UNIVERSITY OF CALGARY
CUMMING SCHOOL OF MEDICINE

Paediatric Clerkship Handbook

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DISCLAIMER

This Handbook has been designed to facilitate your learning and patient care during your paediatric clerkship rotation. We hope it will assist you a great deal! While every effort has been made to ensure the enclosed material is correct, it is possible that errors may be present. Individuals making clinical decisions should ensure that their care is consistent with up-to-date guidelines and recommendations, and should review patient management decisions with more senior clinicians, when appropriate.

If you have suggestions on how to improve this handbook for future students, please contact Julian Midgley at julian.midgley@ahs.ca 10th March 2017 v1.1

WELCOME TO PAEDIATRICS
Have fun learning in a paediatric environment!

HOW A CLERK CAN BECOME MORE SELF-DIRECTED

Present cases in the SNAPPS format to encourage reflection on the problem and possible solutions before quizzing your preceptor.
This promotes higher level clinical reasoning skills.
SNAPPS is learner-driven.

SNAPPS

- **S** - summarise the case
- **N** - narrow the differential
- **A** - analyse the differential
- **P** - probe the preceptor
- **P** - plan management
- **S** - select an issue for self directed learning

Summarise the history and findings

Present only the pertinent facts (the preceptor can readily elicit further details)
Try and use only 50% of your time (less than 3 minutes)
Some of the background can be discussed with the analysis of the differential diagnoses

Narrow the differential diagnosis

Offer no more than 3 possible diagnoses
Focus on the most likely possibilities rather than on “zebras”

Analyse the differential

Review the pros and cons for each diagnosis
Justify the relevant diagnostic possibilities
Demonstrate your analytic clinical skills (verbalise your thinking process)

Probe the preceptor (Uncertainties, Difficulties or Alternative Approaches)

Not as painful as it sounds!
Clarify any difficult or confusing issues/knowledge deficits with your preceptor

Plan management

Either a brief management plan or suggest specific interventions
Requires an integrated clinical approach
Expect the preceptor to be a rich resource of knowledge and experience

Select an issue for self-directed learning

Reflecting on the case may reveal gaps in your knowledge base
Make a note about focused, patient-based questions to guide self-study reading

Wolpaw TM et al, Academic Medicine 78:893 (2003)

http://journals.lww.com/academicmedicine/Fulltext/2003/09000/SNAPPS__A_Learner_centered_Model_for_Outpatient.10.aspx

PAEDIATRIC HISTORY

Date/Time

ID & CC:

- Age (in years/months or months/weeks if very young) and sex
- Hometown
- May include a major underlying diagnosis if there is one (e.g. epilepsy, CP, Trisomy 21, multiple developmental problems)
- One sentence describing the main concern(s) of the patient/family in general terms e.g. *"Three-month old male ex-prem (corrected age 40w) with CLD presents with cough and increasingly "noisy breathing" over past 12h"*

History of the Presenting Illness (HPI):

- Describe each complaint as cited by caretaker/child
- Give details of onset, provoking/relieving factors, quality/intensity, radiation, associated signs and symptoms and timing, where relevant, for each complaint
- Describe family management of problem (drugs, other therapies)

Review of Systems:

- Here or at end of history.
- Use age-appropriate questions to screen all systems.

Immunizations:

- Details, regular versus elective (if none ask why)

Medications:

- Include dose/kg, how given, adherence
- Include non-prescription meds/vitamins/complementary therapies

Allergies:

- Drugs, foods, latex and environmental – specify symptoms
- If anaphylaxis (ask whether carries Epipen)

Past Medical History:

Perinatal:

Pregnancy

- Bleeding, infections, HTN, GDM, ETOH/smoking/illicit drugs, medications

Delivery

- Gestation, induced/spontaneous/vaginal/C-S/breech/forceps/vacuum, birth weight

Neonatal course

Other

- Cried? resuscitation?, APGARS, neonatal problems, early feeds
- Past illnesses, hospitalizations, surgeries
- Other clinics/specialists who see family
- Previous growth problems or other concerns by family doctor/paediatrician

Development:

- Milestones
- Vision/hearing/ life skills (toileting, feeding), sleep
- Gross motor/fine motor/social/speech and language

Nutrition/Activity:

- Current feeding pattern including breast/bottle/weaning/feeding habits
- Sports, activity, TV time

Family History:

- Draw a family tree
- Family structure including who lives at home
- Parents ages, occupation and health, consanguinity
- Siblings age, sex and any illness
- Inherited illness, childhood illness, child deaths, miscarriages/stillbirths

Social History:

- Where and with whom does the child live? Who has custody?
- Who cares for child – daycare, sitter, parents? Smokers who live at home?
- School — grade and any special assistance?
- Supports (at home/while in hospital)
- Financial concerns/support services involved
- Impact of illness on child/family/siblings

ADOLESCENT HISTORY (HEADSSSSS):

Routinely ask

- **H**ome
- **E**ducation, **E**ating habits
- **A**ctivities
- **D**rugs, ETOH, smoking
- **S**ex, **S**exuality, **S**afety, **S**ocial, **S**uicide
- Other: immunization (tetanus, hepatitis B)

PHYSICAL EXAMINATION

In addition to general (adult type) physical examination (depends on patient age):

Have toys handy (for distraction/developmental assessment)

Observe carefully during history

Inspect for dysmorphic features

Be flexible, sensitive yet confident

Position and immobilize patient for certain physical examinations (e.g. otoscopy)

Measure and interpret height, weight, head circumference (including plotting on growth curve and calculation of BMI)

Measure and interpret vital signs (including BP)

Palpate for fontanelles and suture lines

Perform red reflex and cover-uncover test

Perform otoscopy

Elicit primitive reflexes

Perform neonatal/infant hip examination

Assess the lumbosacral spine for abnormalities

Assess for scoliosis

Palpate femoral pulses

Examine external genitalia

Assess for sexual maturity rating (Tanner staging)

IMPRESSION

A brief summary of your overall assessment including age, gender and most important findings on History, Physical Examination and Investigation. Explain how they may relate (max 3 sentences)

e.g. Three month old ex-prem with mild CLD (nighttime home O_2) presenting with 12 hour history of increased cough and poor feeding but no fever, in moderate respiratory distress responding well to increased O_2 and very frequent suctioning. Bilateral crepitations, congestion and CXR consistent with viral bronchiolitis with no evidence of bacterial pneumonia.

PROBLEM LIST

A prioritized point form list of active and chronic issues including a differential diagnosis for active, undiagnosed problems e.g.

1. *moderate respiratory distress — likely viral bronchiolitis (RSV most likely), no evidence of cardiac signs & symptoms,* differential diagnosis *also includes bacterial pneumonia (Strep pneumo, E coli, Staph aureus) → O_2, qhourly suctioning, expect may require 3 - 5 days of hospitalization*
2. *dehydration/nutrition — mild dehydration, poor feeding → trial of frequent small feeds, if not achieving maintenance, consider nasogastric tube feeds.*
3. *CLD — continue current aldactazide dose but consider increase if not improving*
4. *ex-prem — recheck CBC for anemia since history of anemia as newborn*
5. *vaccinations — missed 2 month immunisations so consider prior to discharge*
6. *development — needs a more thorough assessment of tone once more stable*
7. *continuity — need to contact Dr. X, regular paediatrician in am*

PLAN

Outline in detail your plan for each problem on your problem list (e.g. as above).

ADMISSION CHECKLIST

*********All admissions ***must include*** *all of the following:*
(check all are done before calling preceptor/senior to review)

- ❑ A *thorough* **paediatric history**
- ❑ A complete **physical exam**
- ❑ A **growth chart** plotted with current measurements, including BMI
- ❑ A review of **relevant investigations**
- ❑ A review of **old charts** (where applicable)
- ❑ Formulation of a **problem list** and **differential diagnosis**
- ❑ A management **plan** for each problem
- ❑ Complete **orders**
- ❑ Completed **notification of admission** form for primary care physician

The admitting clerk/physician is responsible for ensuring that new orders and notes reach the inpatient units and for drawing them to the attention of the charge nurse for processing

"DAVID" ORDERS

***Identification**:*
"Admit to Unit _____ under _____ Team with _____" (Dx e.g. bronchiolitis)

D – DIET: *e.g. DAT (diet as tolerated), infant—breastfeed or formula ad lib, NPO (nothing by mouth), sips → DAT, diabetic, clear fluids only, etc*

A – ACTIVITY: *e.g. AAT (activity as tolerated), bed rest, respiratory/enteric isolation, seizure precautions, C-spine precautions, elevate HOB 30 degrees, etc*

V – VITALS: *e.g. routine (q4h on ACH inpatient units), neuro vitals if indicated. Specify daily weights, and accurate ins and outs and BP if this is important. Also can write to be notified in certain situations, e.g. if RR>40, or if BP systolic <90 (depends on age and status of child).*

I – INVESTIGATIONS: *labs, imaging, studies, consults, etc*
– IVs: *solution, rate, additives (e.g. D5W 0.45%Saline @75 mL/hr with 20 mmol/L KCl)*

D – DRUGS: *medication, dose, route, frequency, as calculated based on mg/kg (specify this in order) Include meds from home also (in mg, not mL)*

NB – Please send notification of admission form (complete form must be filled out).

PROGRESS NOTES

Weekdays:

- **Patient ID** (age, sex, problem/diagnosis, significant underlying condition)
- **Major events** in past 24h
- **Clinical exam:** write full exam 2x/w if stable; other times highlight relevant parts
- **Daily data**: **weight** (include increase/decrease), **meds** (eg D4/7 cefuroxime), etc
- **Weekly**, must calculate and write meds in mg/kg. Ins (mL/kg/day) Outs (mL/kg/h)
- **Investigations** from last 24h
- **Impression** (of the current/new problems)
- **Problem List/Plans**: for each problem describe ongoing therapy or plans. Include fluid/nutrition, discharge planning, on-call plans
- Changes to condition, test results—add to chart throughout the day
- Add plans from rounds to your progress/supplemental note
- **Friday notes:** write detailed note including specific plans for the weekend. Ensure plans for any anticipated discharge are prepared, paperwork is completed and clearly outlined in notes.

Weekends:

- On known patients, write brief notes highlighting changes
- **On-call:** Document every time asked (parent, RN, attending) to reassess/see patient or change treatment.

Post Op:

- All post-op patients must be examined and an update note documented in the chart

Chronic Patients:

- Keep an **active problem list** in your notes
- Ensure **growth chart** plotted weekly
- **Medications** calculated once per week in mg/kg/day
- **Development Summary** x1/month for infants/toddlers
- **Summary dictation monthly** or when going off-service
- Discuss **social issues/discharge planning** regularly

DAILY PATIENT PRESENTATIONS

- Be brief but thorough, prepare for presentations before rounds
- Start with a **brief identification** e.g. *"This 3 year old boy presented two days ago with cough and fever and is on his second day of treatment with antibiotics for radiographically confirmed pneumonia"*
- State **significant occurrences** over past 24h e.g. *"afebrile now for 24h with RR decreasing (20s) from admission and starting to drink better. Now off O_2"*
- **Pertinent findings on clinical exam**: *"vitals stable with RR 24 and no signs of distress. Still decreased AE on right with faint crepitations but improved AE and clear on the left. Exam otherwise unchanged"*
- **Ins and Outs** (see Progress Notes above)**, meds, recent labs, radiographs, wt etc**
- **Problem list and plan** for each problem:
  1. *Bacterial pneumonia — improving → change to po antibiotics today and consider discharge tomorrow if remains afebrile*
  2. *Dehydration-resolving → saline lock IV and reassess this afternoon*
  3. *Speech delay → arrange for hearing test after discharge*
  4. *Delayed immunizations → will book appt for MMR/varicella next week*
  5. *Discharge Planning → as above, continue cefprozil to complete 10 day course, follow up with GP next week — will call today*

MEDICAL STUDENT TELEPHONE CONSULTATION REQUEST GUIDE

The purpose of this guide is to help you be a more effective telephone communicator to consultants.

1. Identify the consultant (or fellow/resident) on the required service using ROCA.
2. Hello, Dr._____ this is_____ from the _____ (e.g. CTU)
   I have a patient I'd like to present to you please for a consult.
3. (Pause for acknowledgment by consultant)
4. _____ is a___ year/month old who presented _____complaining of _____.
5. Give relevant history and data.
6. I think the most likely diagnosis is_____.
7. This is what we've done for him already_____.
8. I'd like you to evaluate him for_____ (explain your question clearly).
9. We are hoping this consultation can be done _____ (e.g. urgently, non-urgent).
10. Thank you!

Total phone time should hopefully be less than one minute

DISCHARGES

- Discharge planning should be discussed regularly on rounds as an "issue"
- Discharges which may occur over the weekend should be planned well in advance
- Discharge orders should include:
  - **Follow Up** with physicians (specify when and where and with whom)
  - **Planned investigations** (specify when and where and complete requisition)
  - **Discharge medications** (even if the same as admission)
  - **Specific things to watch for and what to do if they occur**

***clerks/residents should personally review all the of the discharge plans with the family prior to their departure and answer any questions*

DISCHARGE CHECKLIST

- ❑ Follow up appointments booked or indicated
- ❑ Follow up investigations indicated/requested
- ❑ Discharge medications indicated
- ❑ Prescriptions
- ❑ Discharge orders (may be conditional or discharge planning orders including medications, follow up, investigations and what to watch for)
- ❑ Handwritten discharge summary completed
- ❑ Discharge summary faxed to next physician
- ❑ Communication with next physician (via faxed discharge summary, phone call +/- consult note)
- ❑ IV's, central lines removed
- ❑ Teaching e.g. Asthma teaching, Epipen teaching
- ❑ Notification to family of potential discharge and discharge time
- ❑ Communication to family about discharge plans including danger signs to watch for
- ❑ Notify charge nurse of potential discharge date

DISCHARGE SUMMARIES

A. For uncomplicated short stay patients complete short written discharge sheet. Please print clearly. Note discharge summaries must be signed by your <u>senior</u> resident or attending physician. Ensure copy is faxed to the office of primary care physician prior to patient discharge.

B. ***How to dictate: (most discharge summaries at ACH/PLC will be into SCM)***
Dial: 77778 (outside line 1-855-648-3117) or access number appropriate for site
ENTER your Speaker Code followed by #
ENTER Facility code (ACH 191, FMC 192, PLC 194)#
ENTER Work type D/C SUMMARY CODE 20# (Transfer summary 21#)
ENTER Patient's 10 DIGIT MEDICAL REGIONAL HEALTH NUMBER (MRN) # ,
Press 2 to begin dictation (if STAT Press 1 after pressing 2). Other buttons 2 to hold and restart, 3 to short rewind, 4 to rewind to beginning, 5 to fastforward, 9 to end).
"This is _____ (your name) clinical clerk dictating for_____ (doctor) on _____(date) from _____ (Alberta Children's Hospital). Discharge summary on patient _____. Patient number _____DOB: _____.
Please send copies to: family doctor, _____, Hospital paediatrician _____ (specify name), the emergency physician who saw the patient, community paediatrician, consultants, your resident _____.

Admission Date: _____
Discharge Date: _____
Most Responsible Diagnosis: _____
Other Diagnoses: _____ (please list as many as possible)
Procedures in Hospital _____ (include date, surgeon, investigations):
Summary Note:
HPI, PMHx, Meds/Allergies, FHx, Social History, Physical Exam at Admission, Investigations at Admission, Course in Hospital and finish with Discharge Plans (condition, follow-up, meds, etc). Obtain confirmation number and document this on patient chart.

COMMUNITY FOLLOW-UP

- Ensuring continuity of care and good follow-up is critical
- Community paediatricians may be consulted for "concurrent care" for complicated or chronic patients
- Please notify community paediatricians directly, by phone, of **important investigation findings, diagnoses or deterioration** (e.g. transfer to PICU)
- Before discharge, phone the primary care physician to **arrange follow-up**
- Send a short note to their office by fax if immediate follow-up is planned
- A copy of the discharge summary or a short note should be faxed to primary physicians at the time of discharge

GUIDELINES FOR CONTACTING PRIMARY CARE PHYSICIANS

To ensure efficient communication with community paediatricians and family physicians, you should contact them by phone prior to the discharge of their patient. ***When you call, you should have, at hand, the following information:***

- Patient's demographic information including most recent weight, height and HC
- Date of admission and discharge
- List of diagnoses while in hospital
- Why and when you would like the patient to see them
- What follow-up you expect them to do e.g. reassess asthma med doses, follow-up weight weekly etc. Communicate clearly in a consult note and/or phone call.
- You should be able to give a succinct but thorough summary of how the patient presented & what was done
- Most recent or significant investigations (fax most recent labs if pertinent)
- Discuss any social stressors for the family or involvement of social work or other services deemed necessary while in hospital
- Describe the discharge condition of the patient including any abnormal physical findings (e.g. the patient still has scattered wheeze and decreased air entry on right) weight and other growth parameters
- Be prepared to give exact doses of medications which you are sending the patient home with and for how long
- Let them know any other specialists who are involved and other planned follow-up
- Mention any labs which are outstanding and need to be followed (e.g. VCUG, metabolic studies)
- Ask for an appointment or ask the unit clerk book a time for the patient

APGAR SCORE

	Score of 0	Score of 1	Score of 2
Appearance	Blue or pale all over	Blue extremities	Pink all over
Pulse rate	Absent	< 100 / min	> 100 / min
Grimace	No response	Feeble cry/grimace	Cry
Activity (Muscle Tone)	None	Some flexion	Flexed and active
Respiration	Absent	Slow & irregular	Strong cry

The test is generally done at one and five minutes after birth, and may be repeated later if the score remains low. Scores 3 and below are generally regarded as critically low, 4 to 6 fairly low, and 7 to 10 generally normal.

DRUG CALCULATIONS FOR PAEDIATRICS

Basic concepts:

- most drugs in paediatrics are dosed on body weight, some on body surface area
- some neonates' drugs are dosed on birth weight until they surpass their birth weight
- references (eg Lexicomp) may list dosages in mg/dose or mg/day

Example:

Emily is admitted for query meningitis. She is 4 days old; her birth weight was 3.5 kg. She now weighs 3.2 kg. One of the drugs you decide to treat her with is ampicillin.
Lexicomp-on-line entry for ampicillin.
Usual dose for neonates:
postnatal age < 1 wk and > 2000 g for meningitis is 150 mg/kg/day, divided q8h.
Dose is based on her birth weight of 3.5 kg: 150 mg/kg/day x 3.5 kg = 525 mg/day
Drug is given q8h (in three divided doses): 525 mg/day divided by 3 = 175 mg/dose

Order is written as:

Ampicillin 175 mg IV q8h (150 mg/kg/day)
Include the dose you used to calculate the patient's drug in brackets as part of your order.

SIGNS OF DEHYDRATION

Dehydration: **Infant:** **Child:**	**Mild** **5%** **3%**	**Moderate** **10%** **6%**	**Severe** **≥ 15%** **≥ 9%**
Appearance	Alert	Restless	Limp/Cold
Heart Rate	Normal	Increased	Rapid
Respiration	Normal	Deep/increased	Deep/rapid
BP	Normal	Normal or low	Low
Skin Turgor	Normal	Slow retraction	Retraction > 2 secs
Eyes	Normal	Sunken	Grossly sunken
Tears	Present	Decreased	Absent
Mucous Membranes	Moist	Dry	Very Dry
Urine Output	Decreased	Minimal	Anuric
Specific Gravity	< 1.020	1.030	> 1.030
Urea	Normal	Elevated	Very high
Arterial pH	> 7.30	7.10 – 7.30	< 7.10
Capillary Refill	< 2 seconds	2 – 3 seconds	>3 seconds
Fluid deficit	**30 – 50 mL/kg**	**60 – 100 mL/kg**	**90 – 150 mL/kg**

VITAL SIGNS

Age	**Respirations (breaths/min)**	**Pulse (beats/min)**	**Systolic BP (mmHg)**	**Weight (kg)**
Infant	**30 - 50**	**120 - 160**	**>60**	**3 - 4**
6 mths - 1 yr	**30 - 40**	**120 - 140**	**70 - 80**	**8 - 10**
2 - 4 yrs	**20 - 30**	**100 - 110**	**80 - 95**	**12 - 16**
5 - 8 yrs	**14 - 20**	**90 - 100**	**90 - 100**	**18 - 26**
8 - 12 yrs	**12 - 20**	**80 - 100**	**100 - 110**	**26 - 50**
>12 yrs	**12 - 16**	**60 - 90**	**100 - 120**	**>50**

For children over 1 year: Systolic blood pressure= 2 x age in years + 90 (in mmHg)
(gives an approximate value for 50th percentile)

PAEDIATRIC FLUIDS

"Maintenance Fluids" (4-2-1 Rule) – this only maintains "usual intake"
***Note there are many approaches for calculating fluid requirements in paediatrics, this is one approach.**

- Used to calculate approximate basic fluid requirements in ***otherwise healthy*** children and infants
- Need to make adjustments for patients with fever, renal impairment, heart disease, SIADH or uncontrolled losses (e.g. post surgical, vomiting or diarrhea) and neonates
- Gives ***per hour*** fluid requirement

Give **4 mL/h for each kg of first 10 kg** (or portion thereof)
Give **2 mL/h for each kg of second 10 kg** (or portion thereof)
Give **1 mL/h for each remaining kg**

Examples: Calculate "Maintenance Fluids" for each of the following:

*a) 4.2 kg baby = **4** x 4.2 = 16.8 mL/hr*
*b) 11 kg child = (**4** x 10) + (**2** x 1) = 42 mL/hr*
*c) 36 kg child = (**4** x 10) + (**2** x 10) + (**1** x 16) = 76 mL/hr*

Total Fluid Intake (TFI) for Neonates

Neonatal Day 1	60	mL/kg/day
Neonatal Day 2	80	mL/kg/day
Neonatal Day 3	100	mL/kg/day
Neonatal Day 4	120	mL/kg/day
Neonatal Day 5	150	mL/kg/day

Range for normal neonates 100 - 200 mL/kg/day
May need to restrict fluids for babies with CHD/AKI (specify maximum TFI in orders)

Fluid in (as TFI) *calculate* as mL/kg/day Urine Out express *calculate* as mL/kg/hour

Choice of Fluids

- Use the gut whenever possible (e.g. po or ng)
- By NG, fluids can be given continuously or bolused
- IV: As a general rule, it is safe to use D5W-0.45%Saline for most infants & children. For very young babies you may consider D10W-0.45%Saline. There are other exceptions, including those with head injuries or meningitis when D5W-0.9%Saline is more appropriate
- For patients with DKA refer to DKA protocol for fluid management
- 20 mmol/L KCL is often added to IV's (even TKVO) as long as the patient has normal kidney function & normal serum potassium
- Bolus using 0.9% Saline or Ringers Lactate only (usually 10 - 20 mL/kg) – no KCL
- Remember TKVO (5 mL/hr or 10 mL/hr for CVL) can be a lot of fluid for a small child

Above calculations apply for usual fluid requirements, not nutritional requirements.

How much should a baby be drinking?

Age (in months)	Number of feedings per day	Volume of each feed oz	Volume of each feed mL
0 - 1	7 - 10	2 - 4	60 - 120
2 - 3	5 - 8	4 - 6	120 - 180
4 - 6	4 - 6	5 - 6	150 - 180
7 - 9	3 - 5	6 - 7	180 - 210
10 - 12	3 - 4	6 - 8	180 - 240

GROWTH

Weight

- average birth weight is 3.5 kg
- expect a 10% weight loss in the first seven days
- regain this loss by ten days
- weight should double by five months, triple by one year and quadruple by two years
- 50th percentile for 12 months is 10 kg

Quick way to estimate a child's weight in kilograms:

For 3 - 12 months = (age in months + 9)/2
For 1 - 6 years = 2 x age in years + 8
For 7 - 12 years = ((age in years x 7) – 5)/2

Length/Height

- measure length (supine) <2 years
- measure height (standing) >2 years
- average length at birth is 50 cm at birth, increases by: 25 cm in first year
  12 cm in second year
  8 cm in third year
  4 - 7 cm/year until puberty
- 50% adult height by 2.5 yr (newborn 30% adult height)
- estimate from 2 to 12 years = age in years x 6 + 77 (in cm)

Head Circumference (HC or OFC)

Measure head circumference: - all children < 2 y
- children with developmental or neurological issues

On average: 35 cm +/- 2 cm at birth (term)
40 cm +/- 2 cm at 3 months
45 cm +/- 2 cm at 9 months
50 cm +/- 2 cm at 3 years
55 cm +/- 2 cm at 9 years

Or, to estimate head circumference during the first year, the head grows at a rate of:

- 2 cm/month for the first three months
- 1 cm/month for the next three months
- 0.5 cm/month for the last 6 months

BSA (in m^2) = $\sqrt{\frac{\text{weight in kg x height in cm}}{3600}}$

BMI (in kg/m^2) = body weight/height^2

CHILDHOOD ENERGY REQUIREMENTS AND GROWTH RATES

	Cals/Kg	Protein (g/day)	Growth Rates
Preterm – 2 months	100 – 120+	3.5	15 – 25 g/kg/day
3 months – 1 year	95 – 100	1.5	15 – 30 g/day
1 to 3 years	95	1.1	6 – 18 g/day
4 to 9 years	88 – 100	0.95	160 – 200 g/month
9 to 13 years	73 M, 61 F	0.95	

NUTRITION

Birth - exclusive breastfeeding or iron-fortified formula up to 6 months
- vitamin D 400 IU / day while exclusively breastfeeding
- (if breastfeeding is discontinued, switch to iron-fortified formula)

* do not microwave milk/formula - it destroys nutrients and can burn the mouth

6 months - *add iron-fortified cereal (use until at least 18 months)*
- start with rice cereal
- every 3 - 5 days, introduce another single-grain cereal (eg. oatmeal)
- use mixed-grain cereals after all single grains introduced
- by 8 months, add plain yogurt or fruit to keep baby interested in cereal
- *add pureed vegetables*
- start with green or bland foods - every 3 - 5 days, introduce another vegetable

7 months - *add pureed fruit* - if constipated add pureed prunes
- give unsweetened fruit only - every 3 - 5 days, introduce another fruit

8 months - *add meats and alternatives*
- puree meats initially, offering new one every 3 - 5 days
- hard-cooked egg yolk is okay
- legumes (kidney beans, chickpeas and lentils) are a good alternative

12 months - *add cow's milk*
- homogenized (full-fat) milk until at least 24 months
- no more than 24 ounces (720 mL) per day (20 ounces by age 2 years)

FORMULAS (0 - 12 months)

1. < 2000 g Birth Weight:
   a) Cow's Milk Based - Similac Special Care 24® (0.81 kcal/mL)
   - Similac Neosure® (< 1250g) (0.74 kcal/mL)
   - Similac Natural Care® (0.79 kcal/mL)

   b) Formula fortifiers: - Similac Human Milk Fortifier® (3.33 kcal/packet)
2. > 2000 g Birth Weight
   a) Cow's Milk Based - made of casein/whey/lactose
   - Similac Advance® (0.68 kcal/mL)
   - Similac 24® (0.81 kcal/mL)
   - Similac 27® (0.92 kcal/mL)

   b) Cow's Milk Based - made of hydrolyzed whey (GERD and renal problems)
   - Nestle Good Start® (0.67 kcal/mL)
3. Soy Based - for lactose intolerance, IgE Cow milk protein allergy, galactosemia, vegetarians
   - Isomil® (0.68 kcal/mL)
4. Hydrolyzed Casein Based - for protein and fat malabsorption
   - Alimentum® (0.68 kcal/mL)
   - Pregestimil® (0.69 kcal/mL)
5. For Fat Malabsorption - Portagen® (0.9 kcal/mL)
6. For Renal Failure - Similac PM 60/40® (0.68 kcal/mL)

PAEDIATRIC (1 - 10 YRS) SUPPLEMENTAL
- Pediasure® (1.0 kcal/mL)
- Pediasure with fibre® (1.0 kcal/mL)
- Pediasure Plus® (1.5 kcal/mL)
- Peptamen Jr® (elemental/hydrolyzed protein) (1.0 kcal/mL)
- Elemental/amino acid: Vivonex Pediatric® (0.8 kcal/mL), Neocate Junior® (1.0 kcal/mL)

PAEDIATRIC (> 10 YRS) SUPPLEMENTAL
- Osmolite HN® (1.0, 1.2 or 1.5 kcal/mL) - Jevity® (1.0, 1.2 or 1.5 kcal/mL)
- Peptamen® (hydrolyzed protein) (1.0 kcal/mL)

RECOMMENDED ROUTINE IMMUNIZATIONS FOR CHILDREN IN ALBERTA (Effective: 1st June 2015)

Age at Vaccination	DTaP-IPV-Hib	DTaP-IPV	Rotavirus	MMRV	Hep B	DTaP	Meningococcal	Pneumococcal	HPV	Influenza
2 months	X		X					X		
4 months	X		X				X	X		
6 months	X							X***		X**
1 yr.				X			X	X		[X**]
18 months	X									[X**]
4 - 6 yr.		X		X				X¯		[X**]
Grade 5					X				X	[X**]
Grade 9						X	X¯¯		X*	[X**]

Notes: immunization schedules vary depending on the province and are subject to change

DTaP-IPV	Diphtheria, tetanus, acellular pertussis, polio vaccine
Hib	*Haemophilus influenzae* type b vaccine; usually combined with the DTaP-IPV
MMRV	Measles, mumps, rubella vaccine and varicella Children who've had varicella disease before 12 months of age should still be immunized
Hep B	Hepatitis B vaccine (3 doses)
DTaP	Diphtheria, tetanus and acellular pertussis vaccine
Meningococcal	Meningococcal C conjugate vaccine (Men C) ¯¯Meningococcal conjugate vaccine – MCV4 (Groups A, C, W-135 and Y)
Pneumococcal	Pneumococcal conjugate vaccine (PCV13) ***For high risk children only at 6 months of age ¯ only for children up to 71 months (catch up program)
HPV	Human Papillomavirus vaccine (consists of three doses) *catch up program for boys
Influenza	The first time a child under 9 years gets influenza vaccine the child receives 2 doses a month apart All children older than 6 months should have influenza vaccine every year. **Annually, during influenza season.

http://www.health.alberta.ca/health-info/imm-routine-schedule.html
http://www.phac-aspc.gc.ca/publicat/cig-gci/index-eng.php

AHS Acute Childhood Asthma Pathway: Evidence based* recommendations

Inpatient Care: Tertiary and Regional Centres

Pathway Inclusions

Age 1-18 years with asthma; 1st time wheeze if diagnosis is likely asthma; **NOT** bronchiolitis; **NOT** pneumonia unless the pneumonia is felt to be a more minor issue compared to the asthma.

Pathway Entry on Admission

MD to determine Phase to enter on admission based on response to treatment prior to admission.

- As per ED pathway, assessment for admission occurs at least 4 hours after administration of oral steroids; prior to this interval, ED pathway is most appropriate.
- Admit to **Phase I** if patient on q1 hourly salbutamol prior to admission.
- Admit to **Phase II** if patient on q2 hourly salbutamol prior to admission.
- **Phase III** rarely indicated at admission (usually discharge from ED when on q4 hourly salbutamol.

Inpatient Assessment

In ED/urgent care, the PRAM score is used for assessment of severity of exacerbation at triage and following respiratory status.

The inpatient pathway uses a modified PRAM score (see below). The modified PRAM score does not include O_2 saturation.

When reviewing PRAM scores in ED prior to admission, most patients are on oxygen such that their PRAM score will be 1-2 points higher than the inpatient modified PRAM score would be for that same patient.

In the inpatient pathway, the modified PRAM score is used to assess if salbutamol treatment is indicated and to extend the intervals of assessment. The patient moves from **Phase I** to **Phase II** to **Phase III** as their assessment intervals extend from q30-60 minutes to q2 hours and then every 4 hours prior to discharge.

Inpatient Assessment Score (Modified PRAM†)

Signs	0	1	2	3
Suprasternal Indrawing	absent		present	
Scalene Retractions	absent		present	
Wheezing	absent	expiratory only	inspiratory & expiratory	audible without stethoscope/silent chest
Air Entry	normal	decreased at bases	widespread decrease	absent/minimal

Phase Change Criteria: SCORE of < 3 at routine assessment or MD order on a reassessment in **Phase I** or **Phase II**.

For salbutamol assessment: if SCORE ≥ 3, give salbutamol, if < 3 no salbutamol.

Repeat PRAM Score 15-30 minutes post any salbutamol treatment.

For any assessment SCORE ≥ 6, give salbutamol and notify MD. If in **Phase II** or **Phase III** move back to previous phase. If in **Phase I** consider further investigations, reassess therapy salbutamol frequency, IV, oxygen, etc.) and consider PICU consultation if not responding to treatment.

† Excludes O_2 saturation

Age	Gross Motor	Fine Motor	Language	Social	Feeds	Safety
1 M.	Raises head slightly, crawling movements, lifts chin	Tight grasp, follows to midline	Alerts to sound (blinking, moving, startling)	Regards face	Breast or formula	Infant car seat, smoke detector, crib safety, falls
2 M.	Holds head in midline, lifts chest off table	No longer clenches fist tightly, follows past midline	Smiles after being stroked or talked to	Recognizes parent		Burns - hot liquids, infant car seat, falls
3 M.	Supports on forearms, holds head up steadily in prone	Holds hands open at rest, follows in circular motion	Coos	Reaches for familiar people/objects, anticipates feeds		
4 - 5M.	Rolls front-back, back-front, sits well when propped, supports on wrists, shifts weight	Moves arms in unison to grasp, touches toy placed on table	Orients to voice, says "ah-goo", razzes	Enjoys looking at environment		Choking/ Suffocation, infant car seat, burns – hot H_2O
6 M.	Sits well unsupported, puts feet in mouth on back	Reaches with either hand, transfers, uses raking grasp	Babbles At 8 M. "dada" or "momma", no discrimination	Recognizes stranger	Iron fortified, 1 grain cereal + milk (rice 1st – least allergies)	Poisonings, burns – hot surface, infant car seat, falls, burns – hot H_2O
9 M.	Creeps, crawls, cruises, pulls to stand, pivots when sitting	Uses pincer grasp, probes with forefinger, holds bottle, finger feeds	Understands "no", waves bye-bye At 10M. "dada" or "momma" discriminately	Starts to explore environment, plays pat-a-cake	6 - 9 M. Strained/ pureed veggies/fruits meats/combos/ plain yogurt /finger foods	Water/pool, toddler seat, poisonings, falls, burns
12 M.	Walks alone	Throws objects, lets go of toys, hand release, mature pincer grasp	Uses 2 words other than "dada" or "momma", runs unintelligible words together	Imitates actions, comes when called, cooperates with dressing	9 - 12 M. Chewy, finger, bite size protein, soft cook veggies, raw peeled fruit, pasta, gradual to family menu, table variety. Wean to whole milk	Auto-pedestrian, water/pool, falls, burns

Age	Gross Motor	Fine Motor	Language	Social	Feeds	Safety
15 M.	Creeps upstairs, walks backwards	Builds tower of 2 blocks, scribbles in imitation	Uses 4 - 6 words, points to 5 body parts	Indicates wants	12 - 24 M. Now Whole Milk Mixed table food diet OK, continue to watch choking hazards	Auto-pedestrian, poisonings, falls, burns
18 M.	Runs, throws toys from standing w/o falling	Turns 2-3 pages at a time, fills spoon and feeds self	Knows 8 body parts, uses intelligible words in jargoning, points 1 finger	Copies parent in tasks, plays in company of other children, looks back/forth between person and thing		Auto-pedestrian, falls, burns
2 Y.	Walks up and down steps w/o help	Turns pages 1 at a time, removes shoes, pants, etc., drinks well from a cup	Uses 2-word combos, uses 50 words and 2 word sentences	Parallel play	Can change to 2% milk at 2 years	Falls-play equipment, tricycles
2 ½ Y.	Jumps with both feet off floor, throws ball overhand	Unbuttons, holds pencil in adult fashion	Uses pronouns appropriately, repeats 2 digits,	Tells first and last name when asked, gets drink no help		Playground, poisoning and choking
3 Y.	Pedals trike, alternates feet when going up steps	Dresses and undresses partially, dries off hands, draws a circle	Uses 3 word sentences & plurals, knows all pronouns, minimum 250 words	Group play, shares toys, takes turns, plays well w/ others, knows full name, age and sex		Playground, poisoning cycling, fire and burns
4 Y.	Hops, skips, alternates feet down steps	Buttons, catches ball	Colours, songs from memory, asks questions	Tells tales, plays cooperatively		Car seat, booster or seat belt. Pedestrian, falls – play equipment,
5 Y.	Skips alternating feet, jumps over low obstacles	Ties shoes, spreads with knife	Prints first name, asks what a word means	Plays competitive games, abides by rules, helps in household tasks		Water/pool, bicycle safety pedestrian, seat belt use

KEY CONDITIONS - http://www.pupdoc.ca/canuc-paeds/

"Key conditions" are the core conditions for each of the Clinical Presentations as listed on the back cover. They have been determined by Canadian paediatric clerkship and undergraduate directors as being important for graduating medical students to know. The lists of Key Conditions are neither differential diagnoses nor schemes (approaches to clinical presentations). Rather, they were selected because they are common, critical to paediatric care, or unique to the discipline of paediatrics.

Abdominal Pain & Abdominal Mass		
Appendicitis Constipation Functional	Neuroblastoma Ovarian torsion	Pregnancy Wilm's tumor
Acutely Ill Child		
Acute abdomen Burn Diabetic ketoacidosis /	Diabetes mellitus Meningococcemia Poisoning / intoxication	Shock Trauma
Adolescent Health Issues		
Disordered eating Psychosocial history (HEADDSS)	Pubertal development Sexual health	Sexually transmitted infections Substance use and abuse
Altered Level of Consciousness		
Encephalitis Head Injury	Hypoglycemia	Metabolic disease
Bruising / Bleeding		
Hemophilia	Idiopathic thrombocytopenic purpura	Leukemia
Dehydration		
Hyponatremia / hypernatremia	Mild / moderate / severe dehydration	
Development / Behavioural / Learning Problems		
Attention deficient hyperactivity disorder Autism spectrum disorder Cerebral palsy	Fetal alcohol spectrum disorder Global delay Gross motor delay	Learning disability Speech / language delay
Diarrhea		
Celiac Cow's milk protein allergy	Gastroenteritis Hemolytic uremic syndrome	Inflammatory bowel disease Toddler's diarrhea
Edema		
Nephritic syndrome	Nephrotic syndrome	Renal failure
Eye Issues		
Absent red reflex Amblyopia Conjunctivitis	Normal vision development Periorbital / orbital cellulitis	Strabismus Visual changes
Fever		
(<1mo, 1-3 mo, >3 mo) Kawasaki disease	Meningitis Occult bacteremia /sepsis	Urinary tract infection Viral
Genitourinary Complaints (hematuria, dysuria, polyuria, frequency, pain)		
Balanitis Enuresis	Phimosis Testicular torsion	Vesicoureteral reflux Vulvo-vaginitis
Growth Problems		
Constitutional delay Failure to thrive	Familial short stature	Turner syndrome
Headache		
Brain tumor Concussion	Increased intracranial pressure	Migraine
Inadequately explained injury (Child abuse)		
Abusive head trauma Domestic violence	Neglect Physical abuse	Sexual abuse

Limp/ Extremity Pain		
Bone tumor Growing pains Juvenile idiopathic arthritis Legg Calve Perthes disease Osgood Schlatter disease	Osteomyelitis Post-infectious Reactive arthritis Rheumatic fever Septic arthritis	Slipped capital femoral epiphysis Transient synovitis Trauma / injury
Lymphadenopathy		
Cervical adenitis Lymphoma	Mononucleosis	Reactive
Mental Health Concerns		
Anxiety Depression	School refusal	Suicidality
Murmur		
Congenital heart disease	Innocent murmur	
Neonatal Jaundice		
Biliary atresia Breast feeding jaundice	Breast milk jaundice Hemolytic anemia	Kernicterus Physiologic
Newborn		
Abnormal newborn screen Birth Trauma Congenital infections Cyanosis Depressed newborn Hypoglycemia Hypothermia	Hypotonia / floppy newborn Large for gestational age Neonatal abstinence syndrome Newborn physical exam (normal, abnormal)	Prematurity Respiratory distress Sepsis Small for gestational age Trisomy 21 Vitamin K deficiency
Pallor/ Anemia		
Hemoglobinopathies	Hemolysis	Iron deficiency
Rash		
Acne Cellulitis Diaper rashes Drug eruption	Eczema Henoch Schonlein purpura Impetigo Scabies	Scarlet fever Seborrhea dermatitis Urticaria Viral exanthems
Respiratory distress / Cough		
Anaphylaxis Asthma Bronchiolitis Congestive heart failure	Croup Cystic fibrosis Epiglottitis Foreign body	Pertussis Pneumonia Status asthmaticus Tracheitis
Seizure / Paroxysmal event		
Arrhythmia Breath-holding spell Brief Resolved Unexplained Event	Febrile vs. non-febrile seizure General vs. focal seizure	Status epilepticus Syncope
Sore Ear		
Otitis externa	Otitis media	
Sore Throat / Sore Mouth		
Dental disease Oral thrush Peritonsillar abscess	Pharyngitis Retropharyngeal abscess / cellulitis	Stomatitis
Vomiting		
Gastroesophageal reflux / Gastroesophageal reflux disease	Intestinal atresia Intussusception	Malrotation/volvulus Pyloric stenosis
Well Child Care (newborn, infant, child)		
Anticipatory guidance Circumcision Crying / colic Dental health Discipline / Parenting Growth – Head circumference, Height, Weight, BMI	Health active living Hearing Hypertension Immunizations Injury prevention Normal development	Nutrition & Feeding Sleep issues Social-economic / cultural / home / environment Sudden infant death syndrome

EMPIRIC AMBULATORY ANTIBIOTIC THERAPY IN COMMON UNCOMPLICATED CHILDHOOD INFECTIONS - 1

CONDITION	BACTERIAL PATHOGEN	FIRST LINE THERAPY	ALTERNATIVES	USUAL DURATION (days)[a]
ACUTE OTITIS MEDIA				
A. No risk factors for antibiotic resistance		**A.** Amoxicillin[1]	**A.** Am/Cl, Cefuroxime, Cefprozil, Azithromycin (5d), Clarithromycin	<2 yrs: 10 ≥2 yrs: 5
B. ≥ 1 risk factor for resistance • antibiotic use within 3 months • attending day care • recent treatment failure	*S. pneumoniae*, NTHI, *Moraxella catarrhalis*	**B.** High Dose Amoxicillin[1]	**B.** Am/Cl, High dose Am/Cl[2], Ceftriaxone[3] IM/IV	10
OTITIS EXTERNA[4,5] (If severe, consult ENT for debridement)	*Pseudomonas, S. aureus*	Cortisporin® or Sofracort®	Cipro HC®	*
TONSILLOPHARYNGITIS	GABHS	Penicillin VK	Amoxicillin, Cephalexin, Clindamycin[6], Macrolides[6]	10[7]
ACUTE SINUSITIS[8]	*S. pneumoniae*, NTHI, *S. aureus*, GABHS, *Moraxella catarrhalis*	Amoxicillin	Same alternatives as for Acute Otitis Media	10–14
COMMUNITY ACQUIRED PNEUMONIA[9]				
0–3 months old		Hospital admission is recommended		
3–36 months old	*S. pneumoniae*, NTHI, GABHS	Amoxicillin	Am/Cl	7–10
3–18 years old	**A.** Typical: *S. pneumoniae*, NTHI, GABHS	**A.** Amoxicillin	**A.** If resistance occurs, same alternatives as for Acute Otitis Media	7–10
	B. Atypical: *Mycoplasma pneumoniae, Chlamydia pneumoniae*	**B.** Macrolides		7–10
PERTUSSIS	*Bordetella pertussis*	Erythromycin (14d) or Clarithromycin (5–7d)	Azithromycin (5d), Cotrimoxazole[10] (10d)	See individual drugs
CERVICAL ADENITIS[8, 9]	GABHS, *S. aureus*	Cephalexin	Am/Cl, Cefprozil, Cefuroxime, Clindamycin, Macrolides	10

EMPIRIC AMBULATORY ANTIBIOTIC THERAPY IN COMMON UNCOMPLICATED CHILDHOOD INFECTIONS - 2

CONDITION	BACTERIAL PATHOGEN	FIRST LINE THERAPY	ALTERNATIVES	USUAL DURATION (days)*
CONJUNCTIVITIS[5] (purulent, >3 months old)	*S. aureus, S. pneumoniae,* NTHI	Polysporin® or equivalent	Polytrim®, Ciprofloxacin or Aminoglycoside drops	*
PERIORBITAL CELLULITIS				
A. Usually related to sinusitis[8, 9]	**A.** *S. pneumoniae,* NTHI, *S. aureus,* GABHS	**A.** Am/Cl	**A.** Cefuroxime, Cefprozil, Macrolides, Ceftriaxone IM/IV, Am/Cl	7–10
B. Secondary to trauma[8, 9]	**B.** *S. aureus,* GABHS	**B.** Cephalexin	**B.** Am/Cl, Cefuroxime, Cefprozil, Clindamycin, Macrolides, Ceftriaxone IM/IV	10–21
CELLULITIS[8]	*S. aureus,* GABHS	Cephalexin	Am/Cl, Clindamycin, Macrolides, Penicillin V + Cloxacillin	7–10
BITE WOUNDS (peripheral extremities and deep punctures)				
Cat/Dog[8, 9]	*Pasteurella multocida, S. aureus,* viridans strep., *Eikenella corrodens, Capnocytophaga*	Am/Cl	Clindamycin + Cotrimoxazole, Ceftriaxone IM/IV	10
Human[8, 9]	viridans strep., *Staphylococcus epidermidis, Corynebacterium, S. aureus,* anaerobes	Am/Cl	Clindamycin + Cotrimoxazole, Ceftriaxone IM/IV	10
IMPETIGO[8]	GABHS, *S. aureus*	Cephalexin, Mupirocin (topical)	Am/Cl, Macrolides, Clindamycin	7
URINARY TRACT INFECTIONS[11] Cystitis or step down therapy from pyelonephritis	*Escherichia coli, Enterococci, Klebsiella, Proteus, (Pseudomonas)*[11]	Cotrimoxazole, Nitrofurantoin	Amoxicillin, Am/Cl, Cefixime, Cephalexin	7–10
ANTIBIOTIC ASSOCIATED DIARRHEA	*Clostridium difficile*	Consider stopping antibiotic and if clinically indicated start Metronidazole	repeat Metronidazole (10d)	7–10

All antibiotics listed in order of treatment choice. Am/Cl = Amoxicillin/Clavulanic acid; Macrolides = Azithromycin, Clarythromycin & Erythromycin; Cotrimoxazole = Trimethoprim-Sulfamethoxazole.

See http://iweb.calgaryhealthregion.ca/programs/pharmacy/druginfo/pages/infectiousdisease.htm

GABHS = *Group A beta-hemolytic streptococcus*, HI = *Haemophilus influenza*, NTHI = *Nontypeable Haemophilus influenza*, *S. aureus* = *Staphylococcus aureus*, *S. pneumoniae* = *Streptococcus pneumonia*, viridians strep. = viridians streptococcus
* Depends on clinical condition or response.

1. High dose therapy of 80–90 mg/kg/day divided bid or tid should be initiated in children with an increased risk of penicillin resistant *S. pneumonia*. Patients with no risk factors for antibiotic resistance, a dose of 40–50 mg/kg/day tid is initiated.
2. Consists of 2 prescriptions: one for Amoxicillin at 40–50 mg/kg/day divided bid and one for Amoxicillin/Clavulanic acid (7:1 ratio) at 45 mg/kg/day divided bid.
3. Dose is 50 mg/kg/day IM/IV once a day for 3 days (maximum dose is 1 g/day)
4. Consider using an astringent to aid in debridement (eg Buro-sol®, Auro-dri®, vinegar diluted 1:1 with propylene glycol or isopropyl alcohol).
5. Refer to antibiotic eye/ear chart.
6. May be less effective due to potential for resistance.
7. Recommended therapy duration is 10 days, but studies of individual drugs have shown bacteriologic cure with 3–5 days therapy.
8. **Increased prevalence of community acquired MRSA. Attempt cultures if feasible.**
9. Community Acquired Pneumonia infections up to 3 years of age, may be caused by viral pathogens, therefore antibiotic therapy may not be required.
10. Cotrimoxazole not preferred for Pertussis, but may be used if intolerant to macrolides.
11. Treatment should be guided by susceptibility testing.

COMMON ANTI-INFECTIVE MEDICATIONS IN COMMUNITY PEDIATRICS

Antibiotic (mg or mg/5 mL)	Dose (per kg/day)	Interval	Maximum Daily Dose
Acyclovir 200 suspension	40–80 mg	3–5x/day	1 g
Amoxicillin 125 & 250 chewable tablet Amoxicillin 250 & 500 capsule Amoxicillin 125 suspension Amoxicillin 250 suspension	40–50 mg [1] 80–100 mg (high dose) [1]	tid bid	1.5 g
AM/CL 125F (4:1), 200 (7:1), 250F (4:1) & 400 (7:1) susp AM/CL 250 (2:1), 500F (4:1) & 875 (7:1) tablet	40–50 mg Amox comp 80–100 mg (high dose) [1,2]	tid bid	1.5 gram Amox comp
Azithromycin 100 & 200 suspension Azithromycin 250 capsule	Day 1: 10 mg Day 2–5: 5 mg [3]	q24h	250 mg
Cefixime 100 suspension Cefixime 400 tablet	8 mg	q12–24h	400 mg
Cefprozil 125 & 250 suspension Cefprozil 250 & 500 tablet	15–30 mg	bid	1 g
Cefuroxime 125 suspension Cefuroxime 250 & 500 tablet	Suspension: 20–30 mg Tablet: 250 mg/dose	bid bid	1 g
Cephalexin 125 & 250 suspension Cephalexin 250 & 500 capsule	25–100 mg	qid	4 g

Antibiotic (mg or mg/5 mL)	Dose (per kg/day)	Interval	Maximum Daily Dose
Ciprofloxacin 250, 500 & 750 tablet Ciprofloxacin suspension (10 g/100 mL)	20–40 mg	bid	1.5 g
Clarithromycin 125 suspension Clarithromycin 250 & 500 tablet	15 mg	bid	1 g
Clindamycin 75 solution Clindamycin 150 & 300 capsule	10–40 mg	tid–qid	1.8 g
Cloxacillin 125 suspension Cloxacillin 250 & 500 capsule	50–100 mg	qid	4 g
Cotrimoxazole 200/40 suspension [4,6] Cotrimoxazole 100/20, 400/80 & 800/160 tablet [4,6]	6–12 mg TMP [5]	bid	320 mg TMP
Erythromycin 125 & 250 solution Erythromycin 200 & 400 suspension Erythromycin 250 & 333 EC capsule	30–50 mg as base	tid–qid	2 g
Metronidazole 250 tablet & 750 extended release tablet Metronidazole 500 capsule Metronidazole suspension (50 mg/mL) [7] Metronidazole Benzoate susp (50 mg/mL) [7,8]	30 mg 48 mg	tid–qid	4 g
Nitrofurantoin 50 & 100 tablet Nitrofurantoin 50 & 100 macrocrystals capsule [7,8] Nitrofurantoin 100 monohydrate macrocrystals cap [7,8] Nitrofurantoin 10 mg/mL suspension [7]	5–7 mg 5–7 mg 100 mg	qid qid q12h	400 mg 400 mg
Penicillin VK 300 suspension Penicillin VK 300 tablet	25–50 mg	tid–qid	3 g

1. Amoxicillin 40–50 mg/kg/day is the standard dose and 80–100 mg/kg/day is the dose for increased risk of penicillin resistant *S. pneumonia* (refer to footnote 1 on the other chart).
2. For high dose Amoxicillin/Clavulinic Acid recommend to use the 7:1 ratio to minimize diarrhea.
3. This dosage is used in treating acute otitis media. Alternatively, 10 mg/kg/day for 3 days can be used. The dosage for treating pharyngitis is 12 mg/kg/day for 5 days (maximum of 500 mg/day).
4. Cotrimoxazole prophylaxis is: 2 mg trimethoprim (TMP)/kg/day q24h.
5. Nitrofurantoin prophylaxis: 1–2.5 mg/kg/day q12–24h (max 100 mg/day).
6. Nitrofurantoin and cotrimoxazole are preferred over β-lactams for UTI prophylaxis.
7. Compounded suspension available in the community from some pharmacies.
8. Metronidazole benzoate compounded suspension available at ACH outpatient pharmacy and some specialized compounding pharmacies.
9. Doxycycline not recommended for use <9 years old.

Initial Empiric Antibiotic Therapy in Hospitalized Children (2013)

Modify therapy when possible according to identified pathogens, antimicrobial susceptibility and clinical status

International travel may increase the risk for harbouring multidrug resistant organisms

If the patient was hospitalized in the past year and has an infection, consider isolating the patient and consulting with Infectious Diseases

Source	Pathogens	Initial Empiric Regimen	Alternative Regimen	Comments
Bacterial Meningitis				
< 6 weeks of age	Group B Strep, *L.monocytogenes, E.coli, Klebsiella, H.influenzae, S.pneumoniae*	ampicillin + cefotaxime		Consider neonatal HSV & acyclovir as needed
≥ 6 weeks of age	*S.pneumoniae, N.meningitidis, H.influenzae*	cefotaxime + vancomycin		Rare cases caused by neonatal pathogens may occur
Shunt Infection	coagulase negative Staph, *P.acnes S.aureus,* gram negative bacilli	cefotaxime + vancomycin	meropenem + vancomycin	Removal infected hardware
Bacteremia / Systemic Inflammatory Response Syndrome (SIRS)				
			Consider neonatal herpes infection & IV acyclovir in sick neonates	
< 6 weeks of age	Group B Strep, *L.monocytogenes,* gram negative bacilli, *E.coli, S.pneumoniae*	ampicillin + cefotaxime*	Ampicillin + gentamicin	*Use meningitis dose until meningitis has been ruled out
≥ 6 weeks of age	*S.pneumoniae, N.meningitidis, S.aureus, H.influenzae,* gram negative bacilli	Cefotaxime* + vancomycin	piperacillin/tazobactam + vancomycin	If initial LP results negative
Septic Shock (excluding intra-abdominal infections)				
	E.coli, Klebsiella, S. aureus, S.pneumoniae, N.meningitidis, H.influenzae, Salmonella Group B Strep*	ceftriaxone** + vancomycin		*in children < 6 weeks of age **Use cefotaxime in infants < 4 weeks of age
Toxic Shock Syndrome				
	S. aureus, Group A Strep	ceftriaxone** + clindamycin + vancomycin		
Abdominal Infections (Necrotizing enterocolitis & intra-abdominal)				
	gram negative bacilli, Enterococcus spp., anaerobes	ampicillin + gentamicin + metronidazole	piperacillin/tazobactam + gentamicin	
Dental Abscess				
	S.aureus, Group A Strep, anaerobes	cefazolin + metronidazole	clindamycin*	*Increasing resistance to clindamycin in GAS & *S. aureus*

Initial Empiric Antibiotic Therapy in Hospitalized Children (2013) - continued

Modify therapy when possible according to identified pathogens, antimicrobial susceptibility and clinical status

Source	Pathogens	Initial Empiric Regimen	Alternative Regimen	Comments
Tracheitis/ Epiglottitis				
	S.aureus, Group A Strep, *S.pneumoniae, H.influenzae**	ceftriaxone** + vancomycin		* In un(der) immunized patient ** Use cefotaxime in infants < 4weeks of age
Retropharyngeal and Parapharyngeal Abscess/Cellulitis				
	S.aureus, Group A Strep, anaerobes	cefazolin + metronidazole **OR** cefazolin + clindamycin	piperacillin/tazobactam	Consider vancomycin in patient with high suspicion of MRSA
Peritonsillar Abscess/Cellulitis				
	Group A Strep, anaerobes, *S.aureus*	cefazolin + metronidazole	clindamycin*	*Increasing resistance to clindamycin in GAS & *S. aureus*
Cervical Lymphadenitis				
	S.aureus, Group A Strep	cefazolin	clindamycin*	Consider adding vancomycin for severe infection *Increasing resistance to clindamycin in GAS & *S. aureus*
Urinary Tract Infections*				
	E.coli, Klebsiella, Pseudomonas, Proteus, Enterococcus spp.	ceftriaxone*	gentamicin +/- ampicillin	*Use cefotaxime in infants < 4weeks of age
Cellulitis	Group A Strep, *S.aureus*	cefazolin	clindamycin	Consider adding vancomycin for
Omphalitis	*S.aureus,* Group B Strep, gram negative bacilli, anaerobes	piperacillin/tazobactam	meropenum	severe infection
Burn Wound Cellulitis				
	S.aureus, Pseudomonas, gram negative bacilli, Group A Strep	piperacillin/tazobactam	cefazolin + ceftazidime	Consider adding vancomycin for severe infection
Cat/Dog Bites	*Pasteurella multocida, S.aureus, Strep. spp. Capnocytophaga,* anaerobes	piperacillin/tazobactam	ceftriaxone* + clindamycin	*Use cefotaxime in infants < 4weeks of age
Osteomyelitis / Septic Arthritis				
< 6 weeks of age	*S.aureus,* Group A & B Strep, gram negative bacilli	cloxacillin + cefotaxime		
≥ 6 weeks of age	*S.aureus,* Group A Strep	cefazolin	cloxacillin	

Pneumonia				
< 6 weeks of age	Group B Strep, *H.influenzae, E.coli, S.pneumoniae, S.aureus*	cefotaxime		Consider clarithromycin for atypical coverage as indicated
≥ 6 weeks of age	*S.pneumoniae,* Group A Strep, *S.aureus*, H.influenzae, M.catarrhalis*	ceftriaxone (6 wks - < 3 m) ampicillin* (> 3 months)		*ampicillin does not cover *S.aureus* infection
Severe/ complicated	*S.pneumoniae,* Group A Strep, MRSA, *S.aureus*, H.influenzae, M.catarrhalis*	ceftriaxone** + vancomycin		Consider macrolide for atypical coverage as indicated
Aspiration	anaerobes, gram negative bacilli	ceftriaxone** + clindamycin **OR** ceftriaxone* + metronidazole	piperacillin/tazobactam	**Use cefotaxime in infants < 4weeks of age

NOSOCOMIAL INFECTIONS: develops after 72 hours in hospital (not incubating or present on admission)
excluding oncology patients

Source	Pathogens	Initial Empiric Regimen	Alternative Regimen	Comments
Pneumonia				
Ventilator Acquired Pneumonia	*S.aureus,* gram negative bacilli, *Pseudomonas*	piperacillin/tazobactam		
IV Site				
Peripheral IV site cellulitis	*S.aureus,* Group A Strep	cefazolin		
Central line or Tunnel infection*	coagulase negative Staph, *S.aureus, Strep. spp.,* gram negative bacilli	ceftriaxone* + vancomycin		Tunnel infections line should be removed *Use cefotaxime in infants < 4weeks of age
Urinary Tract Infections (Urinary Catheter)	gram negative bacilli, *Enterococcus spp.*	ampicillin + gentamicin		Remove urinary catheter No antibiotic treatment unless symptomatic

Anti-Infective Dosing Chart

Antibiotic		Dose	Max Dose	Interval
Ampicillin	N (Meningitis)	100 - 300 mg/kg/day		IV q6-12h
	(Other)	50 - 100 mg/kg/day		IV q6-12h
	I & C (Meningitis)	200 - 400 mg/kg/day	12 g/day	IV q6h
	(Other)	100 - 200 mg/kg/day		IV q6h
Cefazolin	N	20 mg/kg/dose		IV q8-12h
	I & C	50 - 100 mg/kg/day	6 g/day	IV q8h
Cefotaxime	N < 4 weeks	50 mg/kg/dose		IV q6-12h
	I & C (Meningitis)	200 - 300 mg/kg/day	12 g/day	IV q6h
	(Other)	100 - 200 mg/kg/day		IV q6-8h
Ceftazidime	N	50 mg/kg/dose		IV q8-12h
	I & C (Meningitis)	150 - 225 mg/kg/day	6 g/day	IV q8h
	(Other)	100 - 150 mg/kg/day	6 g/day	IV q8h
Ceftriaxone	N	50 - 75 mg/kg/day		IV q24h
	I & C (Meningitis)	100 mg/kg/day		IV q12h
	(Other)	50 - 75mg/kg/day	4 g/day	IV/IM q12-24h
Clindamycin	N	5 mg/kg/dose		IV q6-12h
	I & C	30 - 40 mg/kg/day	4.8 g/day	IV q6-8h
Cloxacillin	N	25 - 50 mg/kg/dose		IV q6-12h
	I & C	100 - 200 mg/kg/day	12 g/day	IV q4-6h
Gentamicin	N (regular)	2.5 mg/kg/dose		IV q8-24h
	(extended interval)	5 mg/kg/dose		IV q24-48h
	I & C (regular)	2.5 mg/kg/dose		IV q8h
	(extended interval)	5 - 9 mg/kg/dose		IV q24h
Meropenem	N	20 mg/kg/dose		IV q8-12h
	C ≥ 3 months (Meningitis)	120 mg/kg/day	6 g/day	IV q8h
	(Other)	60 mg/kg/day	3 g/day	IV q8h
Metronidazole	N	7.5 - 15 mg/kg/dose		IV q12-24h
	I & C	30 mg/kg/day	4 g/day	IV q6-8h
Piperacillin & Tazobactam	I < 6 months	150 - 300 mg/kg/day of Pip. component		IV q6-8h
	I > 6 months & C (Other)	240 mg/kg/day of Pip. component		IV q6-8h
	(Serious Pseudomonas Infection)	300 - 400 mg/kg/day of Pip. component	16 g of Pip/day	IV q6-8h
Vancomycin	N	15 mg/kg/dose		IV q8-24h
	I & C	40 - 60 mg/kg/day	4 g/day	IV q6-8h

N Neonate **I** Infant (1 month to 1 year of age) **C** Children 1-12 years of age

PAEDIATRIC LINGO

- A guide to help you understand the conversations

As and Bs	apneas and bradycardias
ALL	acute lymphocytic leukemia
ALTE	acute life-threatening event
AML	acute myelocytic leukemia
ASD	atrial septal defect
BPD	bronchopulmonary dysplasia (CLD now preferred term)
BSA	body surface area
CGA	corrected gestational age
CHD	congenital heart disease
CLD	chronic lung disease
CP	cerebral palsy
C-S	cesarean section
CTU	clinical teaching unit
DI	diabetes insipidus
GDM	gestational diabetes mellitus
GER(D)	gastroesophageal reflux (disease)
HC	head circumference
IUGR	intrauterine growth restriction
IVH	intraventricular hemorrhage
JIA	juvenile idiopathic arthritis
LGA	large for gestational age
NEC	necrotizing enterocolitis
NGT	nasogastric tube
NICU	neonatal intensive care unit
OFC	occipito-frontal circumference (HC)
PDA	patent ductus arteriosus
PED	paediatric emergency department
PICU	paediatric intensive care unit
PVL	periventricular leukomalacia
ROCA	regional on call application
ROP	retinopathy of prematurity
RSV	respiratory syncytial virus
SIDS	sudden infant death syndrome
SGA	small for gestational age
TFI	total fluid intake
TGA	transposition of the great arteries
TKVO	to keep vein open
ToF	tetralogy of Fallot
TPN	total parenteral nutrition
UAC	umbilical arterial catheter
UVC	umbilical venous catheter
UO	urine output
VCUG	voiding cystourethrogram
VUR	vesicoureteric reflux
VSD	ventricular septal defect

U of C PAEDIATRIC CLERKSHIP
CLINICAL PRESENTATIONS

Demonstrate an approach *(generation of a differential diagnoses, appropriate initial diagnostic investigations and management plan)* to the following core paediatric clinical presentations:

Abdominal Pain & Abdominal Mass
Acutely Ill Child
Adolescent Health Issues
Altered Level of Consciousness
Bruising / Bleeding

Dehydration
Development / Behavioural / Learning Problems
Diarrhea
Edema
Eye Issues

Fever
Genitourinary Complaints (hematuria, dysuria, polyuria, frequency, pain)
Growth Problems
Headache
Inadequately explained injury (Child abuse)

Limp/ Extremity Pain
Lymphadenopathy
Mental Health Concerns
Murmur
Neonatal Jaundice

Newborn
Pallor/ Anemia
Rash
Respiratory distress / Cough
Seizure / Paroxysmal event

Sore Ear
Sore Throat / Sore Mouth
Vomiting
Well Child Care (newborn, infant, child)

http://www.pupdoc.ca/canuc-paeds/