

ROUGH GUIDE - February 2011 (S.Sharma & R.Booth)

ANTIBIOTIC GUIDELINES: Liaise with ID team / on-call microbiologist (x5237) to discuss appropriate choice. Also discuss with PICU cons. Review @ 48 hr, 5 d, & with culture results. Neonates <1000g have fluconazole prophylaxis (*NEJM* 2001;345: p1660) for 1st 6/52. Consider up to 1500g if sick, on abs or with CVL.

Pneumonia: (1) Community acquired: co-amoxiclav or piperacillin/tazobactam +/- erythro/clarithro iv/po. (2) Hospital acquired or pseudomonas likely: Piperacillin/tazobactam + amikacin (OR ceftazidime + amik OR ciprofloxacin + amik). If has had piperacillin/tazobactam previous 2 wks, substitute with ciprofloxacin.

Severe trauma/crush injury: Head injury no abs; gut injury flucloxacillin + amikacin

Bacterial meningitis: cefotaxime (+ampicillin in neonates & infants<3months; consider adding amikacin if severe sepsis; add vancomycin + rifampicin for proven cefotaxime-resistant pneumococcal meningitis). Meropenem only on advice of micro/ID where carbapenem indicated.

Acute meningo-encephalitis: cefotaxime + high dose erythromycin + aciclovir (NB not ceftriaxone)

Fever of uncertain aetiology: (1) +post-op/ventilated/central line: piptaz & amik +/-vanc, substitute piptaz with cipro if had piptaz in previous 2 weeks. (2) +renal failure (incl. on CAPD or HD): vancomycin + piperacillin/tazobactam (OR vancomycin + ciprofloxacin)

NEC/ gut pathology: benzylpenicillin + amikacin + metronidazole

Aciclovir (iv) Adjust in RF	<3 mth: 20 mg/kg q8h; >3 mth: 500 mg/m ² q8h; >12yrs: 10 mg/kg q8h.	Cotrimoxazole (iv/po) Adjust in RF Not for <6 weeks age	PCP treatment: 60 mg/kg q12h. Consider steroids S.maltophilia 45mg/kg iv/po q12h Prophylactic regimens vary, see individual transplant protocol
Amikacin (iv) Levels: T<5mg/L P=20-30mg/L (only for doses <20mg/kg)	<2kg <4wk of life = 10mg/kg q24h; T+P >2kg >4wk of life = 15mg/kg q24h; T+P >2kg <4wk of life = 15mg/kg q24h; T+P >2kg >4wk of life = 20mg/kg q24h; T+G Renal Imp: 10mg/kg, take PEAK after 1st dose then T+H @24hrs	Co-amoxiclav (iv/po) Erythromycin (iv/po) Avoid in LF	iv: prem & 1 st wk of life = 30mg/kg q12h iv: 2 nd -4 th wk of life = 30mg/kg q8h; >4wk BNF Po: <4wk of life 0.25ml/kg 125/31q8h; >4wk BNF 12.5mg/kg/dose q6h all ages. Meningitis: 25mg/kg/dose q6h (max 4g/day). Gastric stasis: 3mg/kg q6h po/ng
Amphotericin Liposomal (iv)	Give test dose of 100mcg/kg (max 1mg) over 10mins, followed by rest of dose 1hr later; Prophyl: 1mg/kg od, take PEAK after 1st dose (max 5mg/kg od)	Flucloxacillin (iv) Adjust in RF	<1wk life 25 mg/kg q12h; 2-3 wks life 25 mg/kg q8h; >3 wk life 25 mg/kg q6h (Max 8g/day) Double dose in severe infections For staph meningitis, cerebral abscess or osteomyelitis <1wk life 50-100 mg/kg q12h; 2-3 wk life 50-100mg/kg q8h; >3wk life 50-100mg/kg q6h
Ampicillin (iv) Adjust in RF	<2kg <1wk of life = 50mg/kg q12h <2kg >1wk of life = 50mg/kg q8h >2kg <1wk of life = 50mg/kg q8h >2kg >1wk of life = 50mg/kg q6h Suspected Listeria: <1wk life = 50mg/kg q8h. >1wk of life = 50mg/kg q4h	Fluconazole (iv/po) Adjust in RF	> 4w: Prophylaxis 3mg/kg; Treatment 6-12 mg/kg (max 800mg) q24h <4w: Proph 3mg/kg; Treatment 6mg/kg; <2wk: q72h; 2-4wk: q48h
Benzylpenicillin (iv) Adjust in RF	Mild-mod infections: <1wk life = 25mg/kg q12h, 2-4 wk life = 25mg/kg q8h, >4wk life = 25mg/kg (max 2.4g) q6hr. Double dose in severe infections Meningitis, meningococcal disease <4wk life =75mg/kg q8h, >4wk life = 50mg/kg (max 2.4g) q4hr	Meropenem (iv) Micro/ID approval Adjust in RF	<1wk of life: 20mg/kg q12h; >1wk of life: 20mg/kg q8h; Meningitis/severe infection 40mg/kg(max 6g/day)
Caspofungin (iv) Adjust in LF	1-18yr: 70mg/m ² (max 70mg) OD Day 1 Then 50mg/ m ² OD (max 70 mg), ↑ 70 mg/m ² if tolerated but inadequate response	Metronidazole (iv/po)	<4wks: 15mg/kg stat, then 7.5mg/kg q12h after 24hr >4wks of life: 7.5mg/kg q8h (Max 400mg po, 500mg iv)
Cefotaxime (iv) Adjust in RF	50mg/kg/dose: <1wk of life q12h, 2-3 wk of life q8h, >3wk life q6h (max 12g/day)	Micafungin (iv)	<4wk: 2mg/kg q24h (14mg/kg if inad response) >4wk & <40kg: 2mg/kg q24h (↑ 4mg/kg if inad response) >40kg: 100mg q24h (200mg if inad response)
Ceftazidime (iv) Adjust in RF	<1wk life = 25mg/kg q24h, 2-3rd wk life = 25mg/kg q12h, 4 th wk life = 25mg/kg q8hr. Double dose in sever infections	Piperacillin / tazobactam (iv) Adjust in RF	90mg/kg <1 mth of life: q8h; >1mth: q6h >15kg Dose banding 6hrly: 15-20kg: 1575mg 20-25kg: 2025mg 25-30kg: 2475mg 30-35kg: 2925mg 35-40kg: 3375mg 40-45kg: 3825mg 45-50kg: 4275mg >50kg: 4500mg
Ciprofloxacin (iv/po) Adjust in RF	<4wk life:10mg/kg iv q12h; 15mg/kg po q12h >4wk: 10mg/kg (max 400mg) iv q8h, 20mg/kg (max 750mg) po q12h	Teicoplanin (iv) Adjust in RF on day4	<4 wks of life: 16mg/kg x 1 dose, then 24 hrs later 8mg/kg q24h >4 wks: 10mg/kg q12h x 3 doses then 10mg/kg q24h (max 400mg/dose)
Clarithromycin (iv/po) Adjust in RF Avoid in LF <4wks of life iv not recommended, po see dosing	iv:>4wks-12yr 7.5mg/kg (max 500mg) q12h iv: 12-18yr 500mg q12h (max dose) po: all ages 7.5mg/kg q12h; dose band for pts >8kg (BNFC)	Vancomycin (iv) Levels: T=5-15mg/L. Peak levels no longer required	<2kg = 15mg/kg; T+H @12hr. If T is ok then dose 12 hrly, if T is high discuss with pharmacy >2kg <4wk of life = 15mg/kg 12hrly; T+G >2kg >4wk of life = 15mg/kg 8hrly; T+G Renal imp: 10mg/kg, mild-mod imp T+G @12hr, severe imp T+H @24hr

All doses <1mg MUST be written in microgram i.e. 500microgram NOT 0.5mg RF = Renal failure, LF = Liver failure

USEFUL THERAPEUTIC DRUG LEVELS:

Dalteparin: Check renal function. Monitor Anti-Xa levels in pts with renal impairment, high bleeding risk and neonates (levels not required for prophylaxis). Give dose at 0600, take level at 1000 (lab will not run anti-Xa levels overnight). Level must not be taken from any line that has ever had heparin through it. Therapeutic level: 0.5-1.0unit/ml. Do not take unnecessary levels as cost £25.20 each.

Phenobarbital: Therapeutic level: 65-172 micromol/L

Phenytoin: Therapeutic level: 0-3months 25-60micromol/L; >3months 40-80 micromol/L. Correct for low albumin (ask pharmacist)

Abidec prem babies 0.6ml po od for 6-12 mo, infants 0.3ml po od, >1yr old 0.6ml po od (Dalivit 0.3ml po od for <1yr. 2nd line b/c high Vit A conc)
Acetazolamide (metabolic alkalosis) 5mg/kg po iv-bd qds
Adrenaline (airway obstruction) 1:1000 0.5ml/kg, max 6ml via neb prn
Alimemazine 1mg/kg/dose po/ing qds, max 25mg/dose qds or 100mg/day. Stat dose prior to procedure: 2mg/kg once.
Amiloride 0.2mg/kg/dose q12h po
Amiodarone 5-10mg/kg po q12h (interacts with digoxin-half dig dose)
Aspirin (anti-platelet) 5 mg/kg po od
Atracurium neonates 300-500 mcg/kg iv, >1mth 300-600 mcg/kg iv; supplemental doses of 100-200 mcg/kg iv
Atropine iv Neonate: 20mcg/kg, 1mo-12 yr: 10-20 mcg/kg, >12 yr: 300-600mcg
Caffeine Base Load: 10mg/kg iv/po/ng. Maint 2.5-5mg/kg iv/po/ng od starting after 24h (NB 2mg caffeine citrate = 1 mg caffeine base)
Calcium chloride 10% (0.68mmol/ml) 0.1-0.2 ml/kg (max 10ml) slow iv
Calcium gluconate 10% (First-line for calcium replacement). (0.225mmol/ml) 0.3-0.5 ml/kg (max 20ml) slow iv (usually over 30mins).
Cantharidin Initially test dose of 0.1 mg/kg then 0.1-0.5 mg/kg/dose q8h po. Neonates require much lower doses (10-50mcg/kg) (v sensitive)
Chloral Hydrate 30-50mg/kg q6h po/pr
Clonidine. Test dose 1mcg/kg then 1-5mcg/kg/dose q6-8hr po/slow iv; sedation 0.1-2mcg/kg/hr (max 25mcg/kg/day up to 1.2mg/day)
Dalteparin Check renal function. Prophylaxis: 0-12yrs 100units/kg q24h, 12-18yrs 2500-5000units sc q24h. Treatment: 100units/kg sc q12h.
Diclofenac 1mg/kg q8h po/pr (not recomm < 6mths, renal impairment, platelet or coag disturbance, or asthma)
Dipyridamole (weaning iNO) 0.6 mg/kg tds iv (very rarely used)
Domperidone neonates- 100-300 mcg/kg q 4-6 hr, 1mo to 12 yr- 200-400 mcg/kg q 6-8 hrs, 12-18 yr- 10-20 mg q 6-8 hrs.
DNase ETT (no dilution) 2.5mg; Neb 2.5mg od-bd
Folic acid prem neonates 50mcg po od, 1m-1yr 500mcg/kg (max 5mg) od, 1-18yr 5mg od (max 15mg od in malabsorption)
Furosemide 1-5mg/kg q6h po/iv
Glycopyrronium bromide 40-100mcg/kg/dose (max 2mg) q6-8h po; 4-10 mcg/kg/dose (max 200mcg) q6 iv or im
Insulin For non DKA- see CHIP protocol, for DKA- DKA protocol.
Ketamine 1-2mg/kg iv over 1min, 4-10mg/kg im
Lansoprazole <1yr and <10kg: 0.5-1mg/kg po/ng od. 10-30kg: 15mg po/ing od; >30kg 30mg po/ing od.
Lorazepam Seizures: 100mcg/kg (max 4mg), repeated after 10min if nec
Magnesium glycerophosphate 1month-12yrs: 0.2mmol/kg po/ng tds; >12yrs 4-8mmol tds (adjust according to response).

Magnesium sulphate iv Peripheral:10% 1ml/kg (max 20ml); Central: 20% 0.5ml/kg (max 10ml, max rate 0.05mls/kg/min, may cause profound hypotension) 50% 0.2ml/kg (max 4ml) (must dilute to 20%)
Mannitol 20% 250-1500mg/kg/dose iv over 30m (=1.25-7.5 ml/kg/dose)
Metolazone 1m-12y: 0.1-0.2 mg/kg od-bd po, 12-18y: 5-10mg od-bd
Morphine sulphate (Oramorph) 0.2 mg/kg q4-6h po. To convert from IV to oral: [total daily iv dose] x3] in 6 divided doses, q4h. Lower doses used in neonates and infants
Naloxone <12 yr: 1 mcg/kg, rpt 2-3 mins as req, 12-18 yr: 1.5-3 mcg/kg, rpt dose 100 mcg/kg every 2 min
N-Acetylcysteine ETT 1-3mls of 5%; Neb <5y 0.5ml 20% +3ml NaCl 0.9%;>5yr 1ml 20%+2.5ml NaCl 0.9%.
Nifedipine 1mo- 12 yr: 200-300 mcg/kg po/ng q8h (max 3mg/kg or 90 mg/d), 12-18 yr: 5-20 mg po/ng q8h (max 90 mg/d)
Omeprazole 500mcg/kg iv q24h, increased to 2mg/kg (max 40mg) iv od, 12-18y 40mg iv od. For oral, please prescribe lansoprazole.
Paracetamol IV: Neonates (incl preterm) <1 month 10mg/kg/dose q6h, max 40mg/kg/day. 1mth -<50kg 15mg/kg/dose q6h, max 60mg/kg/day; >50kg 1g q6h, max 4g/day. Po/pr: neonates: 15mg/kg qds; >1 month-12yrs: 15mg/kg/dose q4h or 20mg/kg qds; >12yrs: 1g qds.
Pentoxifylline see guideline on GOS web (5mg/kg for 6h/d x 6d)
Phenobarbital Loading dose: all ages: 20mg/kg (max 1g) iv over 20min. Repeat doses 10mg/kg in ventilated patients. 12 hours later maintenance: <12y 5mg/kg/day in 1 to 2 divided doses iv/po, 12-18y 300mg bd iv/po
Phenytoin Loading: 18mg/kg iv over 20min (with ECG); 12 hours later maintenance: neonates 2.5-5mg/kg q12h iv/po, 1mo-12yr 5mg/kg q12h iv/po (range 2.5-7.5mg/kg q12h, max 150 mg bd po OR 100mg tds iv), 12-18y, upto 100mg q6-8h iv or 150-200mg bd po (max 300mg bd po)
Potassium chloride iv dose MUST be agreed with consultant 0.5mmol/kg over 1 hour
Potassium canrenoate 1-2mg/kg (max 200mg) bd iv
Propranolol (Fallot's) 0.02mg/kg test dose iv, then 0.1mg/kg/dose over 10min q12h for neonates, q6-8h for >1month; maintenance 0.25-1mg/kg po q8-12h for neonates, q6-8h for >1month.
Ranitidine 1mg/kg (max 50mg) iv q6-8h; <6mo 1-3mg/kg tds po; >6mo 2-4mg/kg(max150-300mg) bd po
Sildenafil 0.25-0.5mg/kg q4-8h. May increase to max 2 mg/kg 6hrly
Sodium chloride 7% For nebulisation 3-5ml prn
Sodium feredetate (Sytron) prophylaxis in prem infants>28 days: 1ml od for 6-12 months; treatment: 1ml/kg/day (give larger vol in divided doses)
Spirolactone neonate: 0.5-1mg/kg bd; infant: 0.5-1.5mg/kg bd; >12yrs: 25-50mg od-bd
Vecuronium 100mcg/kg iv

Sedation: Ventilated neonates: morphine (10-40 mcg/kg/hr). Children also need midazolam (1-4 mcg/kg/min). Clonidine is used for opiate sparing. Oral alimemazine is midazolam sparing. Withdrawal occurs after >7 d - then wean 10% original dose/day
Pain Team arrange N/PCA's and monitor weaning regimes of discharged patients.

Nutrition / electrolytes: Aim for enteral nutrition whenever possible. For growth: 100kcal/kg for first 10 Kg + 50Kcal/kg for next 10kg + 20Kcal/kg for anything >20kg.If not feeding: gastric protection NEJM1998: 338 p791 to ↓ risk of bleeding / pneumonia.

POTASSIUM: n=3.0-4.5mmol/L; usual maintenance=2.5mmol/kg/day, but may require more with diuretic therapy;

HypoK: ↑maintenance if K+ <3.0 (<4.0 if tachydysrhythmias) & UO >1ml/kg/hr. If patient enterally fed, give oral supps 1-4 mmol/kg/day in divided doses. Check Mg! If, on diuretics add spirinolactone. IV potassium can be given only with consultant's approval.

HyperK: stop any K+ containing infusions; furosemide 1-5 mg/kg; Ca gluconate (0.3-0.5ml/kg over 10-30 min); Sodium bicarb 1mmol/kg over 30mins; calcium resonium (0.125-0.25g/kg PR, repeat if necessary q6-8h); glucose (10% 5ml/kg/hr) and insulin 0.05- 0.1units/kg/hr; salbutamol (2.5-5mg nebulised, repeat as necessary, or 4mcg/kg over 5mins iv); CVVH or PD

SODIUM: n=135-145mmol/L; maintenance=2-3mmol/kg/day. Always assess fluid status (wet/dry) & [Na] urine.

HypoNa: Acute CNS signs: 3ml/kg of 2.7% sodium chloride over 20 mins to ↑ Na>125 mmol/L +/- rpt, then normalize @<0.5mmol/hr.

HyperNa: May be intentional (Rx ↑ICP/severe res failure) or diuretic side-effect. Check U[Na] & ensure net H2O gain. Consider DI

CALCIUM: target range for ionised Ca 1.05-1.25; usual maintenance=1.0mmol/kg/day Oral replacement 0.25 mmol/kg q6h

Hypocalcaemia: calcium gluconate 10% 0.5 ml/kg slow iv (usually over 30mins). Incompatible with bicarb soln and phosphate.

Mg2+ Target 0.8-1.0mmol/L. Treat before hypocalcaemia. Slow IVI 0.5ml/kg 20% magnesium sulphate. Maint: 0.2mmol/kg tds

magnesium glycerophosphate.

PROTEIN: 1g/kg/day initially, increasing daily to 3g/kg/day (1g protein = 0.16g nitrogen)

LIPID: 1g/kg/day initially, increasing daily to 3g/kg/day (given over 18-20 hours)

GLUCOSE 10-15% (n req = 4-6mg/kg/min.) Glucose requirements >10mg/kg/min assoc with hyperinsulinism. Glucose (mg/kg/min) = (ml/hr x %gluc.) / (6 x wt). If 'unexplained' hypoglycaemia, do cortisol, insulin, GH and formal BG levels. Administer 2.5ml/kg of 10% glucose & increase maintenance glucose at the same time. Hyperglycaemia: If BM-12 consider CHIP control group protocol (NOT DKA).

ALKALYSING AGENTS: 1ml 7.2% Trometamol (THAM) = 1mmol Sodium bicarb = 1ml 8.4% Sodium bicarb. Use 1mmol/kg and reassess

BLOOD PRODUCTS:Packed Cells: 10-15mls/kg (3-4mls/kg ↑ Hg by 1g/dl). If multiple tx anticipated, order 4-8 red pedi-paks (split single adult unit) to limit donor exposure. **Urgent blood transfusion:** 'unmatched' O neg. 2 unit kept in VCB and 2 in cardiac theatre. Let Haem lab know you have taken it. Group specific match 30 mins, full xmatch 40 mins. **Platelets:** 10mls/kg. Keep Plts >20 in critically ill, but >50 if bleeding risk. Order before 12:00 for routine delivery 3pm.FFP: 10-20mls/kg, 20min to thaw **Cryoprecipitate:** for low fib use 5mls/kg

STERIODS: (NB avoid dexamethasone if possible in neonates due to risk of neurological adverse effects)

ARDS: Late ARDS non-resolving after 7-28days: methylpred 2mg/kg bolus, then 0.5mg/kg qds (Crit Care Med 2003; 31(4):S253-S257)

Asthma: hydrocortisone 4mg/kg (max25mg for <2yr, 50mg 2-5yr, 100mg 5-18yr) qds (as per BNF-C)

Croup: dexamethasone 0.15mg/kg bd (max 12mg) (as per BNF-C)

Extubation: to prevent post-extubation stridor: dexamethasone 0.25mg/kg iv stat, then 0.1 mg/kg q6h x 3 doses

Meningitis: dexamethasone 0.15mg/kg iv qds for 4 days, preferably before or with first dose of antibiotics (Cochrane R/V 2003)

PCP: methylprednisolone 1mg/kg q6h x7d, taper 1mg/kg bd x 2d, then 1mg/kg od x 3days then stop (Am J Dis Child 1993;147(1):30-4

Sepsis: hydrocortisone 1mg/kg qds iv (if already established on steroids consider higher dose) (send random cortisol first)

TB Meningitis: children >14yrs: dexamethasone 0.4mg/kg/day for 7days, 0.3mg/kg/day for 7days, 0.2mg/kg/day for 7days then 0.1mg/kg/day for 7days (in divided doses) (NEJM 2004; 351(17):1741-51)

Spinal Cord Injury: Use is controversial. Methylpred 30mg/kg over 15min, followed 45min later by 5.4mg/kg/hr for 23hrs if started <3hrs after injury or for 47hrs if started 3-8hrs after injury (NB if started >8hrs after injury = detrimental). (NeuroRx 2004; 1(1):80-100). See also BASCIS Statement

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GOLDEN RULES:

1. **If in doubt – DISCUSS.** Do NOT struggle beyond your experience / confidence.
2. **Right tube, place, time.** Get the basics right & do simple things well. If unsure of **venous** placement of central line - transduce
3. **Do not injure the child with the ventilator.** Limit pressure, O₂ & volume.
4. **Adequate sedation & analgesia** – they are different
5. **Patients are under ICU care** - teams consult but don't direct care or prescribe drugs w/o ICU approval
6. **All admissions are d/w ICU cons before acceptance** – including wards and theatres
7. **ICU SpRs do not attend** clinical emergencies on other wards. CSP, ICON & emergency team are 1st line

HOUSEKEEPING:

1. IV K⁺ infusions *only* with ITU consultant approval.
2. Treat pyrexia only if clear clinical benefit: 1 ICP, risk of seizure, low CO
3. Consultant approval for IJ lines < 3kg; No 5 Fr triple lumen lines < 1000g.
4. Cut ETT once position confirmed on CXR
5. Prescription & Fluid Charts: fill in Patient Name, No & Allergies, write legibly in CAPITALS and PRINT your name. Use the prescription desks for all prescribing.
6. Enteral feeds where possible

THE UNIT ROUTINES

Ward rounds: All SpRs attend NICU & PICU am WR. Starts NICU 8:15, followed by PICU, finished by 9:30. (Short-day (SD) SpR attends urgent NICU business immediately following NICU WR). PM WR, PICU 16h, NICU 17h SD SpRs leave after PM WR. Handovers must be short, direct & give a plan for the day. Day registrars must examine their patients and write an entry in the notes, including the plan for the day. Night handover 20:30, then registrars conduct a WR with the senior sister/nurse-in-charge on the night shift to discuss management plans. **Night SpR to order xrays, am bloods & EEGs, dictate discharge summaries & update handover sheet.** **"Housekeeping"** (CrUSS, eye exam, growth charts etc) on NICU & long stay pt on PICU occurs on TUESDAY. (See PPT in ITU training folder O drive.)

MON.	TUES.	WED.	THURS.	FRI.
11:00: X-Ray round 13:30 mini - Micro 14:00 Joint Neuro, neuroradiology, PICU	11:00 Unit psycho-social 12:30 Journal club / M&M / R&D 14:30 ID round	13:00 Hospital Clinical meeting 10:00 -16:00 Unit teaching programme	08:15 Grand NICU/Paed Surg WR 13:00 Reflective practice session 14:00 Nutrition round 14:30 ID ward round	14:00 mini-Micro

Monthly meeting: Last wed core curriculum ITU training days.

Phones: Numbers on desk laminates **Bleep:** GOSH: dial 76, bleep no, your ext no. **Switchboard:** GOSH 5000; National: dial 77 **Direct dialing:** for ext 81xx-85xx: preface=7813; for exts 86xx & 88xx, preface =7829. **Transfer a call:** press "R" or "recall" dial no. transferring to, then hang up after answer. **PACS:** Username/Password for MV300 PICU = hospital/hospital or doctor/doctor. Username/Password for Magicweb is doctor/doctor or lecture/lecture **Consultants:** 1st on: Responsible for clinical Mx & all admission decisions. **Support** (8:15-16:15) MDT meetings, parent updates, trainee supervision, teaching – informal & individual

PICU: 8808/8283/5151/8683	NICU Reg: bl 0638	Metabolic Spr: bl 0573	Dr A Petros ext. 8485 m. phone
NICU: 8812/8285/5098	PICU Reg: bl 0523	Neurology Spr: bl 0100	Dr C Pierce ext. 8116 m. phone
PICU Fellow: 0454	CCCU: 1st-on: bl 0542	Neurosurg Spr: bl 0001 (National pm)	Dr M Peters ext. 8118 m. phone
PICU Fax: 02078138206	CCCU: 2nd-on: bl 0547	Neurosurg Spr on-call: 07960664901	Dr S Skellet ext. 8117 m. phone
Hot Office: 7835/5697/6720	Anaesth Reg: bl 0510	Nephrology Spr: bl 0611	Dr Q Mok ext. 8209 m. phone
Coffee room: 0034	BMT Spr: bl 0671	Paed Surg Spr: bl 0777	Dr P Lister ext. 5809 m. phone
PICU secretary (Paula): 8213	Cardiology Reg: bl 0548	Resp Spr: bl 0699	Dr J Brierley ext. 8208 m. phone
Consultant PA (Carol): 7950	Cardiothor Reg: bl 0530	Urology Spr: bl 0102	Dr S Sharma ext. 8809 m. phone
CATS: x 4850 or 0800 0850003	Haem Spr: bl 0654	Intervent Radio: 7856 / blp 0914	Dr A Nuehsmann ext. 0585 m.phone
PACS x5172 Bl 0458/0457	ID Spr: bl 2102	Vent. tech's: ext 5143/bleep 0561	
CCC: 8652/8312	Immunology Spr: bl 2100	Cardiac arrest: 2222	ICON Fellow 0522

Investigations: **Lab Results:** double click on icon path results. User ID=PICU / NICU (caps lock); Password =WENQ (ward enquiry). **BAL** ask physiotherapists on AM round PCP goes to virology lab **X-ray:** portables bl 0634. **U/S:** Clin. Assit takes form in am. **Contrast studies:** phone & clin assit to take form **Emergency CT head:** bl on-call radiographer (bl 0634)- need to D/W neuroradiologist OR neurosurg on-call. **MRI:** ventilated patients need GA list; emergency scans -arrange with MRI co-ordinator (bl 2060) **Report "foreign" xrays** – send xray request form to "digitise onto PACS". **PACS problems:** office hrs as above/out of hours: on-call radiographer **EEG/ NCV's/EMG/SSEP's:** request EEG dept (x5153) – order anticipated EEGs before WR at 9:00 **pH Studies** Give name to Eugenia who will organise **ECG** request form & phone (x5241) **ECHO:** request cardiology consultation not just echo from on call Spr **Genetics referral:** phone depart sec (x2607), give pts name; routinely seen on Thursdays. **Karyotype & chromosomes:** cytogenetics lab (x8870) orange (lith.hep) & DNA Analysis-EDTA. **Ophthalmology referral:** NICU: put pt details in diary for routine exam on Wed am. Emergency: aircall Spr via switch & send ophthal referral to outpatients. **Admissions** External requests for URGENT admissions must be referred to CATS - including neonatal surg & neurosurgical emergencies. **Internal GOSH Emergency referral:** refer immediately to ICU consultants. CSPs follow "Acutely unwell child" protocol. ICU consultants advise as necessary. **Elective Internal referral:** d/w duty consultant. Details entered into referral folder. Bed availability is confirmed on morning of surgery.

Discharges: Start planning discharge from admission. Think ahead & prepare summary to avoid delays (1) **Tell the parents** of the plan to transfer (2) **Notify the receiving medical team & document** in the pt notes (D/C sticker) who you have notified (3) **Write brief review** in notes (internalel discharges fill in a discharge proforma)

In the event of a death: (1) Ensure the child's parents & PICU consultant are informed immediately. (2) **Declare the child's death** in the notes. Fill in "Death" sticker and place in pt notes. (3) D/W consultant if Coroner's referral needed- checklist in front of death certificate book (<24 hrs admission /operation/accidental/ violence/uncertain cause/parent likely to complain/neglect). If the case is **not** referred, consider requesting PM. Complete death certificate & cremation form. (Remember to print name & write GMC no.) (4) Notify Family Liaison Nurses. Inform all referring consultants (GOSH & external) GP & health visitors. (5) Inform parents bereavement follow up offered in +/- 6 wks. Bedside nurse will give parents information pack & death certificate. They must register death at Camden Registry Office within 5 working days. (6) For suspicious deaths: Contacting coroner out-of-hours: **020 7404 1212** =Camden Area Police Operator: ask for METCALL; get CAD number & message page contact coroner's officer who will phone back. If unexpected death in <2yr must state this to METCALL – they raise the INDIGO team.

IMPORTANT BASICS

AIRWAY: **Ayers T-piece:** max tidal vol 500mls <20kg, use 2L reservoir bag in>20kg. **NB** bag distends to ~50cmH2O. **N-P prong:** measure nostril to tragus. **Intubations:** 2 doctors MUST be present at all intubations. Anticipate difficult airway: stridor, restricted jaw/neck movement, prominent upper teeth, small receding jaw, large tongue, large tonsils/tumor. Pre-oxygenate 3 mins. **Confirm tube position** with capnography & **document ETCO₂ in notes.** Gas induction by anaesthetists only. Consider laryngeal mask (LMA) or cricothyroidotomy in emergency. Cuffed ET (down to 3.5) available for pts requiring high P. **Drugs:** Induction: Fentanyl 2-4 mcg/kg ± atropine 20 mcg/kg (minimum 100mcg) **AND** if CV stable. Midazolam 0.1-0.2mg/kg / thiopental 2-5mg/kg / > 3yrs old then also propofol 1% 2.5-3.5mg/kg. If CV instability: Fentanyl as above/ Ketamine 1-2mg/kg (not in 1ICP) **Paralysis:** Atacurium 0.5-1.0 mg/kg / Vecuronium 100mcg/kg / suxamethonium 1-2 mg/kg (not in 1K,1ICP) **Modified Rapid Sequence Induction** Thiopental / suxameth. +/- Lignocaine 1 mg/kg (esp high ICP) + cricoid pressure
BREATHING: **Ventilation guidelines:** Aim: FIO₂<0.6; TV 4-7ml/kg, PIP<30cmH2O, PEEP 4-8cm H2O, permissive hypercapnia (pH7.25-7.3). Use PEEP to recruit lung & keep it open. Use decelerating flow as default = PRVC (TV not accurate <150mls) or PC. Always set upper press limit. Neuromuscular block –initially, high pressures (PIP>25cmH2O) or to tolerate v. high PaCO₂. **Trial HFOV** if FIO₂>0.6, MAP>16 for PaO₂>8; MAP 2-6 > conventional, 5-10Hz; ΔP 'enough for chest bounce. PaO₂ ≈FIO₂ & MAP; PaCO₂ ≈AP & 1/freq (1 freq.→1PCO₂) Check ABG < 20 min. as CO₂ may ↓ precipitously. Check CXR within 4 hrs (risk of over distension). Daily CXR on HFOV. **PPHN:** see protocol. Good sedation, paralysis, recruit lung PEEP/HFOV, PaO₂ 13-16kPa, lowest PIP, PaCO₂ 4-5kPa, pH ~7.45 THAM (trometamol)/sodium bicarbonate Support ventricular function with filling & inotropes to high-normal MABP eg. term >45mmHg. Surfactant. Then consider iNO, begin 20ppm; if definite response >20% ↑postductal PaO₂, wean promptly to 5-10ppm. Other pulm vasodilators only to be given with ICU consultant approval. Consider ECMO esp. if airleak.

Immunodeficiency: v. high mortality from resp failure– esp if caused by opportunistic pathogen/fluorid overload. Admit early for non-invasive support – facemask/ helmet CPAP/BiPAP to ↓ atelectasis & avoid intubation (evidence ETT related to poor prog (J Pediatr Hematol Oncol 2008; 30: 533-8)

CIRCULATION: Fluid saves lives in shock. Initial vol for resuscitation in shock=20mls/kg; repeat every **5 mins** as needed. Intubate early.Target vasopressor/inotrope to clinical scenario (warm vs cold shock) Crit Care Med. 2002 30(6):p1365. Consider CO monitoring (suprasternal Doppler - USCOM) in dopamine-resistant shock. Human albumin in sepsis, 0.9% sodium chloride in trauma (NEJM 2004; 350:2247-56) **CARDIAC ARREST:** Paediatric arrests are usually secondary to hypoxia- remember O₂ **Asystole/ PEA /non-VT/VF arrest:** CPR (ratio 15 :2)+ Adren 0.1 ml/kg of 1:10 000. q3-5 min, Consider reversible causes **-4 H's:** Hypoxia; Hypovolaemia; Hyper/Hypok+Ca+; Hypothermia & **4 T's:** Tension pneumothorax, Tamponade, Thromboembolism; Toxin/Therap. (tricyclics, β-blockers. Ca2+ channel blockers) **VT/VF:** CPR (ratio 15:2) Adren 0.1 ml/kg of 1:10 000, defibrillate ONCE 4J/kg; repeat q3-5min **SVT:** vagal manoeuvres; adenosine 100mcg/kg rapid iv; ↑ x 100mcg/kg/dose to max 400mcg/kg; consider DC cardioversion 0.5→1→2 J/kg.

SOME USEFUL POST-OP PROTOCOLS (Always confirm at post-op handover and ensure postop checklist)

Spinal fusion: keep flat & sedated for 12 hrs, then log-roll. Check if brace required prior to mobilizing. Aim: wean & extubate promptly unless major haemodynamic instability. Amikacin 10mg/kg iv q12h x 2 doses & flucloxacillin 250mg/kg (max 1g) iv q6h until wound dry. **LTR or Cricoid split:** Co-amoxiclav 30mg/kg (max1.2g) iv tds for 3 doses then ng for 5 days @ following doses: <1yr = 0.25ml/kg of 125/31 q8h, 1-6y 5ml of 125/31 q8h, >6y 5ml of 250/62 q 8h. Anti-reflux therapy (ranitidine). Dexamethasone 24-48 hrs pre extubation

SPECIFIC DISEASES: More detailed guideline available on intranet – confirm with cons.

Upper airway obstruction: Do not give O₂ or CPAP to cases of pure upper airway obstruction unless preparing to intubate. Desaturation in this scenario means impending resp. arrest. Supplemental O₂ & CPAP masks this.

DKA: DON'T give> 20mls/kg resus fluid, DO give fluid slowly DON'T give bicarbonate, DO give insulin ivi @ 0.05- 0.1unit/kg/hr (max) DON'T give bolus insulin, DO repeat electrolytes (Na+&K+). DON'T INTUBATE if possible, if intubating, hyperventilate to mimic pt's unventilated CO₂

Burns: Initially 'forget about the burn' ABC. Discuss with St Andrews Broomfield 01245 440761 Fluids: (adequate skin perfusion & UO) 100% maintenance + 1st 8 hours: Hartmann's/0.9% sodium chloride as 0.25ml/kg/% area burn/hr, backdated to time of burn, next 16 hr: 4.5% human albumin 0.1ml/kg/% burn/hr. Large burns treat empirically vs CVP / BP, may need 2-3 x circulating vol. Elective early intubation in facial/airway burn - risk of severe oedema -DON'T CUT ETT. See St Andrews protocols in BURNS module readings & PICU Protocols

USEFUL STUFF: **Estimated wt** (kg) = 2 x (Age + 4) **Estimated surface area** (m²) = √ [(Height(cm) x Weight (kg)/ 3600)] **ETT diameter** (mm) (>1 yr) = Age/4 + 4, ETT length at lip (cm): 12 + age/2 nostril (cm): 15 + age/2 **Oxygenation Index** (OI)=MAPx FIO₂(%) / PaO₂ (mmHg) **Conversion from kPa to mmHg:** 7.5xkPa

Osmolality serum= 2xNa+gluc+urea (mmol/L). (n= 270 – 295) **Anion Gap** (mEq/L)= (Na + K) – (Bicar + Cl). (n= 8 – 16)

Corrected Na in DKA (mmol/L) = Plasma Na + (0.4 x (glucose – 5.5)) **Plasma Cl: Na Ratio:** 0.74 to 0.80. >0.8 = hyperchloraemia

Base excess due to Cl (mEq/L) = Na - Cl - 32 **Fractional Excretion of Na** (FENa)= (U_{Na} x PCr)/(P_{Na} x UCr) x 100

FLUIDS: Critically ill children ↓ ability to excrete free H₂O. Insensible losses are ↓ on humidified IPPV -so all ventilated children are "fluid restricted". Adjust std values for individuals. **Neonates** 10%D 0.45%sal & 10-20mmol KCl/500ml peripherally. **D1:60; D2:90; D3:120; D4:150ml/kg/d** (VLBW may need D1:90, D2:120 to 180-200ml/kg/day) **Infants & children** 5%D 0.45%Na & 10-20mmol KCl/500ml. 100ml/kg/d for 1st10kg; 50ml/kg/d for next 10kg's; 20ml/kg/d for subsequent kg's. Fluid regimen written as "% maintenance" but 100% for that child must be clearly stated. Most surgical pts = 60% maintenance 1st post-op day, with no TPN for 24-48 hrs.

ACID-BASE BALANCE(From STRS website)

K+	Alb-	K+	Alb-	K+	Alb-	K+	Alb-
	Bic		Bic		Acid X-		Acid X-
Na+	Cl-	Na+	Cl-	Na+	Cl-	Na+	Cl-
					Bic		Bic
Normal		High Chloride = Acidifying		Acid + low Cl = Compensating		Acid + Low Cl + Low alb = Compensating	

	DI	SIADH	CSW/ Renal SW
P Na	↑	↓	↓
U Na	1/N	1/N	↑↑
P Osmo	↑	↓	↓
U Osmo	↓	↑	↑
Urine output	↑↑	↓	↑↑
P Glu	N	N	N
U Glu	-	-	-
status	Dry	Wet	Dry
Mx/d	Fluid +DDAVP	Fluid restrict	Fluid + Na