For drugs prescribed in the NICU, please refer to the handbooks available in unit at both McMaster and St Joseph’s Healthcare. There is a separate PICU handbook with a drug formulary specific to the PICU.

This document is intended for use at McMaster Children’s Hospital (MCH) only and may not be applicable elsewhere. While this document is intended to reflect the practice at MCH at the time of writing, new information may become available. Every attempt has been made to ensure accuracy but these recommendations should be used in conjunction with good clinical judgment, and in consultation with a Pharmacist as needed. For any questions related to the information contained in this document please email: druginfo@hhsc.ca
Navigating HHSC Pharmacy Services

Drug Supply Questions
Call Pharmacy at 76023
- AcuDose problems
- Patient missing medication
- Drug dropped or wasted unintentionally
- Pharmacy supplies

Special Access Program Drugs
Call SAP technician at 76812
- See SAP pages in appendices for more information

Pharmacy Technician Questions
3C, 3Y or 3B: Page 1099
PICU: Page 8055
ED: Page 1871
- Pharmacy supplies
- Storage or handling of medications
- Drug reconstitution questions (if nursing colleagues unable to assist)
- Contacting community pharmacy to obtain drug list

Drug Information Service
Call ext 76019
- Questions about drug literature when no application to or evaluation of patient is required
- Drug formulation, chemical, or compatibility questions
- Route of administration questions (eg can a drug be given intrathecally?)
- Drug infusion rate questions/Guardrail questions

Outpatient Pharmacy
Call ext 76106
- Drug availability for a patient at discharge
- Questions about EAP medications and coverage
- Questions about outpatient prescribing/prescriptions

Clinical Pharmacist Questions
ED: Page Leanne at 6949
3C: Page Nicole, at 1423
3B: Page Paula (4582), John (1096) or Sheliza
PICU: Page Jon at 1525
NICU: Page Lauren (5026) or Shari (1051)
- Drug dosing or optimization
- Questions about evidence for a medication as it pertains to a specific patient
- Evaluation of an adverse drug event, or management of an adverse drug event
- Drug interactions, Drug levels/therapeutic drug monitoring
- Pharmacokinetic or pharmacodynamic properties of medications
- Drug allergies
- Patient/family medication discharge counselling, if needed
**Special Access Program (SAP)**

**What is a Special Access Program (SAP) Product?**

- A pharmaceutical, biologic or radiopharmaceutical product that is **NOT** approved for use in Canada, but has evidence supporting its use and is approved for use and available outside of the country
- Ex: albendazole, ivermectin, artesunate, aztreonam, cidofovir, bevacizumab, nicardipine, IV rifampin, IV ribavirin, IV levetiracetam, IV valproic acid, BabyBkg

| How do I contact the SAP team? | Requests and Information about Requests should be brought to the SAP technicians
1st point of contact=SAP Technician Extension: 76812
Karen Currie (Technician Lead) HHSC Cell: 905-541-9135
Megan Jutting (alternate)
For other SAP issues:
Manager:
Gita Sobhi (Pharmacist)
Extension 73447
HHSC Cell: 905-870-1167 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the SAP program?</td>
<td>Program authorized by Health Canada to permit drug manufacturers to provide non-marketed products in extenuating clinical circumstances or circumstances where effective agents are not available in Canada</td>
</tr>
</tbody>
</table>
| Safety & Efficacy of SAP | SAP authorization by Health Canada does **NOT** establish the safety, efficacy and quality of SAP products.
A physician is to make a risk/benefit decision in the best interest of the patient prior to using or recommending the use of a SAP product |
| Manufacturer of SAP | The manufacturer has the final word on whether a SAP product is supplied, and reserves the right to impose whatever restrictions or conditions on the release of the product.
The manufacturer may or may not charge for the SAP product. |
| Informed Consent | Health Canada recommends that informed consent be obtained by the physician prior to using a SAP product
If the use of the SAP is deemed standard of practice, consent is implied
A product-specific consent may also be issued by the manufacturer |
| Non-formulary SAP | All SAP products that are non-formulary require a Non-Formulary Request form to be completed and signed by the **prescriber**
This is a hospital requirement. |
| Which drugs are available via SAP? | Please contact the SAP team to find out if a product is available via SAP, contact info listed above |
There is no SAP drug list compiled by Health Canada available to prescribers (list provided on next page is drugs obtained at HHS via SAP)

- Trends: uncommon anti-infectives, IV formulations of less common drugs, drugs for metabolic kids, investigational cancer drugs/biologics

**How to request an SAP product?**

- Requesting Physician contacts the SAP technicians as per contact info above
- A SAP Request Form as per Health Canada Requirements will be sent to the prescriber by the SAP Technicians, for completion by the prescriber
- Physician completes the form, returns it to the SAP Technicians; SAP Technicians assign it a purchase order number, fax it to Health Canada, call and liaise with Health Canada as needed.
- Health Canada SAP Program hours of operation are: Monday to Friday, 8:30 to 16:30.

**SAP forms**

- Form A is completed for Patient Specific requests
- Form B is completed for future use requests
- Relevant clinical information to include on a SAP form:
  - Relevant patient history, diagnosis
  - Details of tried & failed therapies
  - Evidence supporting use (include journal articles if applicable/available)
  - Information on safety, side effects, etc
- The manufacturer may also request that a pre-treatment form, company prepared patient consent or other company specific requirements be completed by the prescriber prior to the release of some drugs.
- The initial request for a specific patient must be signed by the requesting physician

**Approval Process**

- Once approved, Health Canada sends a Letter of Authorization (LOA) to the manufacturer and a copy to prescriber
- Drug is then shipped to & received by the SAP program technicians who will notify the requesting prescriber upon receipt of drug
- The dispensary pharmacy technicians will dispense the drug to the patient
- Health Canada –SAP approval is **NOT** always guaranteed.

*Content is adapted from the HHS SAP Protocol*
SAP Drugs*

- 3,4-Diaminopyridine tablet
- Albendazole tablet
- Arsenic Trioxide Vial
- Artesunate vial
- Aztreonam vial
- Baby BIG Vial
- Bedaquiline tablet
- Brincidofovir tablet
- Caffeine vial
- Carbidopa tablet
- Ceftaroline vial
- ChiRhoStim (Secretin) vial
- Cidofovir vial
- Cisapride tablet
- Clofazimine capsule
- CRH vial
- Cyclomydril bottle
- Daratumumab vial
- Decitabine vial
- Deflazacort tablet
- Dehydrate Alcohol 5ml vial
- Diazoxide liquid
- Dinutuximab vial
- Divalproex Na (Depakote Sprinkles) capsule
- Doxycycline vial
- Ergocalciferol ampule
- Etomidate Emulsion ampule
- Flucytosine capsule
- Flucytosine vial
- Foscarnet Na vial
- Foscarin Na vial
- Fucidic Acid tablet
- Gentiuzumab vial
- Glucarpidase vial
- Guanethidine ampule
- Hyaluronidase ampule
- Hydroxocobalamin vial
- Indomethacin vial
- Inotuzumab vial
- Isoniazid vial
- Ivermectin tablet
- L-5-Hydroxytryptophan sachet
- Levetiracetam vial
- Lumitene capsule
- Mitomycin vial
- MVW liquid and tabs/caps
- Nevirapine liquid
- Nitazoxanide tablet
- Nitazoxanide liquid
- Omegaven vial
- Ospolot® Sulthiame capsule
- Pentostatin vial
- Phenoxybenzamine capsule
- Physostigmine ampule
- Piracetam tablet
- Potassium Bromide tablet
- Potassium Neutral tablet
- Potassium Phosphate (K-Phos 2) tablet
- Pralidoxime Chloride vial
- Probenecid tablet
- Propamidine Brolene® bottle
- Quinine Dihydrochloride ampule
- Raltegravir sachet
- Ribavirin vial
- Rifampin vial
- Sacrosidase liquid
- Sargramostim vial
- Sclerosol Aerosol
- Sevelamer Sachet
- Sodium Phenylacetate/ Sodium Benzoate vial
- Sodium Phenylbutyrate Powder
- Sodium Phenylbutyrate tablet
- Sterile Talc vial
- Subutex tablet
- Succimer capsule
- Sulfadiazine tablet
- Synercid vial
- Triamcinolone ampule
- Trientine capsule
- Triheptanoin Liquid
- Valproate Sodium vial
- Zonisamide capsule

*this list may not be exhaustive.
<table>
<thead>
<tr>
<th>Medication</th>
<th>LU Code</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GI Medications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lansoprazole</td>
<td>293</td>
<td>GERD, failed H2RA (ranitidine)</td>
</tr>
<tr>
<td></td>
<td>297</td>
<td>peptic ulcers, NSAID-ulcer prophylaxis</td>
</tr>
<tr>
<td></td>
<td>401</td>
<td>Crohn’s, short gut, scleroderma, pancreatitis</td>
</tr>
<tr>
<td></td>
<td>402</td>
<td>severe GI conditions (erosive esophagitis, zollinger-ellison, strictures, hospital discharge post-GI bleed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15mg, 30mg delayed release (DR) capsules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prevacid Fastabs <strong>NOT</strong> covered under ODB</td>
</tr>
<tr>
<td>Omeprazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquid formulation must be compounded from tablets/capsules</td>
</tr>
<tr>
<td>Pantoprazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40mg enteric coated Pantoprazole sodium tablets</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only covered for clinical criteria of chemotherapy/radiation induced nausea/vomiting (NOT gastroenteritis)</td>
</tr>
<tr>
<td>Pancrelipase</td>
<td>124</td>
<td>Pancreatic insufficiency secondary to pancreatic resection</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>Pancreatic insufficiency due to chronic pancreatitis</td>
</tr>
<tr>
<td></td>
<td>225</td>
<td>Replacement therapy for pancreatic insufficiency due to cystic fibrosis (Cotazym and Creon only).</td>
</tr>
<tr>
<td>Ursodiol</td>
<td>273</td>
<td>For the treatment of primary biliary cirrhosis. Authorization Period: Indefinite</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250mg Tab or 500mg DS tab Compounded suspension 50mg/ml can be made from tabs</td>
</tr>
<tr>
<td><strong>Antimicrobials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>332</td>
<td>SSTI or bone/joint infection with GN bacteria</td>
</tr>
<tr>
<td></td>
<td>333</td>
<td>GU infection with Pseudomonas, or STI</td>
</tr>
<tr>
<td></td>
<td>336</td>
<td>Stepdown from IV therapy in hospital</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>GI Traveller’s diarrhea, enteric fever, Crohn’s</td>
</tr>
<tr>
<td></td>
<td>977</td>
<td>intolerance to other appropriate therapies</td>
</tr>
<tr>
<td></td>
<td>394</td>
<td>500mg ER tablet (Cipro XL), acute cystitis</td>
</tr>
<tr>
<td></td>
<td>395</td>
<td>1000mg ER tablet (Cipro XL), complicated UTI/pyelonephritis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100mg/mL oral suspension, 250mg, 500mg, 750mg immediate release tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500mg, 1000mg ER tablets (extended release), for adolescents</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>337</td>
<td>CAP with co-morbidity or failure to first-line therapy.</td>
</tr>
<tr>
<td></td>
<td>338</td>
<td>COPD with risk factors</td>
</tr>
<tr>
<td></td>
<td>339</td>
<td>Step-Down after parenteral therapy or hospital / emergency department discharge.</td>
</tr>
<tr>
<td></td>
<td>977</td>
<td>Exceptional cases of allergy or intolerance to all other appropriate therapies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No suspension available 250mg, 500mg and 750mg tablets available (only 250mg and 500mg covered with LU)</td>
</tr>
</tbody>
</table>
| Fluconazole | **235**: vaginal candidiasis (150mg PO once, only reimbursed once in 25 day period)  
**528**: oral liquid, when tablets/capsules cannot be tolerated | 150mg capsule  
*50 mg and 100 mg tablets no longer require LU codes*  
10 mg/mL oral liquid, when capsules/tablets not tolerated |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Permethrin 5% cream</td>
<td><strong>311</strong>: failure on cheaper, alternative therapy</td>
<td>5% Nix Dermal topical cream for scabies; Kwellada-P 5% lotion does not require LU code</td>
</tr>
<tr>
<td><strong>Anticonvulsants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levetiracetam</td>
<td><strong>473</strong>: As adjunctive therapy in the management of patients with epilepsy who are not satisfactorily controlled by at least 2 other General Benefit anticonvulsant therapies (e.g., phenytoin, carbamazepine, gabapentin, lamotrigine, topiramate, etc.); AND patients are under a neurologist.</td>
<td>Note: Government will not pay for Keppra if used first line (rejection by EAP as well), must fail 2 agents as billed via ODB. May be covered under private insurance (if applicable)</td>
</tr>
</tbody>
</table>
| Topiramate Sprinkle cap 15mg or 25mg | **321**: In children age 16 and under, as adjunctive therapy in the treatment of seizure disorders where control by other listed anticonvulsants has been unsatisfactory. | 25mg, 100mg, 200mg tabs covered  
Topamax liquid 6mg/mL can be compounded from covered tablets. |
| **Anticoagulants** |  |  |
| Dalteparin | **186**: DVT treatment, maximum duration 3 weeks  
**187**: DVT treatment in pregnancy/lactation  
**188**: DVT treatment when warfarin not tolerated/contraindicated  
**189**: DVT treatment when failed on warfarin |  |
| Enoxaparin | As above for Dalteparin, **PLUS**  
**323**: treatment of PE, maximum duration 3 weeks |  |
| **Respiratory** |  |  |
| Salbutamol Resp Sol | **256**: Patients who have a tracheostomy  
**257**: Patients with CF in whom nebulizer indicated  
**258**: Patients with severe mental or physical disabilities  
**259**: Previously used nebulizer therapy within the last 12 months. | Bulk solution 5mg/mL (10mL bottle) |

**Not covered:**
Septra (Trimethoprim/Sulfamethoxazole) compounded suspension (commercially available suspension on backorder)-consider denominations of Septra 400/80 tabs or Septra DS 800/160 tabs  
Tamiflu: Only covered with LU for outbreak in nursing homes  
Mometason (Nasonex)/Fluticasone Propionate (Flonase)/Fluticasone Furoate (Avamys), Triamcinolone (Nasacort): Can attempt EAP for coverage (see next page). Only covered nasal corticosteroids include: beclomethasone, budesonide, flunisolide.  
Feramax: Can use Palaf (ferrous fumarate) or Fer-in-Sol (ferrous sulfate)-order in mg elemental iron  
Ondansetron: See above
**Exceptional Access Program (EAP):**
The Exceptional Access Program (EAP) facilitates patient access to drugs available in Canada that are not included on the Ontario Drug Benefit (ODB) Formulary, or where no listed alternative is available. In order to receive drug coverage, the patient must be eligible to receive benefits under the Ontario Drug Benefit (ODB) program, or OHIP+.

- EAP useful when patient requires treatment with drug product that is not a general benefit under OHIP+, but either meets criteria pre-specified by EAP for drug funding, or has compelling clinical circumstance for which EAP may consider funding the medication.
- Common medications requested via EAP include oral vancomycin, dapsone, inhaled aztreonam, montelukast, infliximab, sildenafil.
- For drugs that are not time-sensitive: Form can be obtained from the ministry website, or by google searching “EAP form Ontario filetype:PDF.” Form is entitled “Request for an Unlisted Drug Product.”
- Prescriber should include on the completed request their contact information to receive confirmation of approval, and after completing the form, fax to number on the top of the form.
- For time sensitive drugs, or for attainment of drug-product prior to hospital discharge: EAP expedited request form can be found on HHSC Intranet.
- Requests may also be expedited by prescriber phoning 1-866-811-9893, in high urgency situations.
- The Telephone Request Service (TRS), exists for specified drugs commonly requested in time-sensitive situations (eg: oral vancomycin). The TRS supports prescribers in ensuring timely access for their patients, by reviewing the patient’s clinical background and drug criteria with the prescriber. They can likewise be reached at 1-866-811-9893.
### Unapproved Abbreviations, Symbols and Dose Designations and Acceptable Corrections

<table>
<thead>
<tr>
<th>Unapproved Abbreviation</th>
<th>Intended Meaning</th>
<th>Problem</th>
<th>Acceptable Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>Unit</td>
<td>Mistaken for “0” (zero), “4” (four), or cc.</td>
<td>Use ‘unit’.</td>
</tr>
<tr>
<td>IU</td>
<td>International unit</td>
<td>Mistaken for “IV” (intravenous) or “10” (ten).</td>
<td>Use ‘unit’.</td>
</tr>
</tbody>
</table>

**Abbreviations for Drug Names**

Misinterpreted because of similar abbreviations for multiple drugs; e.g., MS, MSO₄ (morphine sulphate), MgSO₄ (magnesium sulphate) may be confused for one another.

Do not abbreviate drug names. (exceptions: ASA, KCl, Humulin R)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Intended Meaning</th>
<th>Problem</th>
<th>Acceptable Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>QD</td>
<td>Every day</td>
<td>QD and QOD have been mistaken for each other, or as ‘qid’. The Q has also been misinterpreted as “2” (two).</td>
<td>Write “daily” and “every other day” in full</td>
</tr>
<tr>
<td>QOD</td>
<td>Every other day</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OD**

Mistaken for “right eye” (OD = oculus dexter)

Write “daily”

**OS, OD, OU**

Left eye, right eye, both eyes

May be confused with one another.

Use “left eye”, “right eye” or “both eyes”

**AS, AD, AU**

Left ear, right ear, both ears

May be confused with one another.

Use “left ear”, “right ear” or “both ears”

**D/C**

Discharge or discontinue

Premature discontinuation of medications if D/C (intended to mean “discharge”) has been misinterpreted as “discontinued” when followed by a list of discharge medications

Use “discharge” and “discontinue”.

**SC, SQ, or sub q**

Subcutaneous

SC mistaken as SL (sublingual); SQ mistaken as “5 every;” the “q” in “sub q” has been mistaken as “every” (e.g., a heparin dose ordered “sub q 2 hours before surgery” misunderstood as every 2 hours before surgery)

Use “subcut” or “subcutaneous”

**cc**

Cubic centimetre

Mistaken for “u” (units).

Use “mL” or “millilitre”.

**μg**

Microgram

Mistaken for “mg” (milligram) resulting in one thousand-fold overdose.

Use “mcg or microgram”.

<table>
<thead>
<tr>
<th>Unapproved Symbol</th>
<th>Intended Meaning</th>
<th>Potential Problem</th>
<th>Acceptable Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>@</td>
<td>At</td>
<td>Mistaken for “2” (two) or “5” (five). Use “at”.</td>
<td>Write out “at” in full</td>
</tr>
<tr>
<td>&gt;</td>
<td>Greater than</td>
<td>Mistaken for “7”(seven) or the letter “L” .</td>
<td>Write out “greater than” in full</td>
</tr>
<tr>
<td>&lt;</td>
<td>Less than</td>
<td>Confused with each other.</td>
<td>Write out “less than” in full</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unapproved Dose Designation</th>
<th>Intended Meaning</th>
<th>Potential Problem</th>
<th>Acceptable Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trailing zero</td>
<td>X.0 mg Or 10.0 mg</td>
<td>Decimal point is overlooked resulting in 10-fold dose error.</td>
<td>Never use a zero by itself after a decimal point. Use “X mg or 10 mg”</td>
</tr>
<tr>
<td>Lack of leading zero</td>
<td>. X mg</td>
<td>Decimal point is overlooked resulting in 10-fold dose error.</td>
<td>Always use a zero before a decimal point. Use “0.X mg”</td>
</tr>
</tbody>
</table>

Adapted from ISMP’s List of Error-Prone Abbreviations, Symbols, and Dose Designations (2010) and ISMP Canada’s Do Not Use – Dangerous Abbreviations, Symbols and Dose Designations (2006)
Legend:

GAS  Group A Streptococcus
GP   Gram Positive
GPC  Gram Positive Cocci
GN   Gram Negative
GNB  Gram Negative Bacilli
MAX  Maximum
MIN  Minimum
NF   Non-Formulary At HHS

Adjust dosing interval for patients with renal impairment.
Safer Order Writing

To reduce the potential for medication errors:

- Write orders clearly and concisely.
- Write medication orders using generic drug names only.
- Be careful with mg/kg/DAY vs mg/kg/DOSE.
- Include the intended dose per kilogram on each order.
- Write the patients weight on each order sheet.
- Never place a decimal and a zero after a whole number (4.0 mg should be 4 mg) and always place a zero in front of a decimal point (.2mg should be 0.2 mg). The decimal point has been missed and tenfold overdoses have been given.
- Never abbreviate the word unit. The letter U has been misinterpreted as a 0, resulting in a 10 fold overdose.
- Always order medications as mg, not mL as different concentrations may exist of a given medication. There are a few exceptions such as co-trimoxazole (Septra®).
- QD is not an appropriate abbreviation for once daily, it has been misinterpreted as QID. It is best to write out “once daily” or “q24h.”
- Do not abbreviate drug names (levo, 6MP, MSO4, MgSO4, HCTZ).
- Do not abbreviate microgram to μg, use mcg, or even safer, write out microgram or use milligrams if possible (0.25 mg instead of 250 micrograms)
Examples of appropriate order writing:

Discharge prescriptions should include:

- Drug name, dose, route, frequency
- Weight on every Rx
- Multidose items or PRN cannot be ordered in #
- Sticker from chart preferred over Bradma (hard to read)
- Time and date on every order (time order is put in chart and flagged for RN)
- Weight on every order
- No abbreviations—see legend on order sheet
- Signature and pager
- Discontinue ceftazolin.

Start cephalexin 175mg PO QID x 14 days.
(as liquid please).

Name of physician/NP, signature, pager, CPSO # and date
Clerks should not sign prescriptions as pharmacy has trouble verifying when 2 names appear on script

Bradma where available or sticker on both yellow and white copies. If not available, may write patient name but requires 2 patient identifiers on order
## ANTIBACTERIALS
**CELL WALL SYNTHESIS INHIBITORS (BACTERICIDAL)**

### β-LACTAMS

### PENICILLINS

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage Range</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benzyl penicillin</strong></td>
<td></td>
<td>narrow spectrum; <strong>NOT</strong> Penicillinase resistant</td>
</tr>
<tr>
<td><strong>Penicillin G</strong></td>
<td>Moderate to Severe Infections:</td>
<td></td>
</tr>
<tr>
<td>(IV or IM)</td>
<td>IV: 100 000 - 400 000 Units/kg/DAY div q4-6h (MAX: 24 million Units/DAY)</td>
<td></td>
</tr>
<tr>
<td><strong>Penicillin V Potassium</strong></td>
<td><strong>Meningitis</strong>: IV: 400 000 Units/kg/DAY div q4h (MAX: 24 million Units/DAY)</td>
<td></td>
</tr>
<tr>
<td>(PO)</td>
<td></td>
<td>Penicillin V Potassium (oral):</td>
</tr>
<tr>
<td>Suspension: 60mg/mL</td>
<td></td>
<td>1. Mild/moderate Group A Strep infection: 25-50 mg/kg/day PO div q8-12h x 10 days</td>
</tr>
<tr>
<td>Tablet: 300mg</td>
<td></td>
<td>- IDSA (GAS pharyngitis)– Children: 300 mg PO BID-TID; Adolescents &amp; adults: 600 mg PO BID x 10 days</td>
</tr>
<tr>
<td>Penicillin V 500 000 units is equivalent to 300 mg.</td>
<td></td>
<td>2. Rheumatic fever (treatment): Less than/equal to 27 kg: 300 mg PO BID x 10 days;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Greater than 27 kg: 600 mg PO BID x 10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Rheumatic fever (prophylaxis AND greater than 5 yrs): 300 mg PO BID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Prophylaxis in asplenics:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 months – 5 yrs: 150 mg PO bid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Greater than 5 yrs: 300 mg PO bid</td>
</tr>
<tr>
<td><strong>Isoxazoyl penicillin</strong></td>
<td></td>
<td>narrow spectrum; <strong>Penicillinase resistant</strong></td>
</tr>
<tr>
<td><strong>Cloxacillin</strong></td>
<td>Primarily used in methicillin-sensitive <em>Staphylococcus aureus</em> (MSSA) infections</td>
<td></td>
</tr>
<tr>
<td>(IV or PO)</td>
<td>IV: 100-200 mg/kg/DAY ÷ q4-6h (MAX: 2g/DOSE and 12 g/DAY); up to 300 mg/kg/DAY may be used in select cases (please consult Infectious Diseases)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>cloxacillin has CNS penetration</strong></td>
<td></td>
</tr>
<tr>
<td>Oral:</td>
<td>PO: Suggest to use cephalixin (1st generation cephalosporin) in place as cloxacillin has low oral bioavailability, poorly tolerated (GI side effects) and need to be taken on an empty stomach</td>
<td></td>
</tr>
<tr>
<td>Suspension 25 mg/mL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capsule: 250 mg, 500 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aminopenicillin: Penicillinase sensitive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ampicillin (IV)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meningitis</strong>: IV: 300-400 mg/kg/DAY div q4-6h (MAX: 2 g/DOSE ;12 g/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other infections</strong>: IV: 100-200 mg/kg/DAY div q6h (MAX: 2 g/DOSE)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Amoxicillin (PO)**                    |
| Suspension: 50mg/mL (supplied at HHS); 25mg/mL |
| For coverage against *Streptococcus pneumoniae* (including empiric therapy for community-acquired pneumonia or otitis media): PO 80-90 mg/kg/DAY div q8h (MAX: 4g/DAY)) |
| BID dosing can be used in otitis media |
| **Standard dose**: PO: 40-50 mg/kg/DAY div q8h |
| GAS pharyngitis: PO: 50 mg/kg ONCE daily x 10 days (MAX: 1,000 mg/DOSE) |
| OR 25 mg/kg BID x 10 days (MAX: 500 mg/DOSE) |

<table>
<thead>
<tr>
<th><strong>Clavulanic Acid: Enhances spectrum; beta-lactamase inhibitor</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amoxicillin + Clavulanic Acid</strong> (Clavulin) (PO)</td>
</tr>
<tr>
<td>Tablets (amoxicillin/clavulanic acid): 250/62.5mg (4:1); 500/125 mg(4:1); 875/125 mg(7:1)</td>
</tr>
<tr>
<td>Suspension (supplied at HHS): 1 mL = 80 mg amoxicillin and 11.4 mg clavulanic acid (7:1)</td>
</tr>
<tr>
<td>Community may stock the 4:1 formulation (1mL = 50mg amoxicillin and 12.5mg clavulanic acid)</td>
</tr>
<tr>
<td>For coverage against <em>Streptococcus pneumoniae</em> (i.e. sequential oral therapy in complicated CAP, AOM, sinusitis): 80-90 mg/kg/DAY of amoxicillin component</td>
</tr>
<tr>
<td><strong>BID dosing may be adequate for AOM, but TID dosing is recommended for pneumonia</strong></td>
</tr>
<tr>
<td><strong>Standard dosing for other gram positive, gram negative, anaerobic infections:</strong> PO: 30-50 mg/kg/DAY of amoxicillin component ÷ q8-12h (MAX: 875 mg/DOSE)</td>
</tr>
<tr>
<td>*One major side effect with clavulanic acid (particularly at high doses) is GI intolerance</td>
</tr>
<tr>
<td><strong>When writing discharge prescription and if suspension is required, please indicate (particularly if high dose amoxicillin is used) the formulation of the amoxicillin-clavulanic acid</strong></td>
</tr>
<tr>
<td><strong>Example of prescription:</strong> Amoxicillin clavulanic acid suspension - Please dispense as 7:1 formulation (80 mg/mL amoxicillin + 11.4 mg/mL clavulanic acid)</td>
</tr>
<tr>
<td>480 mg (of amoxicillin component) PO TID x 10 days</td>
</tr>
<tr>
<td><strong>Ureidopenicillin:</strong> broad spectrum; Penicillinase sensitive</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Piperacillin + Tazobactam</strong> (IV)</td>
</tr>
</tbody>
</table>

CEPHALOSPORINS – do NOT cover MRSA, *Enterococcus* species, *Listeria*, or extended spectrum beta-lactamase producing organisms (ESBL)

<table>
<thead>
<tr>
<th>1st Generation</th>
<th>Excellent coverage against <em>S. aureus</em>, group A <em>Streptococcus</em>, <em>E. coli</em>, <em>Klebsiella</em>. Empiric therapy for cellulitis, osteomyelitis, bacterial adenitis.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ceFAZolin</strong> (Ancef) (IV or IM)</td>
<td>IV: 75-150 mg/kg/DAY div q8h (MAX: 6 g/DAY) Higher doses are needed for infections such as osteomyelitis Cefazolin has poor CNS penetration</td>
</tr>
<tr>
<td><strong>Cefalexin</strong> (Keflex) (PO)</td>
<td>PO: 25-100 mg/kg/DAY div qid Osteomyelitis following IV therapy: 100-150 mg/kg/DAY div QID (MAX: 4 g/DAY)</td>
</tr>
<tr>
<td>Tablet: 250 mg, 500 mg Suspension: 50 mg/mL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd Generation</th>
<th>NO LONGER INDICATED FOR EMPIRIC TREATMENT OF PNEUMONIA. These agents offer no benefit compared to ampicillin/amoxicillin for treatment of <em>S. pneumoniae</em>. Main benefit is coverage against (nontypable) <em>H. influenzae</em> and <em>Moraxella</em>, which cause sinusitis and otitis.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cefuroxime</strong> (IV or IM)</td>
<td>IV: 100-150 mg/kg/DAY div q8h (MAX: 2 g/DOSE)</td>
</tr>
<tr>
<td><strong>Cefuroxime Axetil</strong> (Ceftin) (PO)</td>
<td>Poor oral bioavailability; unlikely to achieve optimal concentrations in severe infections</td>
</tr>
</tbody>
</table>
| **Cefprozil**  
| **(Cefzil) (PO)**  
| Tablet: 250 mg, 500 mg  
| Suspension: 50 mg/mL  
| (eg. for otitis media unresponsive to high-dose amoxicillin or for acute sinusitis)  
| PO: 15-30 mg/kg/DAY div q12h (MAX: 1 g/DAY).  

| **3rd Generation**  
| Broad spectrum activity against gram negatives. CefTRIAXone/cefOTAXime offer excellent coverage against *Streptococcus pneumoniae* and good coverage of methicillin sensitive *S. aureus*. Only cefTAZidime is active against *Pseudomonas aeruginosa*. Useful for CNS infections.  

| **cefOTAXime**  
| **(IV or IM)**  
| ****reserved for neonates less than 1 month old**  
| Neonates greater than 2 kg (if less than 2 kg, please refer to neonatal dosing handbook):  
| 0 – 7 days of age: 100-150 mg/kg/DAY IV div q8h  
| Greater than 7 days of age: 150-200 mg/kg/DAY IV div q6-8h  
| **Meningitis:** IV: 300 mg/kg/DAY div q6h (MAX: 12 g/DAY)  
| Other infections:  
| IV: 100-200 mg/kg/DAY div q6-8h (MAX: 6 g/DAY)  

| **cefTRIAXone**  
| **(IV or IM)**  
| **for infants and children greater than 1 month old**  
| **Meningitis:** IV/IM: 100 mg/kg/DAY div q12h or q24h (Max: 2 g/DOSE; 4 g / DAY)  
| Other infections: IV/IM: 50-75 mg/kg q24h (MAX: 2 g/DAY)  
| STI (gonococcal infection):  
| Greater than 45 kg: 250 mg IM x 1
## ANTIBACTERIALS (CONTINUED)

### CEPHALOSPORINS (3<sup>rd</sup> Generation)

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dosage and Administration</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **cefTAZidime**  | IV: 75-150 mg/kg/DAY div q8h (MAX: 6 g/DAY)  
For meningitis, CF exacerbation and severe infections: 200mg/kg/day div q8h | Active against Pseudomonas aeruginosa. Good CNS penetration.  

| **Cefixime** (Suprax) (PO) | No longer indicated for empiric treatment of gonorrhoea. Main indications are treatment of UTI pathogens resistant to first-line antimicrobials and typhoid fever. Poor coverage of *S. pneumoniae* and no *Pseudomonas* coverage.  

| Tablet: 400 mg  
Suspension: 20 mg/mL | Other infections:  
PO: 8 mg/kg/DAY div q12-24h (MAX: 400 mg/DAY)  
Salmonella infection (off-label dosing): 10mg/kg PO BID | |

### CARBAPENEMS – Very broad spectrum antibiotics (coverage against GP, GN and anaerobes including extended beta-lactamase producing strains of GN); no coverage against MRSA ** Requires ID endorsement **

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dosage and Administration</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **Meropenem** (IV) | CNS infection: 40 mg/kg/DOSE IV q8h (MAX: 2 g/DOSE)  
Other infections: 20 mg/kg/DOSE IV q8h (usual MAX: 1 g/DOSE) | |
| **Ertapenem** (IV) | 3 months - 12 years: 15 mg/kg/DOSE IV q12h (max: 1 gram/DAY)  
Greater than 13 years: 1 g IV once daily | *please note that ertapenem has poor activity against *Pseudomonas aeruginosa* and has no CNS penetration |

*please note that ertapenem has poor activity against *Pseudomonas aeruginosa* and has no CNS penetration*
<table>
<thead>
<tr>
<th>GLYCOPEPTIDES</th>
<th>Only active against GP (including MRSA). Use as an alternative for GP coverage in patients with severe penicillin allergy (i.e. anaphylaxis, angioedema)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vancomycin</strong> (IV or PO)</td>
<td>125mg capsules are available, but if liquid formulations are required, the IV formulation will be used orally</td>
</tr>
<tr>
<td>Meningitis or MRSA infections:</td>
<td>IV: 60 mg/kg/DAY div q6-8h (MAX: 4 g/DAY)</td>
</tr>
<tr>
<td>Other infections:</td>
<td>IV: 40-60 mg/kg/DAY div q6-12h (usual MAX: 2 g/DAY)</td>
</tr>
<tr>
<td>Higher doses may be required in patients with suspected/confirmed MRSA infections, or individuals who are in clinically severe sepsis</td>
<td>Infuse over a minimum of 1 hour to avoid Red Man Syndrome; If reaction occurs, increase infusion time. In patients with known history of Red Man Syndrome, write on order to infuse over at least 2 hours.</td>
</tr>
</tbody>
</table>
| Monitor trough levels (initially pre-4th dose) in patients with septic shock, proven MRSA infections, concurrent nephrotoxins, fluctuating renal function or extended treatment courses | **Clostridium difficile** infection (usually reserved for severe infection or failed metronidazole): PO: 10 mg/kg/DOSE q6h (usual dose is 125mg PO q6h)
### ANTIBACTERIALS (CONTINUED)

<table>
<thead>
<tr>
<th><strong>Protein Synthesis Inhibitors</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VIA 50S Ribosome (Bacteriostatic)</strong></td>
</tr>
</tbody>
</table>

#### MACROLIDES

**Atypicals:** *Mycoplasma, Legionella, Chlamydia, H. pylori*  
GAS and *S. pneumoniae* infections in patients with severe penicillin allergy (although substantial macrolide resistance has been observed with these pathogens).

<table>
<thead>
<tr>
<th><strong>Drug</strong></th>
<th><strong>Formulations</strong></th>
<th><strong>Uses</strong></th>
<th><strong>Dosage</strong></th>
</tr>
</thead>
</table>
| **Clarithromycin** | Tablet: 250 mg, 500 mg  
Suspension: 25 mg/mL, (50 mg/mL not available at HHS) | Useful for mild bacterial pneumonia in adolescents. Also commonly used for atypical mycobacterial infections.  
PO: 7.5 mg/kg/DOSE BID (Max: 500 mg/DOSE) | Need to think about drug interactions (clarithromycin inhibits CYP3A4). May include potential interactions with theophylline, carBAMazepine, cisapride, digoxin, cycloSPORINE, tacrolimus. |
| **Azithromycin** | Tablet: 250 mg  
Suspension: 40 mg/mL | Useful for known atypical respiratory infections and bacterial enteritis. **AVOID USING TO TREAT INFECTIONS PRESUMED TO BE CAUSED BY GROUP A STREPTOCOCCUS OR PNEUMOCOCCUS.**  
PO/IV: 10 mg/kg (MAX: 500 mg) once, then 5 mg/kg (MAX: 250 mg) q24h for 4 days  
Pertussis:  
PO/IV: 1 – 5 months: 10 mg/kg q24h for 5 days;  
6 months or older: 10 mg/kg x 1 (maximum 500 mg) then 5 mg/kg once daily (maximum 250 mg/day)  
Chlamydia trachomatis urethritis or cervicitis:  
PO: Children or adolescents over 45 kg: 1,000 mg PO x 1  
Chlamydial conjunctivitis (infants): 20 mg/kg IV/PO once daily for 3 days |
<table>
<thead>
<tr>
<th>AMINOGLYCOSIDES</th>
<th>GN Aerobes (including <em>Pseudomonas aeruginosa</em>)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tobramycin</strong></td>
<td>Formulary aminoglycoside of choice (see Gentamicin for exceptions)</td>
</tr>
<tr>
<td>I.V. 5-7 mg/kg/dose q24h (extended frequency dosing is preferred in patients without renal impairment to maximize pharmacokinetics and dynamics of drug)</td>
<td></td>
</tr>
<tr>
<td>Doses as high as 10-12 mg/kg/DAY I.V. q24h recommended in patients with cystic fibrosis.</td>
<td></td>
</tr>
<tr>
<td>(Inhaled tobramycin for CF patients): 80 mg BID to TID via inhalation</td>
<td></td>
</tr>
<tr>
<td>Once daily dosing should be used for all patients - over 1 month of age, except in the setting of endocarditis and in patients with extensive burns. <em>Ototoxicity</em> and <em>nephrotoxicity</em> may occur, consider monitoring trough levels pre-2nd dose (target less than 1 mg/L) in patients at risk for nephrotoxicity (e.g. septic shock, concurrent nephrotoxins, fluctuating renal function or extended treatment courses). Prolonged therapy (i.e. greater than 2 weeks) generally not warranted and needs to be reassessed. May potentiate muscle weakness with neuromuscular blockers or conditions that affect the neuromuscular junction.</td>
<td></td>
</tr>
</tbody>
</table>

| **Gentamicin** | Used for: Neonates, as synergy in gram positive infections: enterococcus endocarditis, listeria meningitis and complicated group B streptococcus; for gram negative infections |
| I.V. (Treatment of Gram Negative Infections): 5-7 mg/kg/dose q24h (extended frequency dosing is preferred in patients without renal impairment to maximize pharmacokinetics and dynamics of drug) |
| Synergy with beta-lactams for severe gram positive infection (e.g. *Enterococcus* endocarditis): 1mg/kg/DOSE I.V. q8h |
| Monitoring and toxicity profile similar to tobramycin (see above) |
**LINCOSAMIDES**

Useful for toxic shock syndromes, osteomyelitis with known susceptible pathogens, anaerobic infections involving head and neck (please note it is not for CNS infection), and for susceptible *S. aureus* (including some MRSA) and group A streptococcus infections. Be careful – resistance in *S. aureus* is not particularly uncommon!

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose Information</th>
</tr>
</thead>
</table>
| Clindamycin   | **IV:** 30-40 mg/kg/DAY div q8h (usual MAX: 600 mg/DOSE; 900 mg IV q8h is usually prescribed in the setting as adjunct therapy in streptococcal/staphylococcal toxic shock or necrotizing fasciitis)  
**PO:** 10-30 mg/kg/DAY div q6-8h (MAX: 450 mg/DOSE)  
May potentiate muscle weakness with neuromuscular blockers or conditions affecting neuromuscular junction. Oral suspension is very poorly tolerated, avoid if possible, use 150 mg capsules or an alternative antibiotic |

**DNA Complex Damaging Agents (Bactericidal)**

**metroNIDAZOLE** (IV or PO) Tablets: 250 mg; Suspension: 15 mg/mL – anaerobic coverage

**Anaerobic infections:**

Usual PO dose: 20-30 mg/kg/DAY div q8-12h (MAX: 2250 mg/DAY). Doses as high as 50 mg/kg/DAY may be used in severe infections (including CNS infections)  
IV: 20-30 mg/kg/ DAY div q8-12h (MAX: 1,500 mg/DAY)  
*C. difficile (For Colitis):* (Enteral administration preferred but IV can be used)

**IV/PO:** 30-50 mg/kg/DAY div q6-8h (MAX: 1,500 mg/DAY)  
Excellent oral absorption, use IV only if PO contraindicated or not tolerated
**Folic Acid Metabolism Inhibitors (Bacteriostatic)**

**TRIMETHOPRIM-SULFAMETHOXAZOLE (TMP-SMX) (Septra, Co-trimoxazole)**

Useful for: UTI treatment with a known susceptible pathogen, cutaneous abscess/cellulitis (empiric MRSA coverage – don’t forget to drain!!), *Pneumocystis* pneumonia, *Toxoplasma*, *Nocardia*, *Stenotrophomonas*

**Order in mg of trimethoprim component and mL of suspension (or number of tablets – need to specify whether it is single strength or double strength tablets)**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>PO/IV:</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial infections (UTI)</td>
<td>8-10 mg/kg/DAY (of Trimethoprim component) div q12h</td>
<td></td>
</tr>
<tr>
<td>MRSA bacterial infections</td>
<td>8-12 mg/kg/DAY (of Trimethoprim component) div q12h (higher doses may be needed depending on site of infection)</td>
<td></td>
</tr>
<tr>
<td><em>Pneumocystis jiroveci</em> pneumonia (PJP):</td>
<td>15-20 mg/kg/DAY (of Trimethoprim component) div q6-8h</td>
<td></td>
</tr>
<tr>
<td>If PJP is severe (i.e. hypoxia), consider adding IV methylPREDNISolone 1 mg/kg q24h</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>PJP prophylaxis</em> (Hematology/Oncology, HIV):</td>
<td>3-5 mg/kg/day (of Trimethoprim component) div bid on Monday, Wednesday, Friday</td>
<td></td>
</tr>
</tbody>
</table>

**Formulation:**

<table>
<thead>
<tr>
<th>Formulation:</th>
<th>Trimethoprim</th>
<th>Sulfamethoxazole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspension</td>
<td>8 mg/mL</td>
<td>40 mg/mL</td>
</tr>
<tr>
<td>Injectables</td>
<td>16 mg/mL</td>
<td>80 mg/mL</td>
</tr>
<tr>
<td>SS (single strength) Tablet</td>
<td>80 mg</td>
<td>400 mg</td>
</tr>
<tr>
<td>DS (double strength) Tablet</td>
<td>160 mg</td>
<td>800 mg</td>
</tr>
</tbody>
</table>

**Excellent oral absorption, use IV only if PO contraindicated. Maintain good fluid intake and urine output. Monitor CBC and LFTs. Do not use in patients with G-6-PD deficiency.**
<table>
<thead>
<tr>
<th><strong>Trimethoprim</strong></th>
<th>Urinary tract infection prophylaxis: 2 – 3mg /kg/DAY trimethoprim once daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet: 100 mg</td>
<td></td>
</tr>
<tr>
<td>Suspension: 10 mg/mL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DNA Gyrase Inhibitors (Bactericidal)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QUINOLONES</strong>&lt;br&gt;(MUMC Formulary: Cipro and Levo)</td>
</tr>
<tr>
<td>Enteric GNB, including most ESBL in paediatrics and <em>Pseudomonas</em>. Levofloxacin also has excellent coverage against <em>S. pneumoniae</em>. Theoretical risk of development of arthropathy in children is based primarily on animal studies. The use of quinolones in situations of antibiotic resistance where no other agent is available is reasonable, weighing the benefits of treatment against the low risk of toxicity of this class of antibiotics. Another situation would be where there are no other orally administered antibiotics available. Note extensive black box warnings related to tendinopathy and cardiac toxicity.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ciprofloxacin</strong>&lt;br&gt;(IV or PO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet: 250 mg, 500 mg, 750 mg</td>
</tr>
<tr>
<td>Suspension: 100 mg/mL (tablets are preferable if dose is given via enteral tubes)</td>
</tr>
<tr>
<td><strong>REQUIRES ID ENDORSEMENT</strong></td>
</tr>
<tr>
<td>Ciprofloxacin usually reserved for infections caused by <em>Pseudomonas aeruginosa</em> or other resistant gram negative bacilli, or as step-down therapy from IV for intra-abdominal infections or bacteremias.</td>
</tr>
<tr>
<td>IV/PO: 20-30 mg/kg/DAY div q12h (MAX: 400 mg/DOSE IV or 750 mg/DOSE PO)</td>
</tr>
<tr>
<td>Excellent oral absorption, use IV only if PO contraindicated.</td>
</tr>
<tr>
<td>NO feeds, dairy products, vitamins (containing calcium, magnesium, iron) 1 hour before OR 2 hours after ciprofloxacin as drug absorption will be impaired.</td>
</tr>
</tbody>
</table>
**REQUIRES ID ENDORSEMENT**

Levofloxacin usually reserved for infections caused by penicillin-resistant *Streptococcus pneumoniae* or mycobacterial infections. Can be used as step-down therapy from IV for polymicrobial intra-abdominal or pelvic infections involving gram negatives or streptococcal isolates.

- ≤ 5 years of age: 10mg/kg PO / IV BID
- >5 years: 10mg/kg PO / IV once daily (MAX: 750mg/DAY)

Above dosing is based on pediatric pharmacokinetic study.

NO feeds, dairy products, vitamins (containing calcium, magnesium, iron) 1 hour before OR 2 hours after levofloxacin as drug absorption will be impaired.

<table>
<thead>
<tr>
<th>Other antimicrobials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nitrofurantoin</strong></td>
</tr>
<tr>
<td>Suspension: 10 mg/mL</td>
</tr>
<tr>
<td>50 mg, 100 mg</td>
</tr>
<tr>
<td>TABLETS</td>
</tr>
<tr>
<td>Macrobid® – macrocrystals/monohydrate 100 mg capsule</td>
</tr>
<tr>
<td>Indication: cystitis. Should never be used for pyelonephritis or systemic infections.</td>
</tr>
<tr>
<td>Treatment: 5-7 mg/kg/day PO divided q6h (maximum 400 mg/DAY)</td>
</tr>
<tr>
<td>Prophylaxis: 1-2 mg/kg/DAY (usual adult dose is 50-100 mg qhs)</td>
</tr>
<tr>
<td>Macrobid (nitrofurantoin monohydrate/macrocrysals) are commonly used in adults or children over 12 y.o. and are dosed as 100 mg po BID. This formulation should not be used in younger children, or those who require administration through a tube.</td>
</tr>
<tr>
<td>Generally to be avoided in GFR less than &lt; 50 mL/min</td>
</tr>
<tr>
<td><strong>ANTIFUNGALS</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
</tbody>
</table>
| **Tablet:** 50mg, 100mg<br>**Suspension:** 10mg/mL | **Oropharyngeal candidiasis:** IV/PO: 3 mg/kg q24h<br>**Esophageal candidiasis:** IV/PO: 6 mg/kg q24h (MAX: 400 mg/DAY)<br>**Candidemia:** IV/PO: 12 mg/kg once (MAX: 800 mg) Then 6 mg/kg/DAY (MAX: 400 mg/DAY, ↑ doses may be used depending on type of *Candida* species or site of infection)<br>Excellent oral absorption, use IV only if PO contraindicated.<br>May increase serum levels of cycloSPORINE, midazolam, cisapride, phenytoin.<br>Aspergillus species and *Candida krusei* are intrinsically resistant.<br>Dosage adjustment is required in patients with impaired renal function<br>*Candida glabrata* is susceptible dose-dependent - 12mg/kg load AND maintenance **<br>**Requires ID endorsement and extensive monitoring of drug levels**<br>Coverage against many *Candida* species and *Aspergillus*<br>**Requires biochemist approval.**<br>Voriconazole troughs typically used in therapeutic drug level monitoring. Requires biochemist approval. | **Children 2 to less than 12 years:**<br>Loading dose (IV): 9 mg/kg/dose q12h x 2 doses then<br>Maintenance dose (IV): 8-9 mg/kg q12h (MAX: 350 mg/dose)<br>Oral following IV therapy: 9 mg/kg PO q12h (MAX: 350mg/dose)<br>**Children 12 years or older:**<br>Loading dose: (IV) 6 mg/kg/dose q12h x 2 doses then<br>Maintenance dose(IV): 4 mg/kg/dose q12h<br>Oral following IV therapy: Less than 40 kg: 100 mg q12h<br>Greater than 40 kg: 200 mg q12h<br>Only IV formulation needs to be used with caution in patients with renal impairment (use oral formulation in this scenario)
## ANTIFUNGALS (continued)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Route of Administration</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liposomal Amphotericin B (IV) (Ambisome)</td>
<td><strong>Requires ID endorsement</strong></td>
<td>Coverage against many <em>Candida</em> species, <em>Aspergillus</em> and most <em>Mucor</em> 3 – 5 mg/kg IV once daily. Can be increased to 10 mg/kg in some scenarios. Monitor renal function and electrolytes (particularly potassium and magnesium). Infusion-related adverse effects (e.g. fever, rigors etc) may require pre-treatment with acetaminophen, diphenhydrAMINE</td>
</tr>
<tr>
<td>Caspofungin (IV)</td>
<td><strong>Requires ID endorsement</strong></td>
<td>Loading dose: 70 mg/m²/DAY IV x 1 dose (MAX: 70 mg) then Maintenance dose: 50 mg/ m²/DAY IV once daily (MAX: 50 mg)</td>
</tr>
<tr>
<td>Nystatin</td>
<td>Oral candidiasis: PO: infants: 100 000 Units swish and swallow QID children: 250 000 Units swish and swallow QID adolescents: 500 000 Units swish and swallow QID</td>
<td></td>
</tr>
<tr>
<td><strong>ANTI-VIRALS</strong></td>
<td><strong>Acyclovir</strong></td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td><strong>For HSV and VZV infections</strong></td>
<td>Need to monitor kidney function and ensure adequate hydration (especially on high dose of intravenous therapy). Dosing adjustment is necessary in patients with impaired renal function</td>
<td></td>
</tr>
<tr>
<td>Tablets: 200 mg, 400 mg and 800 mg</td>
<td>Infants 1-3 months: 20 mg/kg/DOSE IV Q8H (duration will be dependent on organ involvement – 21 days for CNS and disseminated disease; 14 days for skin and mucous membrane involvement)</td>
<td></td>
</tr>
<tr>
<td>Suspension: 40 mg/mL</td>
<td>HSV encephalitis (3 months to 12 years): 10-15 mg/kg/DOSE IV Q8H (MAX: 1 g/DOSE) HSV encephalitis (Greater than 12 years): 10 mg/kg/DOSE IV Q8H (MAX: 1 g/DOSE)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mild – moderate mucocutaneous HSV infection in immunocompetent hosts: 30-50 mg/kg/DAY PO div 3 TO 5 TIMES DAILY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HSV infection in immunocompromised hosts or severe infection (eg. eczema herpeticum): 5-10 mg/kg/DOSE IV Q8H PO dosing (following IV therapy): 60-80 mg/kg/DAY PO div 3 TO 5 TIMES DAILY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Varicella or zoster in immunocompromised hosts: 10mg/kg/DOSE IV Q8H PO dosing (following IV therapy): 80 mg/kg/DAY PO div 3 TO 5 TIMES DAILY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Varicella or zoster in immunocompetent host (note that therapy not always indicated): 80 mg/kg/DAY PO div 3 TO 5 TIMES DAILY</td>
<td></td>
</tr>
</tbody>
</table>
| | *based on expert opinion due to lack of efficacy data of using 60mg/kg/DAY in patients outside neonatal period and increased risk of nephrotoxicity. Ref: Red Book (2015) and Long SS. J Infection 2016;72:S91-97.
<table>
<thead>
<tr>
<th>ValACYclovir</th>
<th>ValACYclovir is a prodrug of acyclovir (improved oral bioavailability, less frequent administration). Unavailability of suspension and lack of pediatric dosing are limiting factors for routine use in young children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablets: 500mg, 1000mg Suspension commercially not available</td>
<td>Cold sores (Herpes labialis) 12 years of age or older: 2000mg BID x 1 day</td>
</tr>
<tr>
<td>If IV formulation is required, use acyclovir</td>
<td>Varicella or zoster 2 years or older: 20mg/kg PO TID (1g po TID is typically used in adolescents and adults)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ValGANciclovir</th>
<th>For other indications including prophylaxis or pre-emptive treatment of CMV disease in immunocompromised hosts (e.g. solid organ transplant or HSCT), please consult Infectious Diseases service.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital CMV: 16mg/kg PO BID</td>
<td>For CMV infections (IV formulation: ganciclovir) Tablets: 450mg Suspension: 50mg/mL</td>
</tr>
</tbody>
</table>
Oseltamivir

Available as 75 mg capsules OR 6 mg/mL suspension

Usual treatment duration is for 5 days only

**dosage adjustment is necessary in renal impairment**

*NOTE: Consult Infectious Diseases for premature infants & neonates (Less than 1 month of age).

Infants- 1 month to 12 months:

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>Term Infants 1 to 8 months</th>
<th>Infants 9 to 11 months†</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 – 3.5 kg</td>
<td>9 mg BID</td>
<td>12 mg BID</td>
</tr>
<tr>
<td>3.6 – 4.5 kg</td>
<td>12 mg BID</td>
<td>15 mg BID</td>
</tr>
<tr>
<td>4.6 – 5.5 kg</td>
<td>15 mg BID</td>
<td>18 mg BID</td>
</tr>
<tr>
<td>5.6 – 6.5 kg</td>
<td>18 mg BID</td>
<td>21 mg BID</td>
</tr>
<tr>
<td>6.6 – 7.5 kg</td>
<td>21 mg BID</td>
<td>24 mg BID</td>
</tr>
<tr>
<td>7.6 – 8.5 kg</td>
<td>24 mg BID</td>
<td>27 mg BID</td>
</tr>
<tr>
<td>8.6 – 9.5 kg</td>
<td>27 mg BID</td>
<td>30 mg BID</td>
</tr>
<tr>
<td>9.6 kg and over</td>
<td>30 mg BID</td>
<td>30 mg BID</td>
</tr>
</tbody>
</table>

†AAP recommends 3.5mg/kg/dose twice daily in infants aged 9 – 11 months (Reference: AAP Policy Statement: Recommendations for Prevention & Control of Influenza in Children 2016-2017).

Children greater than 12 months:

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>DOSE (if suspension is used)</th>
<th>DOSE (if capsules are used)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15kg</td>
<td>30mg BID</td>
<td>--</td>
</tr>
<tr>
<td>15 – 23 kg</td>
<td>48mg BID</td>
<td>--</td>
</tr>
<tr>
<td>23 – 40 kg</td>
<td>60mg BID</td>
<td>--</td>
</tr>
<tr>
<td>40 kg</td>
<td>75mg BID</td>
<td>75mg BID</td>
</tr>
</tbody>
</table>
ANTI-MALARIALS

Artesunate
120 mg vial (SAP)-see SAP section at end of Medication Handbook

Treatment consists of 4 doses

<table>
<thead>
<tr>
<th>Patient Weight (kg)</th>
<th>Dose</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>3mg/(kg*dose) IV</td>
<td>0, 12, 24, 48h</td>
</tr>
<tr>
<td>Greater than 20</td>
<td>2.4mg/(kg*dose) IV</td>
<td>0, 12, 24, 48h</td>
</tr>
</tbody>
</table>

4h following dose at 48h: stepdown to oral Malarone, dosing below

*CBC to be done q week for 4 weeks following dose to monitor for artesunate-associated hemolysis

Malarone
(atovaquone/proguanil)
PO

Pediatric tabs:
62.5mg atovaquone/25mg proguanil

Adult tabs:
250mg atovaquone/100mg proguanil

Treatment of active malaria:

<table>
<thead>
<tr>
<th>Patient Weight (kg)</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 8</td>
<td>2 pediatric tabs po daily x3d</td>
</tr>
<tr>
<td>8.01-10</td>
<td>3 pediatric tablets po daily x3d</td>
</tr>
<tr>
<td>10.01 to 20</td>
<td>1 adult tablet po daily x3d</td>
</tr>
<tr>
<td>20.01 to 30</td>
<td>2 adult tablets po daily x3d</td>
</tr>
<tr>
<td>30.01 to 40kg</td>
<td>3 adult tablets po daily x3d</td>
</tr>
<tr>
<td>Greater than 40</td>
<td>4 adult tablets po daily x3d</td>
</tr>
</tbody>
</table>

Greater than 40

Prophylaxis prior to travel in an endemic region:

<table>
<thead>
<tr>
<th>Patient Weight (kg)</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 8</td>
<td>1/2 pediatric tab po daily</td>
</tr>
<tr>
<td>8.01-10</td>
<td>3/4 pediatric tab po daily</td>
</tr>
<tr>
<td>10.01 to 20</td>
<td>1 pediatric tablet po daily</td>
</tr>
<tr>
<td>20.01 to 30</td>
<td>2 pediatric tablets po daily</td>
</tr>
<tr>
<td>30.01 to 40kg</td>
<td>3 pediatric tablets po daily</td>
</tr>
<tr>
<td>Greater than 40</td>
<td>1 adult tab po daily</td>
</tr>
</tbody>
</table>

PEDIATRIC FORMULARY

Acetaminophen
Analgesic and antipyretic.

PO: Refer to table for weight based dosing standardization
Can be dosed q4-6h prn

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Single Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 - 3.9</td>
<td>40</td>
</tr>
<tr>
<td>4.0 - 5.4</td>
<td>60</td>
</tr>
<tr>
<td>5.5 - 7.9</td>
<td>80</td>
</tr>
<tr>
<td>8.0 - 10.9</td>
<td>120</td>
</tr>
<tr>
<td>11.0 - 15.9</td>
<td>160</td>
</tr>
<tr>
<td>16.0 - 21.9</td>
<td>240</td>
</tr>
<tr>
<td>22.0 - 26.9</td>
<td>320</td>
</tr>
<tr>
<td>27.0 - 31.9</td>
<td>400</td>
</tr>
<tr>
<td>32.0 - 43.9</td>
<td>480</td>
</tr>
<tr>
<td>44 – over</td>
<td>650</td>
</tr>
</tbody>
</table>

PR: 10-20 mg/kg/dose q4-6h (neonates may require higher doses-refer to Neonatal Drug Cards)
For doses less than 80mg, can administer acetaminophen drops 80mg/mL (not suspension) rectally.

Acetylsalicylic Acid
Antiplatelet:
PO: 5 mg/kg/DOSE q24h.
Minimum 20 mg, usual maximum 325 mg.

Kawasaki disease:
PO: 3-5 mg/kg/DOSE q24h (round to nearest 20mg denomination)
Supplied as 80 mg chewable tablets and 325 and 650 mg tablets.
**Alteplase**
Thrombolytic

**Unblocking of occluded catheters**

- **Intracatheter:** 1 mg/mL:
  - Less than 30 kg: 110% of lumen volume (max 2 mL)
  - Greater than 30 kg: 2 mL

Instil appropriate volume into occluded lumen. Leave in place for 1-2 hours, then aspirate solution. Do not infuse.

May repeat once if ineffective.

**Empyema/Parapneumonic effusions**

- **Intrapleural:** 0.1 mg/kg/DOSE (usual max 4 or 6 mg/DOSE)

Dilute in 20-100 mL of saline and clamp thoracostomy tube for 1 hour after administration.

**amLODIPine**
Calcium channel blocker

- **PO:** 0.1-0.3 mg/kg/DAY (max 15 mg/day)

Due to long half life of drug, dose adjustments should be made every 3-5 days only

**BisACODYL**

- **PO/PR:**
  - ages 6 months to 11 years: 5mg x 1
  - 12 years or older: 10 mg x 1

Available only as delayed release 5 mg tablets (taken whole, cannot be split/chewed)-can take 6-12 hours for effect or 10 mg suppositories (can be cut)-15-60 minutes to desired effect

**Calcium salts**
Electrolyte.

**Treatment of hypocalcemia:**

- **PO:** 50-150 mg elemental calcium/kg/day div QID
- **IV:** 50-100 mg calcium GLUCONATE/kg
  
  (usual max 3 g/DOSE)

OR 0.05-0.1 mmol/kg/hr infusion

IV available as calcium GLUCONATE (1 gram calcium GLUCONATE = 2.3 mmol calcium.) Please refer to Pediatric IV monograph for further prescribing details and limitations. PO available as calcium carbonate [liquid as 80 mg elemental calcium/mL], chewable tabs (Tums 500 mg) = 200 mg elemental calcium/tab, or calcium
carbonate tabs 1250 mg (containing 500 mg elemental calcium) OR calcium lactogluconate 20 mg elemental calcium/mL.

**Calcitriol**  
Vitamin D analogue (1,25-OH Vitamin D)  
PO: 0.015-0.025 mcg/kg/day div BID  
Titrate to 0.5-1 mcg/day  
Available as 0.25 mcg and 0.5 mcg gelatin capsules. Each liquid filled capsule contains 0.17 ml.

**Captopril**  
Angiotensin converting enzyme inhibitor (ACE-I).  
PO: 0.1-0.3 mg/kg/DOSE q8h initially  
(usual maximum 6 mg/kg/DAY or 200 mg/DAY).  
Monitor blood pressure closely after first dose, may cause profound hypotension. Cough is a common side effect. Not available as liquid formulation-consult pharmacist for administration directions.

**carBAMazepine**  
Anticonvulsant.  
PO: 10-20 mg/kg/DAY initially, usual maintenance dose is 20-30 mg/kg/DAY. Divide daily dose q8-12h.  
Serum trough concentration target is 17-50 micromol/L (4-11 microgram/mL).

**Charcoal**  
Adsorbent used in toxic ingestions.  
PO: 1-2 g/kg once (max 50 g/DOSE).  
PO: Multiple dose therapy 0.5 g/kg q4-6h.  
Give via NG if necessary, consider antiemetics.

**Chloral Hydrate**  
Sedative and hypnotic.  
Procedural Sedation:  
PO/PR: 80 mg/kg 20-45 mins before procedure may repeat half dose if no effect in 30 minutes (maximum 2 g/dose).  
Sedation:  
PO/PR: 25-50 mg/kg/DOSE q6-8h (max 500 mg q6h or 1 g hs).  
Avoid in liver dysfunction. Tolerance develops and withdrawal may occur after long-term use. Can cause airway obstruction and
respiratory depression, use with caution. For PR use, dilute syrup with water.

**Codeine:** Codeine has now been replaced with Morphine as the preferred oral narcotic analgesic for acute pain at HHSC due to better safety profile. Please refer to morphine dosing

**Dexamethasone**
Corticosteroid.

**Acute Asthma:**
IV/PO: 0.3 mg/kg/DOSE x 2 days (usual max 10 mg/DOSE)

**Croup:**
IV/PO: 0.6 mg/kg ONCE (usual max 12 mg)

**Cerebral Edema:**
IV/PO: 1-2 mg/kg then 1-1.5 mg/kg/DAY div Q6H (usual maximum 16 mg/DAY)

**Antiemetic for antineoplastic regimens:**
IV/PO: 0.25 mg/kg/DOSE q8h

Discontinuation of therapy greater than 14 days requires gradual tapering. Consider supplemental steroids at times of stress if patient has received long-term or frequent bursts of steroid therapy.

**Dextrose**

**Treatment of hypoglycemia:**
IV: 0.5-1 g/kg/DOSE:
1-2 mL/kg of 50% dextrose
2-4 mL/kg of 25% dextrose (infants and children)
5-10 mL/kg of 10% dextrose

1 mmol of dextrose (0.2 g of dextrose) provides 2.8 kJ (0.67 kcal).
Diazepam
Benzodiazepine sedative, anxiolytic and amnestic.

**Status epilepticus:**
- **IV:** 0.1-0.5 mg/kg/DOSE  
  (usual maximum 5 mg for children less than 5 yrs  
  10 mg for children greater than 5yrs)
- **PR:** 0.5 mg/kg/DOSE (maximum 20 mg/DOSE).
  For PR route, use IV formulation

**Skeletal muscle spasms:**
- **PO:** 0.12-0.8 mg/kg/DAY divided q6-8h
- **IV:** 0.04-0.2 mg/kg/DOSE Q2-4h  
  (max 0.6mg/kg in 8 hours)

Usual max IV: 5 mg for children less than 5 years
10 mg for children greater than 5 years

Fast onset and short duration of action with single doses, duration of action prolonged with continued use. Withdrawal may occur if discontinued abruptly after prolonged use. Not recommended for continuous infusion due to poor solubility.

**dimenhyDRINATE (Gravol®)**
Antihistamine used to treat nausea and vomiting.
- **IV/IM/PO:** 0.5 -1 mg/kg/DOSE div q6h prn  
  (maximum 50 mg/DOSE).
Available as 3 mg/mL liquid. *Please round to nearest 2.5mg dose.*
Not indicated for infants less than 2 years of age

**diphenhydrAMINE (Benadryl®)**
Antihistamine used primarily to treat urticaria.
- **IV/IM/PO:** 0.5-1 mg/kg/DOSE q6h prn  
  (maximum 50 mg/DOSE).
Available as 2.5mg/mL elixir. *Please round to nearest 2.5mg dose.*
**Docusate (Colace)**
Laxative
PO: 5 mg/kg/DAY once daily or in divided doses 2-4 times/DAY (maximum 200 mg/DAY)

Available as 10 mg/mL suspension or 100 mg capsule. Limited efficacy (consider alternatives-See Pediatric Bowel Regimen)
Suspension is bitter tasting. Mask taste by diluting with juice or milk/formula. *Please round to nearest multiple of 5mg.*

**Domperidone**
Prokinetic agent.
PO: 1.2-2.4 mg/kg/DAY div q6h (usual maximum 30 mg /DAY due to risk of QTc prolongation-Health Canada)
Give 15-30 mins prior to feed/meals and at bedtime. Baseline ECG and ECG after initiation recommended.

**Enoxaparin**
Anticoagulant, low-molecular weight heparin.
**Treatment:**
Subcutaneous:
Less than 2 months of age: 1.5 mg/kg/DOSE q12h.
Greater than 2 months of age: 1 mg/kg/DOSE q12h.

**Prophylaxis:**
Subcutaneous:
Less than 2 months of age: 0.75 mg/kg/DOSE q12h or 1.5 mg/kg q24h
Greater than 2 months of age: 0.5 mg/kg/DOSE q12h or 1mg/kg q24h
Maximum prophylactic dose 30mg q12h, or 40mg q24h

Monitor platelets and hemoglobin. Avoid in severe renal dysfunction. Anti-factor Xa level drawn 4 hours post Subcutaneous injection should be 0.5-1 unit/mL for treatment and 0.2-0.4 unit/mL for prophylaxis.

**EPINEPHrine (1mg/mL)**
NEB: Less than 10 kg: 2.5 mg/DOSE in 0.9% NS inh q1h prn
10 kg or greater: 5 mg/DOSE in 0.9% NS inh q1h prn

Bronchiolitis:
NEB: 1.5 mg in 4 mL of 3% Hypertonic saline q8h
Anaphylaxis:
    IM/SUBCUT: 0.01mg/kg/dose q20min prn (maximum 0.5mg/dose)

**fentaNYL**
Narcotic analgesic

    Continuous infusion:
    Continuous infusion: 0.5-2 mcg/kg/hr
    Initial bolus (loading) dose: IV: 0.5-1 mcg/kg
    PRN Breakthrough dose: 0.5-1 mcg/kg q1-2 h prn
    (refer to continuous infusion electronic order set)

Please note: **fentaNYL is 100 x more potent than morphine**
To prevent withdrawal, avoid abrupt cessation following high doses or long duration of therapy (greater than 5 days). Common adverse effects are pruritus, nausea and constipation.
**For severe pain or non-opioid naïve patients, some children/youth may require substantially higher doses for adequate analgesia. Please speak with staff physician or pharmacist to titrate to effect**

**Ferrous Sulfate : See iron.**

**Fluticasone (Flovent®)**
Inhaled corticosteroid.

    INH: 1-5 years:  Low dose: 100-125 mcg/day
           Medium dose: 200-250 mcg/day
       6-11 years: Low dose: Less than 200mcg/day
                  Medium dose: 200-500 mcg/day
                       High dose: Greater than 500mcg/day

Available as 50 mcg, 125 mcg , 250 mcg /inhalation metered dose inhaler, orders must specify strength as well as number of puffs. During acute exacerbations, may require higher doses.
**Furosemide**
Loop diuretic.

PO: 1-2 mg/kg/DOSE q6h-q24h (usual max 80 mg/DOSE)
IV: 0.5-2 mg/kg/DOSE q6h-q24h (usual max 80 mg/DOSE)
   or
begin at 0.1 mg/kg/hour and titrate to clinical effect
   (maximum 0.5 mg/kg/h).

Available as 10 mg/mL oral solution. *Please round to nearest 1mg dose.*

**Gabapentin**
Neuropathic pain agent

PO: 20 – 75mg/kg/day div. TID (max 2400-3600 mg/day)
Titrate to effect. Starting dose: 5mg/kg QHS
Then increase every 2–4 days by 5–6 mg/kg per day until:
   1. Effective analgesia achieved (may be noted at 30–45 mg/kg/day)
   2. Side effects experienced (nystagmus, sedation, tremor, ataxia, swelling)
   3. Maximum total dose of 50–75 mg/kg/day reached
      (2400–3600 mg/day)

Note: Younger children (<5 years) may require a 30% higher mg/kg per day dosing, such as a total dose of 45–60 mg/kg per day. Half of the total daily dose may be given as the evening dose if symptoms occur mostly in the evening and overnight. Consider titrating more rapidly for severe pain or as tolerated, titrate more gradually if sedation noted.

**Hyaluronidase**
Enzyme for interstitial IVs causing tissue damage (Calcium, TPN, Potassium etc.)

   SUBCUT: 6 months or younger: 3 units per site x 5
          Over 6 months of age: 30 units per site x 5

Available as 1,500 unit ampoule. Must be diluted by RN according to IV monograph (depending on age). Special Access drug, pharmacy requires notice that drug given. Best results if injected within 1 hour of IV going interstitial.
**Hydrochlorothiazide**
Thiazide diuretic.

- **PO:** 1-4 mg/kg/DAY div q12h

Available as 5 mg/mL suspension. *Please round to nearest 0.5mg or 1mg.*

**Hydrocortisone**
Corticosteroid.

- **Acute asthma:**
  - **IV:** 1-2 mg/kg/DOSE q6h for 24-48 hours then reassess.
    - (usual max is 5 mg/kg/DOSE)

- **Anaphylaxis:**
  - **IV:** 5-10 mg/kg/DOSE.

- **Acute adrenal crisis:**
  - **IV:** 1-2 mg/kg then:
    - Infants: 25-150 mg/DAY div q6h.
    - Older children: 150-250 mg/DAY div q6h.
    - OR: 50-100 mg/m² load then 25mg/m²/dose q6h

Discontinuation of therapy greater than 14 days requires gradual tapering. Consider supplemental steroids at times of stress if patient has received long-term or frequent bursts of steroid therapy.

**HYDROmorphone**
Narcotic analgesic *avoid range dosing in pediatrics*

- **Analgesia:**
  - **PO:** 0.03-0.08 mg/kg/DOSE q4-6h prn
    - (usual initial max 3 mg/DOSE **)
  - **IV:** 0.01-0.02 mg/kg/DOSE q2-4h prn (usual initial max 1mg)

- **Sedation/analgesia:**
  - Continuous infusion: 2-8 microgram/kg/hr
  - Initial bolus (loading) dose: IV: 0.01-0.02 mg/kg
  - PRN breakthrough dose: 0.01-0.02 mg/kg q3h prn
  - (refer to HYDROmorphone infusion electronic order set)

To prevent withdrawal, avoid abrupt cessation following high doses or long duration of therapy (Greater than 5 days). Common adverse effects are pruritus, nausea and constipation

**For severe pain or non-opioid naïve patients, some children/youth may require substantially higher doses for adequate analgesia. Please speak with staff physician or pharmacist to titrate to effect.**
Hydroxyzine
   Anti-pruritic:
   PO: 2 mg/kg/DAY div TID or QID
Available as a 2 mg/mL suspension or 10 mg, 25 mg capsules

Hyoscine Butylbromide
Anti-spasmotic (For acute relief of GI, GU and gallbladder tract spasms)
   IV: 0.25-0.5 mg/kg/dose TID-QID (maximum 20mg/dose)
   PO: tablets on long-term backorder, consider alternatives:
      Dicyclomine 10-20 mg PO QID PRN
      Pinaverium 50-100mg PO TID
      Trimebutine 100-200 mg PO TID

Hypertonic Saline 3%:
   Bronchiolitis
   NEB: 4 mL of 3% saline q8h (with EPINEPHrine 1.5mg)

Ibuprofen
   Analgesic and anti-inflammatory (NSAID).
   Can be dosed q6-8h prn.
   PO:

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Single Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 - 3.9</td>
<td>20</td>
</tr>
<tr>
<td>4 - 5.4</td>
<td>30</td>
</tr>
<tr>
<td>5.5 - 7.9</td>
<td>40</td>
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<tr>
<td>8 - 10.9</td>
<td>60</td>
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<tr>
<td>11 - 15.9</td>
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<tr>
<td>16 - 21.9</td>
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</tr>
<tr>
<td>22 - 26.9</td>
<td>200</td>
</tr>
<tr>
<td>27 - 31.9</td>
<td>250</td>
</tr>
<tr>
<td>32 - 43.9</td>
<td>300</td>
</tr>
<tr>
<td>44 – over</td>
<td>400</td>
</tr>
</tbody>
</table>

Do not administer within 6 hours of Parenteral or PO Ketorolac (duplicate NSAIDs).
Administer with food, if able, to minimize GI upset.
Avoid in patients with renal impairment or increased risk of bleeding
**Insulin (regular)-HumuLIN R or NovoLIN Toronto**
Recombinant human insulin.

**Diabetic ketoacidosis:**
IV: 0.05-0.1 units/kg/h initially. (add 25 units of regular insulin to 250mL NS) then titrate to patients response

*For IV administration MUST use regular insulin.*

**Hyperkalemia:**
IV: 0.1 units/kg (add 100 units of regular insulin to 100 mL NS) AND dextrose 0.5 g/kg.

**Ipratropium (Atrovent®)**
Inhaled anticholinergic bronchodilator.

**Severe asthma:**
NEB: 250 microgram (0.5-1 mL) q4-6h.
INH: 2-4 puffs q4-6h (1 puff = 20 mcg)

**Iron**

**Treatment of iron deficiency anemia:**
PO: 4-6 mg/kg/DAY (of elemental iron) div q8-24h. (usual max: 180 mg/day = 60 mg elemental iron TID)

**Prevention of iron deficiency anemia:**
PO: 2-3 mg/kg/DAY (of elemental iron) div q8-24h.

Give with food if GI upset occurs. Liquid does stain teeth, rinse mouth well.

Available as ferrous sulfate 75 mg/mL solution (15 mg/mL elemental iron) and tablets containing 60 mg elemental iron/300 mg ferrous sulfate or 35 mg elemental iron/300 mg ferrous gluconate. Round to nearest 12.5 mg dose (2.5 mg elemental iron) for liquid.

Ferrous fumarate (Palafer) and Feramax not available in hospital.

**Kayexelate® (Sodium Polystyrene Sulfonate)**
Cation exchange resin.

**Treatment of hyperkalemia:**
PO/PR: 1 g/kg/DOSE may be repeated q4-6h prn (usual maximum 30-60 g/DOSE).

May be added to feeds to chelate potassium (see Pediatric Hyperkalemia Management with Sodium Polystyrene Sulfonate (Kayexalate®) in Formula/Breast Milk Order Set)
Serum potassium 5.2 – 6.1 mmol/L: 1.2 g per 120 mL EBM/formula
Serum potassium greater than 6.2 mmol/L: 2.4 g per 120 mL
EBM/Formula

Give in water or juice, do not mix with fruit juices with high potassium content such as orange juice. Available overnight as 1.2 g doses to be added to feeds.

**Ketorolac (Toradol®)**
Analgesic and anti-inflammatory (NSAID).
- **IV/IM:** 0.5 mg/kg/DOSE q6h (maximum 120 mg/DAY). Some adult studies have shown ceiling dose of 10mg/dose IV
- **PO:** Adolescents: 10 mg q6h (max 40 mg/DAY) for 5 days total (IV and PO). No weight based dosing available for children. Available as 10 mg tablets.

*IV dosing not equal to PO*
Adverse effects include renal dysfunction, GI irritation and ulceration.

**do not administer within 6 hours of ibuprofen (duplicate NSAIDs)**

**Lactulose**
Osmotic laxative.
- **PO:**
  - infants: 2.5-5 mL q8-24h.
  - children: 5-10 mL q8-24h.
  - adolescents: 15-30 mL q8-24h.

**levETIRAcetam:**
Anticonvulsant
- **PO:** 5-10 mg/kg/DAY (Daily or BID)

May titrate dose to effect (max 3,000mg/DAY), may require dosage adjustment in renal impairment. IV available as SAP product. Please contact pharmacist for information.
**LORazepam**
Benzodiazepine sedative, anxiolytic and amnestic.

**Status epilepticus:**
- **IV:** 0.1 mg/kg/DOSE, (usual maximum 4 mg/DOSE).
  - May repeat 0.1 mg/kg in 5 mins if needed
- **PR:** 0.2 mg/kg/DOSE (usual maximum 8 mg/DOSE)

**Pre-op/procedural sedation:**
- **PO/SL:** 0.05 mg/kg/dose (max 2 mg /DOSE)
- **IV:** 0.03-0.05 mg/kg/dose (max 4 mg/DOSE).

Intermediate duration of action and no active metabolites. Withdrawal may occur if discontinued abruptly after prolonged use. Not recommended for continuous infusion due to poor solubility. May give parenteral preparation rectally.

**Magnesium salts**
Electrolyte.

**Treatment of hypomagnesemia:**
- **PO:** 20-40 mg/kg/day elemental magnesium div TID-QID
- **IV:** 25-50 mg/kg (maximum 5 g) over 4-5 hours

**Severe acute asthma:**
- **IV:** 25-75 mg/kg/DOSE once (usual maximum 2 g/DOSE)

IV available as magnesium sulfate. PO available as magnesium glucoheptonate oral liquid 100 mg/mL (5mg/mL elemental Mg) or magnesium oxide 420 mg tablet (252 mg elemental Mg)

**methylPREDNISolone**
Corticosteroid.

**Severe acute asthma:**
- **IV:** 0.5-1 mg/kg/DOSE q12h (usual max 40 mg/DOSE)
  - OR: 1-2 mg/kg/DOSE q6h until improvement seen
  - (usually 24-48 hours) then q24h or switch to PO prednisone.

**Anti-inflammatory:**
- **IV:** 1-2 mg/kg/DOSE q24h.

**High dose/pulse therapy:**
- **IV:** 10-30 mg/kg/DOSE q24h

Discontinuation of therapy greater than 14 days requires gradual tapering. Consider supplemental steroids at times of stress if patient has received long-term or frequent bursts of steroid therapy.
**Metoclopramide**
Antiemetic, gastrointestinal prokinetic agent.
IV/PO: 0.4-0.5 mg/kg/DAY div q6h
(usual maximum 40 mg/DAY).
Extrapyramidal reactions occur more commonly in children and may be treated with diphenhydramine. Contraindicated in children less than 1 year and use with caution in children greater than 1 year

**Midazolam**
Benzodiazepine
Seizure termination:
IN: 0.2 mg/kg/DOSE (max 5mg/nare)
Dose can be repeated in 5 minutes PRN
Onset within 5 minutes, peak within 10 minutes and duration 30-60 minutes following intranasal administration

**Morphine**
Narcotic analgesic.

*Analgesia*: *avoid range dosing in pediatrics*
PO: 0.2-0.5 mg/kg/DOSE q4-6h prn
(usual initial max is 10-15 mg/DOSE**)
IV: 0.05-0.1 mg/kg/DOSE q2-4h prn (initial max 5mg) and increase as required
*Sedation/analgesia:*
Continuous infusion: 10-40 microgram/kg/hr infusion
Initial bolus (loading) dose IV: 0.05-0.1 mg/kg
PRN breakthrough dose: 0.05-0.08 mg/kg q3h PRN
(refer to continuous infusion electronic order set)

Please note: Morphine has now replaced codeine as the preferred oral narcotic analgesic for acute pain at HHSC due to better safety profile. Reduced doses may be required if used in combination with benzodiazepines. To prevent withdrawal, avoid abrupt cessation following high doses or long duration of therapy (over 5 days). Common adverse effects are pruritus, nausea and constipation.

**For severe pain or non-opioid naïve patients, some children/youth may require substantially higher doses for adequate analgesia. Please speak with staff physician or pharmacist to titrate to effect**
Naproxen  
Analgesic and anti-inflammatory (NSAID).  
PO: 10-20 mg/kg/DAY div q8-12h (maximum 1 g/DAY). 
Adverse effects include renal dysfunction, GI irritation and ulceration. 
Available as 25mg/mL liquid preparation or 250mg and 500mg tablets. Also available as suppositories (250 mg) if PR route preferred.

Nifedipine  
Anti-hypertensive.  
PO: 0.125-0.25mg/kg/DOSE (max 10mg/DOSE). 
May repeat doses of 0.25-0.5 mg/kg every 4-6 hours (up to 2mg/kg/day) 
Use immediate release capsules. Each 10mg liquid filled capsule contains 0.3mL.

Omeprazole  
Inhibitor of gastric acid secretion (proton pump inhibitor).  
PO: 1-2mg/kg/DAY divq12-24h (maximum 40 mg/DAY). 
A 2 mg/mL oral suspension is available.  Please round to nearest 1mg dose. 
**See also PPI table at end of formulary listing for alternatives**

Ondansetron  
Antiemetic.  
Post-op N/V  
IV/PO: 0.05-0.1mg/kg/DOSE q8h prn (usual max 4 mg/DOSE, may increase to 8mg as needed)  
Chemotherapy-induced nausea and vomiting:  
IV/PO: 0.15 mg/kg/DOSE (max 8mg/dose)

Oxybutynin (Ditropan)  
Urinary antispasmodic agent.  
PO: 1-5 years: 0.2 mg/kg/DOSE BID-QID  
Greater than 5 years: 5 mg/DOSE BID-QID  
Available as 1 mg/mL syrup or 5 mg tablets
**Pantoprazole**
Inhibitor of gastric acid secretion (proton pump inhibitor).
- **PO/IV:** 1-1.5 mg/kg/DAY div q12-24h (usual max 40 mg/DOSE)
- **GI bleed (infusion):**
  - **IV:**  5 – 15 kg: 2 mg/kg/DOSE x 1 DOSE, then 0.2 mg/kg/h
  - 16 – 40 kg: 1.8 mg/kg/DOSE x 1 DOSE, then 0.18 mg/kg/h
  - Greater than 40 kg: 80 mg x 1 DOSE, then 4 - 8 mg/h

There is no liquid formulation available. Intravenous and oral pantoprazole provide equivalent acid suppression. Tablets are enteric coated - do not crush tablets or administer tablets via gastric tubes.

**preferred formulary alternative for adult doses**
**See also PPI table at end of formulary listing for alternatives**

**PEG-3350 (Polyethylene Glycol)**
Osmotic Laxative
- **PO:** 0.5-1.5 g/kg/DOSE

Suggested initial dose:
- 4 – 8 kg: 4.25 g PO daily
- 9 – 16 kg: 8.5 g PO daily
- Equal to or greater than 17 kg: 17 g PO daily

Available as 17 gram sachet in hospital. Onset 2-4 days. If no effect in 48 hours, can increase to BID dosing. Mix in 125-250 mL of suitable beverage (water, juice, soda). Odorless and tasteless.

**PHENobarbital**
Barbiturate anticonvulsant.
- **Status epilepticus:**
  - **IV:**  20 mg/kg over 20-30 minutes.
- **Maintenance:**
  - **IV/PO:** 3-5 mg/kg/DAY ÷ q12-24h.

Usual serum level for seizure control: 65-172 mmol/L (15-40 mg/L) Compounded as 10mg/mL formulation, round to nearest 5mg dose if possible.
Phenytoin
Anticonvulsant

**Status epilepticus:**
IV: 20 mg/kg over 20 minutes.

**Maintenance:**
IV/PO: 5 mg/kg/DAY (range 3-10 mg/kg/DAY) div q8-12h.

May require higher doses for patients with head injuries. Must be diluted in saline only and requires in-line filter (0.22 micron). Hold feeds before and after enteral administration as feeds may decrease bioavailability of phenytoin. Significantly increased free fraction in patients with hypoalbuminemia may result in underestimation of effective drug concentration and difficulty in interpretation of drug levels and toxicity may occur at “therapeutic” serum levels. Therapeutic level: 40-80 micromol/L (10-20 microgram/mL).

Phosphate salts:
Electrolyte

**Treatment of hypophosphatemia:**
PO: 1-2 mmol/kg/day div BID-QID
IV: 0.15-0.34 mmol/kg (maximum 15 mmol/dose) over 4-5 hours (may repeat)

IV available as sodium PHOSPHATE (3 mmol phosphate + 4 mmol sodium/mL) and potassium PHOSPHATE (3 mmol phosphate + 4.4 mmol potassium/mL). PO available as IV formulation of potassium phosphate (see above) given PO, and Phosphate 500 mg effervescent tablet (16 mmol phosphate/3 mmol potassium per tablet) or sodium phosphate oral solution (4.2 mmol/mL phosphate). Order in mmol phosphate component

Dose recommendations assume normal renal function. Please refer to Pediatric IV monograph for further prescribing details and limitations

**Pico-Salax®** (picosulfate sodium/magnesium oxide/citric acid)
Stimulant and Osmotic Laxative
PO: 1-6 yrs administer ¼ sachet
6-12 yrs administer ½ sachet
Over 12 yrs: 1 sachet
Dose can be repeated after 6-8 hours for bowel prep and may be ordered BID short-term for refractory constipation. Used for refractory constipation, fecal impaction and for cleaning out bowels. Contents of 1 sachet are mixed with 160 mL water.

**Potassium Salts**
Electrolyte. 1 mmol of potassium CHLORIDE = 1 mEq of potassium CHLORIDE

T**Treatment of hypokalemia:**
PO: 1-2 mmol/kg/DAY div q6h-24h.
IV: 0.25-0.5 mmol/kg/DOSE (suggest max 20 mmol/DOSE then reassess)
In PICU/ED/HEM-ONC may give up to 1 mmol/kg/DOSE

For IV administration, potassium CHLORIDE available as 10 mmol/100 mL sterile water for peripheral administration and 20 mmol/100 mL sterile water for central administration. Please round doses where possible.

For PO administration potassium CHLORIDE is available as oral solution 1.33 mmol/mL, and slow release capsules (Micro-K) 600 mg (= 8 mmol). Potassium CITRATE (K-Lyte) is also available as effervescent tablet (25 mEq/tablet). Give po with food. Dilute oral solution in water or juice and give over 5-10 mins. Slow-release capsules should be swallowed whole or can be opened and contents sprinkled on semi-solid food.

Usual PO maximum = 80 mmol/DAY. Doses greater than 20 mmol should be divided for tolerability

Risk of arrhythmias and cardiac arrest with rapid IV administration. Dose recommendations assume normal renal function. Please refer to Pediatric IV monograph for further prescribing details and limitations.
**prednisONE or prednisOLONE**
Corticosteroid.

*Acute asthma:*
PO: 1-2 mg/kg/DOSE q24h.

*Anti-inflammatory or immunosuppressive:*
PO: 0.5-2 mg/kg q24h (usual max is 60 mg/DAY)

1 mg prednisONE = 1 mg prednisOLONE.

PrednisONE is 5 mg/mL and compounded as liquid in hospital.
PrednisOLONE is 1 mg/mL and commercially available.
Discontinuation of therapy greater than 14 days requires gradual tapering. Consider supplemental steroids at times of stress if patient has received long-term or frequent bursts of steroid therapy.

**Ranitidine**
H₂ receptor antagonist.

*Reduction of gastric acid secretion:*
IV: 2-4 mg/kg/DAY div. q8-12h (usual max 50 mg q8h).
PO: 4-10 mg/kg/DAY div. q8-12h (usual max 300 mg/DAY).

IV dose is approximately 50% of oral dose. Modify dosage interval for patients with renal impairment. May add IV daily dose to TPN. Available as a 15 mg/ml oral solution, 75 mg or 150 mg tablets.

**Salbutamol (Ventolin)**
Bronchodilator, β₂ agonist.

*Acute asthma:*
MDI: Less than 20 kg: 4 puffs q30 mins – q4h prn
Greater than 20 kg: 8 puffs q30mins-q4h prn
NEB: Less than 10 kg: 2.5 mg q30mins – q4h prn
10 kg or greater: 5 mg q30mins – q4h prn
Administered in 3 mL of NS.
Available as 5 mg/mL solution for nebulization.

*Maintenance therapy:*
MDI: 1-2 puffs q4h prn.
Titrate dose to effect and/or adverse effects (monitor for tachycardia, tremor and hypokalemia). For most patients metered dose inhalers with a spacer device are the preferred method of drug delivery.
Senna
Stimulant laxative.
   PO: infants: 1 or 2.5 mL (1.7 or 4.25 mg) q24h.
   children: 2.5 or 5 mL (4.25 or 8.5 mg) q24h.
   adolescents: 5 or 10 mL (8.5 or 17 mg) q24h.
Some patients, particularly those receiving opiates may require higher doses and/or more frequent administration. Also supplied as 8.6 mg tablets.

Spironolactone
Potassium sparing diuretic.
   PO: 1-3 mg/kg/DAY div. q12-24h.
Available as a 5 mg/mL suspension. *Please round doses to the nearest 0.5 mg or 1 mg.*

Topiramate
Anticonvulsant
For greater than 2 yrs and less than 16 yrs:
   PO: 1-3 mg/kg/DAY as single dose (initial max 25 mg/DAY) then can increase dose at 1-2 week interval by 1-3 mg/kg/DAY divided q12h.
   Usual maintenance
   PO: 5-9 mg/kg/DAY divided q12h
17 years and older:
   PO: 25 to 50 mg/DAY as a single dose, may increase dosage by 25 to 50 mg/DAY at 1-week intervals, given q12h.
   Titrate dose to response to a usual maintenance dose of 200 to 400 mg/DAY divided q12h

Available as 6 mg/mL liquid (compounded in hospital), or 25 mg or 100 mg tablets

Ursodiol
TPN Cholestasis:
   PO: 30 mg/kg/DAY divided q8h
Biliary Atresia:
   PO: 10-15 mg/kg/DAY once daily
Valproic Acid and Derivatives
Anticonvulsant.

**Maintenance**
PO: 15-20 mg/kg/DAY increased to a maximum of 30-60 mg/kg/DAY q6-12h.

Desired therapeutic range: 350-700 micromol/L (50-100 microgram/mL).

Dosing is equivalent for valproic acid, divalproex and sodium valproate. Valproic acid oral liquid may be administered rectally (PR).

Valproic acid IV is special access only and reserved for specific indications. Please consult Pharmacist.

**Vitamin K (Phytonadione)**
Reversal of prolonged clotting times or warfarin induced anticoagulation.

IV/PO: 0.5-10 mg/DOSE.

Use lower doses if there is no significant bleeding and patient will require warfarin in the future. May repeat in 6-8 hours. Injection may be given by mouth, undiluted or in juice or water.

**Zinc**
Supplement
PO: 0.5-1 mg elemental zinc/kg/DAY divided q8-12h

(usual max 15 mg elemental zinc/DAY)

Available as 10 mg/mL elemental zinc suspension, 10 mg or 50 mg elemental zinc tablets (as zinc gluconate)
Suggested dose equivalence apply in stable analgesic states. Patients with acute postoperative pain may have variations to suggested conversions.

### Approximate Opioid Analgesic Equivalence at HHS - April 2014

<table>
<thead>
<tr>
<th>OPIOID</th>
<th>Parenteral Dose (mg)a</th>
<th>Oral Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>fentaNYL</td>
<td>0.1</td>
<td>N/A</td>
</tr>
<tr>
<td>HYDROmorphone</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Methadone</td>
<td>N/A&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.5-10&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Morphine</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>OxyCODONE</td>
<td>N/A</td>
<td>15</td>
</tr>
</tbody>
</table>

These approximate analgesic equivalences should be used only as a guide for estimating equivalent doses when switching from one opioid to another in chronic pain patients. Additional references & patient response should be consulted to verify appropriate dosing of individual agents.

- Parenteral route includes intravenous, intramuscular and subcutaneous route, but does not include intraspinal route.
- Methadone equivalency is highly variable – this ratio from Micromedex as suggested equivalency ratio in patients on chronic oral methadone.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Equivalent Dose (mg)</th>
<th>Relative Mineralocorticoid Potency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glucocorticoids:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Short-acting</strong> (biologic half-life 8–12 h)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cortisone</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td><strong>Intermediate-acting</strong> (biologic half-life 12–36 h)</td>
<td></td>
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</tr>
<tr>
<td>MethylPREDNISolone</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>PrednisoLONE</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>PrednisONE</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td><strong>Long-acting</strong> (biologic half-life 36–54 h)</td>
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</tr>
<tr>
<td>Dexamethasone</td>
<td>0.75</td>
<td>0</td>
</tr>
</tbody>
</table>

*a Equivalent doses are approximations and may not apply to all diseases or routes of administration. Duration of hypothalamic-pituitary-adrenal (HPA) axis suppression and degree of mineralocorticoid activity must be considered separately.*