	R	N	R	R	R	R
	Penicillin (Oral)								
	Ampicillin/Amoxicillin	99	N	R	N	22	R	46	R
	Amoxicillin-Clavulanate			R		75	94	95	R
	Piperacillin-Tazobactam			R		93	97	99	94
Cephalosporins	Cephalexin - 1st gen	R	54	R	100	29[b]	91[b]	48[b]	R
	Cefazolin - 1st gen	R	54	R	100	63	94	54	R
	Cefuroxime - 2nd gen	R							R
	Cefixime - 3rd gen	R		R		73	94	95	R
	Cefotaxime / Ceftriaxone - 3rd gen	R		R		76	94	96	R
	Ceftazidime - 3rd gen	R		R					93
Carbapenems	Ertapenem - restricted	R		R		99	99	99	R
	Imipenem - restricted			R					83
	Meropenem - restricted	N		R		99	99	99	83
AMGs	Gentamicin		N	N	N	88	99	89	91
	Tobramycin	R	N	N	N	81	93	89	100
	Amikacin	R	N	N	N	99	100	98	99
FQs	Ciprofloxacin	36[b]	N	N	N	44	94	66	85
	Levofloxacin	38[b]							
	Moxifloxacin	N	N	N	N	N	N	N	N
Miscellaneous	Erythromycin[c]		46	15	72	R	R	R	R
	Clindamycin	R	58	32	80	R	R	R	R
	Tetracycline[d]	23[b]	89	85	93			R	R
	Linezolid - restricted	96	100	99		R	R	R	R
	Metronidazole	R	R	R	R	R	R	R	R
	Nitrofurantoin-simple cystitis only[b]	99	98	99	98	93	37	R	R
	TMP-SMX or Cotrimoxazole	R	97	99	96	71	96	63	R
	Vancomycin	97	100	100	100	R	R	R	R

This susceptibility chart is provided as a guide to empiric therapy until culture and susceptibility results are available.

KEY

R = Intrinsically resistant

= Susceptibility not tested

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NOTES:

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d. Organisms susceptible to tetracycline are also susceptible to doxycycline. However, some organisms that are nonsusceptible to tetracycline may be susceptible to doxycycline.

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Residential Care Locations:

CG Bradley Centre
CZ Pansy Lane
DH Mountain View Manor North
DH Mountain View Manor South
ER Forest View Manor - ECU
ER Hillside Manor - ECU
FC Fraser Hope Lodge
FC Fraser Hope Lodge A
FL Alder
FL Arbutus-Willow
FL Birch
FL Cedar
FL Cypress
FL Maple
FL Pine
FL Spruce
FL Willow
HV Aquadel
HV Cheam
HV Greendale
HV Manning
HV Rosedale
LM Cedar Hill Centre Ext Care
LM Cedar Hill Centre West - CC
LM Maple Hill Centre Ext Care
LM Maple Hill Centre - Hospice
LM Marrwood Central Ext Care
LM Marrwood South Ext Care
LM Rosewood Centre Ext Care
MM Residence - Cedar Hub
MM Residence - Cherry Hub
MM Residence - Deroche Hub
MM Residence - Dewdney Hub
MM Residence - Fern Hub
MM Residence - Hatzic Hub
MM Residence - Silver Hub
MM Residence - Stave Hub
MS Cottage Pavilion Ext Care
MS Worthington Pav Ext Care
MS Worthington 1W General Rehab
PA Finlay Pavilion 1 -Ext
PA Finlay Pavilion 2 -Ext
PA Finlay Pavilion 3 -Ext
PA Weatherby Pavilion 1 -Ext
PA Weatherby Pavilion 2 -Ext
PA Weatherby Pavilion 3 -Ext
QP 2 East
QP 2 West
QP 3 East
QP 3 East Respite
QP 3 West General Rehab
QP William Rudd
RM Baillie House Albion Flats
RM Baillie House Haney Lane
RM Baillie House Millers Pond
RM Baillie HOuse Ruskin Hill
RM Baillie House Websters Corn
YR 2 Holland Park
YR 3 Whalley View
YR 5 Cedar Hills Park
YR 6 Bear Creek Park

Link: [Fraser Health Antimicrobial Stewardship]

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