

# Geriatric Prescribing in the Emergency Patient

*The intent of this flipchart is as 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.*

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# ANXIETY - ACUTE

## IS DRUG WITHDRAWAL CAUSING ANXIETY?

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

## MEDICATION WHICH MAY CAUSE ANXIETY SYMPTOMS UPON WITHDRAWAL:

- Anticholinergics
- SSRIs (citalopram, paroxetine, sertraline, etc.)
- TCAs (amitriptyline, nortriptyline, imipramine, doxepin, etc.)
- Trazodone (particularly higher doses)
- Alcohol
- Hypnotics (less frequently with zopiclone, zolpidem)
- Benzodiazepines
- Opioids

## 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)

- Carbamazepine
- **Digoxin (toxicity)**
- Felodipine
- Isoniazid
- **Levodopa (Sinemet®, Prolopa® and other dopamine agonists) – related to resurgence of symptoms**
- **Levothyroxine (if dose too high)**
- **Methylphenidate (Ritalin®), pseudoephedrine, caffeine**
- NSAIDs
- Prednisone
- Quinolones (such as ciprofloxacin, moxifloxacin, levofloxacin)
- **Salbutamol (and salmeterol, formoterol (Berotec®) and terbutaline)**
- SSRIs – particularly **fluoxetine (Prozac®)**
- **Theophylline**

## SHORT-TERM ACUTE MANAGEMENT:

- Maximize use of non-pharmacological approaches
- Elderly 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 up to maximum BID PRN
- **Lorazepam** 0.5 mg po up to maximum BID PRN

### DO NOT USE:

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>▪ Diazepam</li><li>▪ Chlordiazepoxide</li><li>▪ Flurazepam</li></ul> | <ul style="list-style-type: none"><li>▪ Alprazolam (Xanax®)</li><li>▪ Buspirone (Buspar®)</li></ul> |
|--|---|

# DELIRIUM - CAUSES

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

## PRISM-E:

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

<b>P</b>	<ul style="list-style-type: none"><li>▪ PAIN</li></ul>
<b>R</b>	<ul style="list-style-type: none"><li>▪ RESTRAINT</li><li>▪ RETENTION</li></ul>
<b>I</b>	<ul style="list-style-type: none"><li>▪ INFECTION</li></ul>
<b>S</b>	<ul style="list-style-type: none"><li>▪ SENSORY IMPAIRMENT</li><li>▪ SLEEPLESSNESS</li></ul>
<b>M</b>	<ul style="list-style-type: none"><li>▪ MEDICATION (new, withdrawal or change in dose)</li><li>▪ METABOLIC</li></ul>
<b>E</b>	<ul style="list-style-type: none"><li>▪ ENVIRONMENT</li><li>▪ EMOTIONS</li></ul>

## MEDICATIONS ASSOCIATED WITH DELIRIUM:

- *Often dose related*
- *Includes non-prescription as well as prescription medications*
- *Consider with any medication change (not just listed below)*
  
- **Alcohol**
- **Anticonvulsants** (such as phenytoin, carbamazepine, gabapentin)
- **Anticholinergics** (such as benztropine, scopolamine)
- **Antidepressants** (including SSRIs and particularly TCAs such as amitriptyline)
- **Antiemetics** (such as dimenhydrinate (Gravol®), meclizine)
- **Antihistamines sedating** – (such as chlorpheniramine (Chlortripolon®), diphenhydramine (Benadryl®))
- **Antiparkinsonian Meds** which contain levodopa (such as Sinemet®, Prolopa®)
- **Antipsychotics** (such as olanzapine, quetiapine, risperidone, methotrimeprazine (Nozinan®), loxapine)
- **Benzodiazepines**
- **Corticosteroids** (more common with higher doses)
- **Digoxin** (with high levels/doses)
- **Gastrointestinal medications** (particularly cimetidine)
- **Muscle relaxants** (such as cyclobenzaprine (Flexeril®), methocarbamol (Robaxin®), baclofen)
- **Narcotics** (particularly meperidine, pentazocine, propoxyphene)
- **NSAIDs** (most common with indomethacin, sulindac)
- **Urinary antispasmodics** (such as oxybutynin, tolterodine (Detrol®), solifenacin (Vesicare®))

# DELIRIUM & AGITATION - TREATMENT

## CLINICAL PEARLS:

- Use non-pharmacological approach if able (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.

## 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 QT interval - Symptoms of QT prolongation:** dizziness, fainting, palpitation, nausea, vomiting; evident on ECG

MEDICATION	DOSE – (unless patient on established regimen already)
<b>Risperidone</b> <i>*NOTE: Dissolvable tablet available</i>	0.125 to 0.25 mg daily to bid prn PO/SL <ul style="list-style-type: none"> <li>▪ avoid total doses greater than 2 mg/day</li> </ul>
<b>Olanzapine (Zyprexa®)</b> <i>*NOTE: Dissolvable tablet available</i>	1.25 to 2.5mg q4h prn PO/SL <ul style="list-style-type: none"> <li>▪ avoid total doses greater than 10 mg/day</li> </ul>
<b>Quetiapine (Seroquel®)</b>	6.25 to 12.5 mg PO q4h prn <ul style="list-style-type: none"> <li>▪ avoid total doses greater than 50 mg/day</li> </ul>
<b>Haloperidol</b>	0.25 to 0.5 mg q2 to 3 h prn PO/IM/SC/IV <ul style="list-style-type: none"> <li>▪ avoid total doses greater than 2 mg/day (may use up to 1 mg in larger “younger” elderly)</li> </ul>
<b>Loxapine</b>	2.5 mg PO/IM/SC q4h prn up to 10 mg per 24 hours <ul style="list-style-type: none"> <li>▪ may be alternative for patients not responding to above agents (limited evidence for first-line use)</li> <li>▪ note risk of medication error with injectable form due to high concentration formulation</li> </ul>

**Note:** There is a “black box” warning on the newer antipsychotic agents – suggest review with family regarding increased risk of CVD and pneumonia if used in patients with pre-existing dementia.

## MONITOR:

- Improvement in target symptoms
- Sit to stand BP daily x 3 days
- Patients with cardiac history, other medications which may cause QT interval prolongation, may require ECG monitoring

# DRUG WITHDRAWAL

## CLINICAL PEARLS:

- Withdrawal symptoms often manifest after large dose reductions or abrupt discontinuations after prolonged use
- This may be important if your elderly 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:

<b>CNS</b>	<b>AUTONOMIC</b>	<b>OTHER</b>
<ul style="list-style-type: none"><li>• Agitation, Anxiety</li><li>• Depression</li><li>• Dizziness</li><li>• Dysphoric mood</li><li>• Grand mal seizures</li><li>• Hypersomnia (withdrawal from stimulants)</li><li>• Insomnia</li><li>• Psychotic symptoms</li><li>• Restlessness</li><li>• Hallucinations</li><li>• Vivid dreams</li></ul>	<ul style="list-style-type: none"><li>• Autonomic hyperactivity</li><li>• Tachycardia (HR &gt; 100)</li><li>• Diarrhea</li><li>• Fever</li><li>• Nausea &amp; Vomiting</li><li>• Piloerection</li><li>• Pupillary dilation</li><li>• Sweating</li><li>• Tremor</li></ul>	<ul style="list-style-type: none"><li>• Fatigue</li><li>• Increased appetite</li><li>• Lacrimation, rhinorrhea</li><li>• Malaise</li><li>• Myalgias</li><li>• Psychomotor agitation or retardation</li><li>• Yawning</li></ul>

## MEDICATIONS:

- Alcohol
- Antidepressants (all classes)
- Antipsychotics (all classes and generations)
- Barbiturates (i.e.: Fiorinal®)
- Benzodiazepines
- Beta blockers
- Clonidine
- Nicotine
- Non-prescription medications (such as dimenhydrinate (Gravol®), diphenhydramine (Benadryl®), chlorpheniramine (Chlortripolon®), scopolamine)
- 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 reinstated, will need to withdraw more gradually than in a younger patient
- For alcohol withdrawal – use lower doses of lorazepam to control withdrawal symptoms with CIWA protocol (consider 1-2 mg instead of 2-4 mg on protocol)
- For nicotine withdrawal, may use patches, lozenges and gum

# ELECTROLYTE IMBALANCES

## HYPONATREMIA – MEDICATION CAUSES:

- Antihypertensives: ACE inhibitors, clonidine, methyldopa, **thiazide diuretics** (HCTZ, chorthalidone, indapamide), furosemide
- Antidepressants: **SSRIs** (citalopram, escitalopram, sertraline, fluoxetine, paroxetine, fluvoxamine), TCAs (amitriptyline, nortriptyline, imipramine, doxepin, etc.), MAOIs (tranylcypromine), bupropion, duloxetine, mirtazapine, venlafaxine, trazodone
- Antineoplastics (chemo meds)
- ADH analogues (desmopressin (DDAVP®))
- NSAIDs
- Opioids
- Anticonvulsants (carbamazepine, levetiracetam (Keppra®), valproic acid)
- Antiparkinson meds (amantadine, levodopa, pramipexole (Mirapex®))
- Antiarrhythmics: amiodarone, propafenone
- Clofibrate (Lopid®)
- Sulfonyleurea Hypoglycemics (i.e. tolbutamide, chlorpropamide, glyburide, glimepiride)
- Antipsychotics (may be due to effects on dopamine levels)
- Tacrolimus

## HYPERKALEMIA - MEDICATION CAUSES:

- ACE inhibitors (enalapril, fosinopril, perindopril, ramipril, trandolapril, etc.)
- ARBs (candesartan, valsartan, irbesartan, etc.)
- Amiloride; Triamterene
- Spironolactone
- K supplements (including salt-substitutes)
- NSAIDs
- Co-trimoxazole (Septra® or Bactrim®) (specifically the trimethoprim component)
- Cyclosporine
- Tacrolimus
- Pentamidine
- Digoxin (in acute toxicity)
- Herbal Supplements: licorice root, dandelion

## HYPOKALEMIA - MEDICATION CAUSES:

- Diuretics: thiazides (hydrochlorothiazide, chlorthalidone, indapamide), furosemide, ethacrynic acid, metolazone
- Beta agonists (high dose) such as salbutamol, salmeterol & terbutaline
- Penicillin (high dose)
- Sorbitol (often found in liquid medications including acetaminophen)
- Laxatives (in general)
- Insulin overdose
- Sodium Polystyrene Sulfonate (Kayexalate®) overuse
- Corticosteroids

# FALLS

## HOW CAN MEDS INCREASE RISK OF FALLS?

- Dizziness
- Orthostatic or postural hypotension
- Drowsiness
- Confusion, “muddling”
- Parkinsonian symptoms
- Balance and gait disturbances
- Changes in vision (blurred, double vision, halos)
- Impact on bladder, bowels

## CLINICAL PEARLS

- 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 med changes - dose changes, additions, discontinuations

## WHAT MEDS CAN INCREASE RISK OF FALLS?

- **More than 3 - 5 prescription concomitant meds** (regardless of type of med) increases risk of falls
- **Psychoactive or psychotropic drugs**
  - Antidepressants (TCAs, SSRIs, etc.)
  - Antipsychotics (haloperidol, loxapine, risperidone, olanzapine, quetiapine)
  - Sedative/hypnotics (benzodiazepines, zopiclone, OTC sleep aids)
  - Antihistamines (diphenhydramine (Benadryl®), dimenhydrinate (Gravol®))
  - Anticonvulsants (including gabapentin, phenytoin)
- **Alcohol** (more than 1 or 2 drinks/day)
- **Analgesics** (opioids/narcotics, NSAIDs)
- **Muscle relaxants** (methocarbamol (Robaxin®), cyclobenzaprine (Flexeril®))
- **Cardiovascular meds**
  - Antihypertensives
  - Antiarrhythmias
  - Diuretics



# INSOMNIA

## CLINICAL PEARLS:

- Address other causes of insomnia, such as nocturia or pain, before automatically giving a sleeping pill
- Ask about caffeine and stimulant use (such as in oral decongestants)
- Ask about OTC sleep aids such as Nytol® (diphenhydramine) - Avoid use (refer to “Do not use” info, below)
- If chronic, regular sedative used, continue current medication to avoid withdrawal
- Antipsychotics are not recommended for use solely as a sedative/hypnotic

## IS YOUR PATIENT CONFUSED?

- Confusion in an elderly patient may be a symptom of withdrawal from a sedative or alternatively due to the sedative itself

## WHAT SHOULD YOU USE FOR YOUR GERIATRIC PATIENT?

- Reserve for situations where poor quality sleep or daytime functioning are affected
- If a patient does not currently use a sleeping pill
  - Use the smallest dose possible
  - Use HS PRN only (don't automatically give)

MEDICATION	COMMENTS
<b>Zopiclone</b> 3.75 mg po HS PRN	May repeat 3.75 mg dose in 1 hour if unable to sleep <i>Health Canada Warning November 2014: maximum dose in elderly is 5mg nightly</i>
<b>Benzodiazepines</b>  <b>Lorazepam</b> 0.5 mg po HS PRN  <b>Oxazepam</b> 7.5 to 10 mg po HS PRN	Use only for patients intolerant to zopiclone, using at home regularly or if otherwise clinically indicated  <ul style="list-style-type: none"> <li>▪ <i>older adults are more sensitive to the effects of benzodiazepines on the CNS &amp; more prone to side effects (such as confusion, amnesia, decreased daytime ability and mobility, cognitive impairment)</i></li> </ul>
<b>Trazodone</b> 25 mg po HS	May be helpful if agitation is contributing to insomnia Note: may cause dizziness, postural hypotension at higher doses in elderly

## DO NOT USE:

▪ <b>Antidepressants</b> amitriptyline & other tricyclic antidepressants, mirtazapine ( <b>these are not indicated for sleep alone</b> )
▪ <b>Barbiturates</b> – long acting and high rate of physical dependence
▪ <b>Non-Prescription Medications (mostly antihistamine)</b> dimenhydrinate (Gravol®), diphenhydramine (Benadryl®, Nytol®, Sleep-Eze®, Sominex®, Unisom®, Tylenol Nighttime®)
▪ <b>Antipsychotic Medications</b> haloperidol, quetiapine (Seroquel®), risperidone, olanzapine
▪ <b>Longer-acting Benzodiazepines</b> flurazepam, bromazepam, alprazolam, diazepam, chlordiazepoxide, clonazepam
▪ <b>Ultra-short acting Benzodiazepines</b> triazolam (Halcion®), midazolam
▪ <b>Zolpidem</b> – may cause complex sleep behaviours and has insufficient evidence in elderly

# 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 med 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 meds may be delayed and unpredictable in elderly (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):

- Antibiotics
- Antidepressants
- Cholinesterase inhibitors (such as Donepezil, Galantamine, Rivastigmine)
- Cytotoxics (Chemotherapy) and radiation
- Iron
- NSAIDs
- Opioids
- Potassium
- Theophylline

Nausea more likely with chronic use, high doses, or toxicity

- Anticonvulsants
- Digoxin
- Opioids
- Theophylline

## MEDICATION WITHDRAWAL CAUSING NAUSEA & VOMITING:

- Opioids
- Benzodiazepines
- Alcohol

## MEDICATION MANAGEMENT:

CAUSE	COMMENTS	MEDICATION
<b>Chemically Induced (Medications or Toxins)</b>	Tolerance to N&V from medications develops quickly – may only need short course of anti-emetic	<b>Dimenhydrinate</b> (Gravol®) 12.5 to 25 mg PO/IV/SC q6h prn <b>Prochlorperazine</b> (Stemetil®) 2.5 to 5 mg PO q8h prn
<b>Opioid-induced</b>		
<b>GI dysmotility</b> <b>If bowel obstruction suspected: AVOID prokinetic agents</b>	May be caused by drugs such as opioids or anticholinergics	<b>Metoclopramide</b> 5 to 10 mg q6 to 8h PO/SC/IV prn <b>Domperidone</b> 5 to 10 mg PO q6 to 8h prn <b>Ondansetron</b> 4 mg PO/IV q8 to 12h prn
<b>Vertigo</b>	Often see autonomic symptoms such as pallor, diaphoresis, salivation as well	No optimal agents available Could trial: <b>Dimenhydrinate</b> 12.5 to 25 mg PO/IV/SC q6h prn <u>OR</u> <b>Betahistine</b> (Serc®) 8 mg PO TID PRN
<b>GERD/Irritation</b>	May be caused by drugs such as ASA, NSAIDs, iron, potassium, some antibiotics, alcohol	<b>Antacid</b> 15-30 mL QID PRN <u>H2 antagonist</u> – <b>Ranitidine</b> 150 mg PO BID or 50 mg IV q12h <u>PPI</u> – <b>Pantoprazole</b> 40 mg PO daily
<b>Chemotherapy Induced</b>		<b>Ondansetron</b> 4 to 8 mg PO/IV q12h prn +/- <b>Dexamethasone</b> 4 mg PO/IV q12h

## PAIN - ACUTE

### 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?

- **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 <b>Ibuprofen</b> 200 to 400mg PO q6-8h prn <b>Diclofenac</b> 50 mg PO or PR q12h prn <b>Naproxen</b> 250 mg PO or PR q8h prn <b>Ketorolac</b> IV 15mg q6h prn  <b>Celecoxib</b> 100mg daily to BID	AVOID in patients with : <ul style="list-style-type: none"> <li>▪ Hypertension</li> <li>▪ CHF</li> <li>▪ Renal impairment (eGFR &lt; 60)</li> <li>▪ Gastic reflux or GERD</li> <li>▪ Past GI bleed</li> </ul> Naproxen possibly a safer cardiac option NSAIDS may cause confusion (rarely) May cause dizziness, vertigo, drowsiness, headache in increasing order of frequency: <b>Ibuprofen &lt; Diclofenac &lt; Naproxen &lt; Ketorolac &lt; Indomethacin</b> COXIBs have equal efficacy and similar renal/CV toxicity to other NSAIDs
<b>Fentanyl</b> 12.5 to 25 mg IV/SC q2-3h prn	Very short duration of action
<b>Tylenol #3® tablets</b> 1 to 2 tablets q4 to 6h prn	Caution if previous constipation or bowel obstruction with codeine
<b>Oxycodone</b> 2.5-5mg PO q4-6h prn (Percocet®) contains 5mg oxycodone	Each tablet of Tylenol#3 or Percocet contains ~ 325 mg acetaminophen

### RARELY APPROPRIATE:

Muscle relaxants

(Cyclobenzaprine (Flexeril®), methocarbamol (Robaxacet®, Robaxin®), diazepam

- Use smallest dose for short time only

### DO NOT USE:

- Pentazocine
- Meperidine
- Fentanyl Patch -do not use for opioid naïve and 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

# PNEUMONIA

Elderly patients require more time to develop a fever and may only increase temperature by 2.5<sup>0</sup> 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
- *Strep pneumo* is still the most common pathogen for bacterial pneumonia
- Viral causes of community acquired pneumonia (CAP) is common – not always bacteria
- Need to ensure more frequent INR monitoring if patient on warfarin and given fluoroquinolones (such as levofloxacin or moxifloxacin) or co-trimoxazole (Septra® or Bactrim®)
- 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:

- Don't use same class of medication if patient has received in the past 3 months
- Empiric treatment of CAP for elderly patients is the same as for the younger adult
- May use ceftriaxone IV or amoxicillin-clavulanate PO with Macrolide or Doxycycline (i.e. if patient had received no antibiotic or has received any fluoroquinolone in past 3 months)
- May use moxifloxacin (if cephalosporin and/or macrolide used in past 3 months)
- Oral moxifloxacin has good bioavailability (90%) and could be considered in clinically stable patients able to swallow
- For patients in whom a UTI may also be suspected: moxifloxacin and macrolides have limited urinary effects and alternative choices may be superior
- For **aspiration pneumonia** coverage of anaerobes is **controversial** and may have been overemphasized in the past. May be beneficial in patients with poor oral hygiene, poor dentition, and with putrid sputum - may be more significant in witnessed aspiration and/or recent abdominal surgery
- Refer to current local antibiogram (available on FHA intranet)
- Treatment duration typically 7 to 14 days – may stepdown to oral therapy before 7 days to complete course of therapy (after afebrile 48-72 hours)
- Pneumonia due to *Klebsiella* may require 14 days therapy

# URINARY TRACT INFECTION

Elderly patients require more time to develop a fever and may only increase by less than 2.5<sup>0</sup> C  
Symptoms may often be non-specific (i.e. change in mental status, falls, confusion, fatigue, failure to thrive)

## CLINICAL PEARLS:

- Obtain urinalysis and culture if suspected
- 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
- Consider treatment if symptomatic AND bacteria  $\geq 100$  mega CFU/L AND pyuria  $\geq 10$  WBCs per HPF (don't treat asymptomatic bacteriuria)
- Some consider 10 mega CFU/L as the cut-off for treatment in symptomatic elderly patients
- Need to ensure more frequent INR monitoring if patient on warfarin and given fluoroquinolones (i.e. - ciprofloxacin) or co-trimoxazole

## TREATMENT:

- Consider ciprofloxacin, co-trimoxazole (Septra® or Bactrim®) or nitrofurantoin (Macrobid®) (if eGFR greater than 40mL/min) as first line agents
- Nitrofurantoin not effective if eGFR less than 40 mL/min
- Nitrofurantoin requires a 7 day course
- Nitrofurantoin may be less effective in older males due to potential prostate involvement (unable to get high enough tissue concentration)
- Ciprofloxacin and co-trimoxazole can be given for 3 to 5 days in uncomplicated cases
- Moxifloxacin not effective for UTI as not enough gets into the urine
- Be familiar with local antibiogram (available on FHA Intranet)
- Male patients with prostatitis may require longer duration of therapy

## CATHETER-ASSOCIATED UTI:

- Consider treatment if symptomatic (as above)
- 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 urine specimen after catheter removed and/or replaced since bacteria may adhere to old catheter
- Minimum treatment duration of 7 days (usually 10 to 14 days)

## APPENDIX A: ANTICHOLINERGIC SIDE EFFECTS

	Mild	Moderate	Severe
<b>CNS</b>	<ul style="list-style-type: none"> <li>• Drowsiness</li> <li>• Fatigue</li> <li>• Mild amnesia</li> <li>• Inability to concentrate</li> </ul>	<ul style="list-style-type: none"> <li>• Excitement</li> <li>• Restlessness</li> <li>• Confusion</li> <li>• Memory impairment</li> </ul>	<ul style="list-style-type: none"> <li>• Profound restlessness and disorientation; Agitation</li> <li>• Hallucinations; Delirium</li> <li>• Ataxia, Muscle Twitching; Hyperreflexia; Seizures</li> <li>• Exacerbation of cognitive impairment (in dementia)</li> </ul>
<b>Eyes</b>	<ul style="list-style-type: none"> <li>• Inability to accommodate</li> <li>• Vision disturbances</li> <li>• Dizziness</li> </ul>	<ul style="list-style-type: none"> <li>• Vision disturbances</li> <li>• Dizziness</li> </ul>	<ul style="list-style-type: none"> <li>• Increase risk of accidents; Falls</li> <li>• Exacerbation of acute angle closure glaucoma</li> </ul>
<b>Mouth</b>	<ul style="list-style-type: none"> <li>• Dry mouth</li> </ul>	<ul style="list-style-type: none"> <li>• Disturbing dry mouth</li> <li>• Speech problems</li> <li>• Decrease Appetite</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulty chewing, swallowing, and speaking</li> <li>• Impaired perception of taste &amp; texture of food</li> <li>• Mucosal damage</li> <li>• Dental/periodontal disease</li> <li>• Malnutrition</li> </ul>
<b>GI</b>		<ul style="list-style-type: none"> <li>• Esophagitis</li> <li>• Decrease Gastric secretions</li> <li>• Decrease Gastric emptying</li> <li>• Decrease Peristalsis; Constipation</li> </ul>	<ul style="list-style-type: none"> <li>• Fecal impaction</li> <li>• Altered medication absorption</li> <li>• Paralytic ileus; Pseudo-obstruction</li> </ul>
<b>CVS</b>		<ul style="list-style-type: none"> <li>• Increase HR</li> </ul>	<ul style="list-style-type: none"> <li>• Conduction disturbance; SVT</li> <li>• Exacerbation of angina</li> <li>• CHF</li> </ul>
<b>Urinary</b>	<ul style="list-style-type: none"> <li>• Urinary hesitancy</li> </ul>	<ul style="list-style-type: none"> <li>• Urinary hesitancy</li> </ul>	<ul style="list-style-type: none"> <li>• Urinary retention; UTI</li> </ul>
<b>Skin</b>	<ul style="list-style-type: none"> <li>• Decrease Sweating</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease Sweating</li> </ul>	<ul style="list-style-type: none"> <li>• Thermoregulatory impairment leading to hyperthermia</li> </ul>

### WHAT MEDICATIONS CAN CAUSE ANTICHOLINERGIC (Ach) SIGNS AND SYMPTOMS?

Medications with Ach mechanism of action	Medications with Ach side effects	Medications with some <i>in vitro</i> Ach activity
<ul style="list-style-type: none"> <li>• Hyoscine (Buscopan®)</li> <li>• Dimenhydrinate (Gravol®)</li> <li>• Prochlorperazine (Stemetil®)</li> <li>• Benztropine (Cogentin®)</li> <li>• Trihexyphenidyl (Artane®)</li> <li>• Belladonna</li> <li>• Oxybutynin (Ditropan®)</li> <li>• Flavoxate (Urispas®)</li> <li>• Atropine</li> <li>• Ipratropium (Atrovent®)</li> <li>• Tiotropium (Spiriva®)</li> </ul>	<ul style="list-style-type: none"> <li>• Disopyramide (Rythmodan®)</li> <li>• Quinidine</li> <li>• Diphenhydramine (Benadryl®)</li> <li>• Cyclobenzaprine (Flexeril®)</li> <li>• Tricyclic antidepressants (amitriptyline, nortriptyline, imipramine, doxepin, etc.)</li> <li>• Chlorpromazine, fluphenazine (Modecate®)</li> <li>• Meperidine (Demerol®)</li> </ul>	<ul style="list-style-type: none"> <li>• Cimetidine</li> <li>• Theophylline</li> <li>• Digoxin</li> <li>• Nifedipine</li> <li>• Furosemide</li> <li>• Ranitidine</li> <li>• Isosorbide</li> <li>• Warfarin</li> <li>• Dipyridamole (Persantine®)</li> <li>• Codeine</li> <li>• Captopril</li> <li>• Dyazide®</li> </ul>

# APPENDIX B: EXTRAPYRAMIDAL SYMPTOMS “EPS”

## WHAT DO THEY INCLUDE?

- Dystonia – involuntary sustained muscle contractions that result in twisting and repetitive movements or abnormal postures
- Akathisia – 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

## HOW TO TREAT?

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

# APPENDIX C: GERIATRIC RESOURCES

## OTHER GERIATRIC RESOURCES WITHIN FHA:

Geriatric Medicine Consult  
Geriatric Emergency Nurse Clinician  
Clinical Pharmacist  
Delirium Watch

## FHA INTRANET RESOURCES:

Appropriate Use of Drugs in the Elderly (Jan 2010)  
FHA Clinical Education – Detecting the 3 D's  
VCH Antipsychotic Guidelines for BPSD Management (in depth review)  
BC Guidelines ([www.bcguidelines.ca](http://www.bcguidelines.ca))

FHA Local Antibiograms:

- [Fraser East \(ARH, CCH, FCH, MMH\) Antibiogram](#)
- [Fraser North \(BH, ERH, RCH, RMH\) Antibiogram](#)
- [Fraser South \(DH, JPOCSC, LMH, PAH, SMH\) Antibiogram](#)

FHA Protocols: CIWA Alcohol withdrawal, Pneumonia, Delirium

## OTHER:

STOPP Criteria for Inappropriate Medications (Screening Tool of Older Persons' potentially inappropriate Medications) - <http://www.em-consulte.com/en/module/displayarticle/article/245669/tableau/tbl3>

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

## ABBREVIATIONS USED:

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

*"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)*



# FRASER EAST ANTIBIOGRAM

ARH, CGH, FCH, MMH  2013 ANTIBIOGRAM (% Susceptible <sup>a</sup> )		GRAM POSITIVE							GRAM NEGATIVE							Bacteroides fragilis group <sup>b</sup>	53	This susceptibility chart is provided as a guide to empiric therapy until culture and susceptibility results are available.
		Staphylococcus aureus (MSSA + MRSA)	MRSA (Methicillin Resistant Staph. aureus)	MSSA (Methicillin Susceptible Staph. aureus)	Coagulase Negative Staphylococcus	Streptococcus - Group A	Streptococcus pneumoniae	Enterococcus spp	Escherichia coli	Klebsiella spp	Proteus mirabilis	SPICE Organisms <sup>b</sup>	Pseudomonas aeruginosa	Stenotrophomonas maltophilia	Acinetobacter spp			
Number of Isolates		1484	469	1025	218	110	92	938	3755	597	202	403	247	30	39	133		
Penicillins	Cloxacillin	69	R	99	50	N	N	R	R	R	R	R	R	R	R	R	R	
	Penicillin	N	R	N	N	100	99	80	R	R	R	R	R	R	R	N	R	
	Ampicillin	N	R	N	N	100	99	86	44	R	45	R	R	R	R	87	R	
	Amoxicillin/Clavulanate	69	R	99	50	100	99	86	86	94	93	R	R	R	R	S		
	Piperacillin/Tazobactam	69	R	99	50	100	99	86	96	96	99	N <sup>e</sup>	91	R	90	S	91	
Cephalosporins	Cephalexin - 1st gen	69	R	99	50	100	N	R	52 <sup>a</sup>	80 <sup>a</sup>	46 <sup>a</sup>	R	R	R	R	R	R	
	Cefazolin <sup>c</sup> - 1st gen	69	R	99	50	100	N	R	77	81	46	R	R	R	R	N	R	
	Cefixime - 3rd gen		R			N	N	R	87	95	94	N	R	R	R	S	R	
	Cefotaxime / Ceftriaxone - 3rd gen		R			100	99	R	87	94	95	N	R	R	R	S	R	
	Ceftazidime - 3rd gen		R			N	N	R				N	93	R		S	R	
Carbapenems	Ertapenem - restricted		R					R	99	98	99	96	R	R	R	S		
	Imipenem - restricted		R					86 <sup>j</sup>	99	96			86	R		S	94	
	Meropenem - restricted		R						99	99	99	99	92	R	97	S	92	
AMGs	Gentamicin					R	R	93	97	98	93	93	R	97	N	R		
	Tobramycin	N	N	N		R	R		92	95	98	93	99	R	97	N	R	
	Amikacin	N	N	N		R	R	N	99	99	99	99	98	R	90	N	R	
FCs	Ciprofloxacin	N	N	N	N	N	N	60 <sup>a</sup>	76	95	95	95	89	R	95	S	R	
	Moxifloxacin						99	N	NOT recommended for UTI							S	R	
Miscellaneous	Azithromycin / Clarithromycin	59 <sup>i</sup>	9 <sup>i</sup>	81 <sup>i</sup>	40	83 <sup>i</sup>	78	R	R	R	R	R	R	R	R	S	R	
	Clindamycin	78	56	87	57	87	95	R	R	R	R	R	R	R	R	R	53	
	Doxycycline	97	96	97	85		92	23 <sup>a</sup>			R		R	97 <sup>d</sup>		S		
	Linezolid - restricted	99	99	99	99			98	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	99
	Nitrofurantoin - simple cystitis only <sup>d</sup>	98	99	97	98	N	R	86	91	39	R	R	R	R	R	R	R	R
	TMP-SMX or Cotrimoxazole	94	95	93	79	R	86	R	78	93	88	92	R	97	87	S	R	
	Vancomycin	99 <sup>f</sup>	99 <sup>f</sup>	99 <sup>f</sup>	99	100	99	93	R	R	R	R	R	R	R	R	R	R

Produced by the collaborative efforts of the Fraser Health Department of Laboratory Medicine and Pathology, FHA Medication Use Evaluation Team and FHA Antimicrobial Stewardship Program.

# FRASER NORTH ANTIBIOGRAM

BH, ERH, RCH, RMH  2013 ANTIBIOGRAM (% Susceptible <sup>a</sup> )		GRAM POSITIVE							GRAM NEGATIVE							Bacteroides fragilis group <sup>h</sup>		
		Staphylococcus aureus (MSSA + MRSA)	MRSA (Methicillin Resistant Staph. aureus)	MSSA (Methicillin Susceptible Staph. aureus)	Coagulase Negative Staphylococcus	Streptococcus - Group A	Streptococcus pneumoniae	Enterococcus spp	Escherichia coli	Klebsiella spp	Proteus mirabilis	SPICE Organisms <sup>b</sup>	Pseudomonas aeruginosa	Stenotrophomonas maltophilia	Acinetobacter spp		Haemophilus influenzae	
<b>Number of Isolates</b>		2386	780	1606	280	182	116	1455	4385	918	432	646	412	68	78	249	53	
Penicillins	Cloxacillin	67	R	99	36	N	N	R	R	R	R	R	R	R	R	R	R	
	Penicillin	N	R	N	N	100	99	65	R	R	R	R	R	R	R	N	R	
	Ampicillin	N	R	N	N	100	99	76	40	R	49	R	R	R	R	82	R	
	Amoxicillin/Clavulanate	67	R	99	36	100	99	76	83	94	93	R	R	R	R	S		
	Piperacillin/Tazobactam	67	R	99	36	100	99	76	95	95	99	N <sup>e</sup>	85	R	98	S	91	
Cephalosporins	Cephalexin - 1st gen	67	R	99	36	100	N	R	49 <sup>g</sup>	78 <sup>g</sup>	52 <sup>g</sup>	R	R	R	R	R	R	
	Cefazolin <sup>g</sup> - 1st gen	67	R	99	36	100	N	R	74	79	54	R	R	R	R	N	R	
	Cefixime - 3rd gen		R			N	N	R	86	95	94	N	R	R	R	S	R	
	Cefotaxime / Ceftriaxone - 3rd gen		R			100	99	R	86	95	96	N	R	R	R	S	R	
	Ceftazidime - 3rd gen		R			N	N	R				N	92	R		S	R	
Carbapenems	Ertapenem - restricted		R					R	99	99	99	99	R	R	R	S		
	Imipenem - restricted		R					7 <sup>g</sup>	99	97			88	R		S	94	
	Meropenem - restricted		R						99	99	99	99	91	R	96	S	92	
AMCs	Gentamicin					R	R		90	97	94	92	94	R	99	N	R	
	Tobramycin	N	N	N		R	R		89	95	94	91	99	R	97	N	R	
	Amikacin	N	N	N		R	R	N	99	99	99	99	98	R	99	N	R	
FOs	Ciprofloxacin	N	N	N	N	N	N	47 <sup>g</sup>	75	95	77	93	88	R	96	S	R	
	Moxifloxacin						99	N	NOT recommended for UTI							S	R	
Miscellaneous	Azithromycin / Clarithromycin	57 <sup>i</sup>	12 <sup>i</sup>	78 <sup>i</sup>	34	77 <sup>i</sup>	74	R	R	R	R	R	R	R	R	R	S	R
	Clindamycin	69	44	82	47	78	85	R	R	R	R	R	R	R	R	R		53
	Doxycycline	95	92	96	89		79	23 <sup>g</sup>			R		R	99 <sup>d</sup>		S		
	Linezolid - restricted	99	99	99	99			99	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	99
	Nitrofurantoin - simple cystitis only <sup>g</sup>	97	97	97	99	N	R	81	93	40	R	R	R	R	R	R	R	R
	TMP-SMX or Cotrimoxazole	96	97	96	70	R	82	R	76	93	74	90	R	97	94	S	R	
Vancomycin	99 <sup>f</sup>	99 <sup>f</sup>	99 <sup>f</sup>	99	100	99	85	R	R	R	R	R	R	R	R	R	R	

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

**KEY**

- R = Inherently resistant
- S = Predictably ≥99% susceptible
- = Susceptibility not tested
- N = Not recommended
- = Synergy with penicillins or vanco

**MDRO Prevalence:**  
 - ESBL *E. coli*: 11%  
 - ESBL *Klebsiella* spp: 4%

- NOTES:**
- a. This antibiogram includes only the first isolate of a specific organism from any patient.
  - b. SPICE organisms are *Serratia*, *Providencia*, *Morganella*, *Citrobacter*, *Enterobacter* and *P. vulgaris*. These organisms may carry inherent genes that cause *in-vivo* resistance to all cephalosporins.
  - c. Interpretation based on dose of cefazolin 2g IV q8h.
  - d. Susceptibility for *S. maltophilia* represents minocycline.
  - e. SPICE organisms have an inducible enzyme that confers resistance against piperacillin/tazobactam.
  - f. Some *S. aureus* isolates with an MIC of 2 will be interpreted as susceptible but may result in clinical failure.
  - g. For urinary tract isolates only.
  - h. Combined from all FHA sites.
  - i. Susceptibility to erythromycin for these organisms is the same as for azithromycin/clarithromycin.
  - j. Ampicillin result predicts imipenem result for *E. faecalis*.

Produced by the collaborative efforts of the Fraser Health Department of Laboratory Medicine and Pathology, FHA Medication Use Evaluation Team and FHA Antimicrobial Stewardship Program.

# FRASER SOUTH ANTIBIOGRAM

DH, JPOSCS, LMH, PAH, SMH  2013 ANTIBIOGRAM (% Susceptible <sup>3</sup> )		GRAM POSITIVE							GRAM NEGATIVE									
		<i>Staphylococcus aureus</i> (MSSA + MRSA)	MRSA (Methicillin Resistant <i>Staph. aureus</i> )	MSSA (Methicillin Susceptible <i>Staph. aureus</i> )	Coagulase Negative <i>Staphylococcus</i>	<i>Streptococcus</i> - Group A	<i>Streptococcus pneumoniae</i>	<i>Enterococcus</i> spp	<i>Escherichia coli</i>	<i>Klebsiella</i> spp	<i>Proteus mirabilis</i>	SPICE Organisms <sup>b</sup>	<i>Pseudomonas aeruginosa</i>	<i>Stenotrophomonas maltophilia</i>	<i>Acinetobacter</i> spp	<i>Haemophilus influenzae</i>	<i>Bacteroides fragilis</i> group <sup>h</sup>	
<b>Number of Isolates</b>		2564	812	1752	202	196	168	1225	5423	887	436	589	472	76	49	204	53	
Penicillins	Cloxacillin	68	R	99	41	N	N	R	R	R	R	R	R	R	R	R	R	
	Penicillin	N	R	N	N	100	99	77	R	R	R	R	R	R	R	N	R	
	Ampicillin	N	R	N	N	100	99	83	40	R	38	R	R	R	R	84	R	
	Amoxicillin/Clavulanate	68	R	99	41	100	99	83	82	93	90	R	R	R	R	S		
	Piperacillin/Tazobactam	68	R	99	41	100	99	83	95	95	98	N <sup>e</sup>	85	R	96	S	91	
Cephalosporins	Cephalexin - 1st gen	68	R	99	42	100	N	R	50 <sup>g</sup>	78 <sup>g</sup>	42 <sup>g</sup>	R	R	R	R	R	R	
	Cefazolin <sup>e</sup> - 1st gen	68	R	99	41	100	N	R	73	80	48	R	R	R	R	N	R	
	Cefixime - 3rd gen		R			N	N	R	86	94	92	N	R	R	R	S	R	
	Cefotaxime / Ceftriaxone - 3rd gen		R			100	99	R	86	93	92	N	R	R	R	S	R	
	Ceftazidime - 3rd gen		R			N	N	R				N	91	R		S	R	
Carbapenems	Ertapenem - restricted		R					R	99	99	99	95	R	R	R	S		
	Imipenem - restricted		R					83 <sup>j</sup>	99	99			84	R		S	94	
	Meropenem - restricted		R						99	99	99	99	87	R	98	S	92	
AMGs	Gentamicin					R	R	●	91	97	92	94	91	R	98	N	R	
	Tobramycin	N	N	N		R	R		89	96	93	92	99	R	99	N	R	
	Amikacin	N	N	N		R	R	N	99	99	99	99	98	R	92	N	R	
FCs	Ciprofloxacin	N	N	N	N	N	N	52 <sup>g</sup>	72	95	81	91	89	R	94	S	R	
	Moxifloxacin							99	N	NOT recommended for UTI							S	R
Miscellaneous	Azithromycin / Clarithromycin	57 <sup>j</sup>	13 <sup>j</sup>	77 <sup>i</sup>	37	86 <sup>i</sup>	79	R	R	R	R	R	R	R	R	S	R	
	Clindamycin	74	54	83	50	86	88	R	R	R	R	R	R	R	R	R	53	
	Doxycycline	96	96	96	88		84	22 <sup>g</sup>			R		R	99 <sup>d</sup>		S		
	Linezolid - restricted	99	99	99	97			94	R	R	R	R	R	R	R	R	R	99
	Metronidazole	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	99
	Nitrofurantoin - simple cystitis only <sup>d</sup>	97	97	96	98	N	R	83	92	40	R	R	R	R	R	R	R	R
	TMP-SMX or Cotrimoxazole	90	92	88	71	R	88	R	73	92	74	90	R	97	90	S	R	
	Vancomycin	99 <sup>f</sup>	99 <sup>f</sup>	99 <sup>f</sup>	99	100	99	91	R	R	R	R	R	R	R	R	R	R

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

**KEY**

R = Inherently resistant  
S = Predictably ≥99% susceptible  
= Susceptibility not tested  
N = Not recommended  
● = Synergy with penicillins or vanco

**MDRO Prevalence:**  
- ESBL *E. coli*: 10%  
- ESBL *Klebsiella* spp: 5%

**NOTES:**  
a. This antibiogram includes only the first isolate of a specific organism from any patient.  
b. SPICE organisms are *Serratia*, *Providencia*, *Morganella*, *Citrobacter*, *Enterobacter* and *P. vulgaris*. These organisms may carry inherent genes that cause *in-vivo* resistance to all cephalosporins.  
c. Interpretation based on dose of cefazolin 2g IV q8h.  
d. Susceptibility for *S. maltophilia* represents minocycline.  
e. SPICE organisms have an inducible enzyme that confers resistance against piperacillin/tazobactam.  
f. Some *S. aureus* isolates with an MIC of 2 will be interpreted as susceptible but may result in clinical failure.  
g. For urinary tract isolates only.  
h. Combined from all FHA sites.  
i. Susceptibility to erythromycin for these organisms is the same as for azithromycin/ clarithromycin.  
j. Ampicillin result predicts imipenem result for *E. faecalis*.

Produced by the collaborative efforts of the Fraser Health Department of Laboratory Medicine and Pathology, FHA Medication Use Evaluation Team and FHA Antimicrobial Stewardship Program.