INTERN SURVIVAL GUIDE

Montgomery Family Practice Residency Program
2005-2006

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RADIOLOGY REPORTS

Dial 2332

To use: ID# = attending # (ex. 290,807,579,664)
Pt. ID# = birthday (ie. 01/01/00)
2 -- pause
3 -- review/resume
44 -- fast forward
77 -- rewind to start
8 -- previous report
9 -- impression
-- speed up
* -- slow down

DICTATION (215)396-5365 or the White Phone

Problems: (610)832-0400

11 -- H&P
12 -- Consult
14 -- D/C summary
16 -- STAT dictation

1 -- hold
2 -- dictation pause
3 -- review
44 -- fast forward to end
5 -- disconnect
77 -- begin
8 -- end
* -- clear

QUICK CODE REFERENCE

VFIB:
- Thump if witnessed
- Defib. 200J, 300J, 360J
- Epi. 1:10,000 - 0.5-1.0 mg
- Defib. 360J
- Lidocaine 1 mg/kg push
- Defib. 360J
- Defib. 360J
- Repeat Lido.
- Defib. 360J

PSVT:
Stable: vagal maneuvers
Adenosine 6mg then 12 mg x 2
Verapamil 5.0 mg

VTACH:
- *Without pulses:* treat as Vfib
- *With pulses:*
  - Stable: oxygen
    Lidocaine 1 mg/kg push
    Lidocaine 0.5 mg/kg q8min. until resolved or to 3mg/kg
    Procainamide 20 mg/min until VT resolves or up to 1 gm
    Cardiovert as if unstable
  - Unstable: oxygen
    consider sedation
    Defib. 50J
    Defib 100J
    Defib 200J
    Defib 360J
    If recurrent Lidocaine then Cardiovert at level previously successful then Procaine or Bretylium

ASYSTOLE:
- Should be confirmed in at least 2 leads.
- If unsure Vfib vs Asystole Defib
- Epi. 1:10,000 0.5 – 1.0 mg push then q5 min
- Atropine 1 mg repeat in 5 min
- Consider bicarb
- Consider a pacer

PULSELESS ELECTRICAL ACTIVITY (PEA):
- Epi. 1:10,000 0.5 mg – 1.0 mg push then q5 min
- Consider Bicarb if hyperkalemia in the differential
- Consider hypovolemia
  Cardiac tamponade
  Tension pneumothorax
  Hypoxemia
  Acidosis
  Pulmonary embolism

BRADYCARDIA:
- Sinus, junctional, or Mobitz I without signs or symptoms – observe
- Mobitz II, 3rd degree AV block without signs or symptoms – needs pacer
- Any rhythm above with symptoms – Atropine 0.5 – 1.0 mg
- If continued symptoms repeat x1
- If continued symptoms – external pacer or consider dopamine or isoproterenol until perm. Pacer

Pediatric and Neonatal Resuscitation

Pediatric and Neonatal Resuscitation

MEDICATIONS AND FLUIDS

AGE	WEIGHT (KG) LB ÷ 2.2 = KG	INITIAL DOSE OF EPINEPHRINE (1:10,000) 0.1 cc/KG/dose 0.01 mg/KG/dose	SUBSEQUENT DOSES OF EPINEPHRINE (1:1,000)* 0.1 cc/KG/dose 0.1 mg/KG/dose	ATROPINE (0.4 mg/cc) 0.02 mg/KG/dose min dose = 0.15 mg max dose = 2.0 mg	SODIUM BICARBONATE (8.4%) 1.0-2.0 meq/KG dose 1.0-2.0 cc/KG dose	DEXTROSE 10% VIA PERIPHERAL IV 5.0 cc/KG/dose	DEXTROSE 25% VIA CENTRAL IV 2.0 cc/KG/dose	NALOXONE (NARCAN) (0.4 mg/cc) 0.1 mg/KG/dose min dose = 0.5 mg max dose = 2.0 mg	MAINTENANCE IV FLUID 100 cc/KG–up to 10 KG 50 cc/KG–next 10 KG 20 cc/KG–remaining KG
preemie	<2.5	0.25 cc	0.25 cc	0.38 cc	2.5 cc + 2.5 cc H2O	13 cc	———	1.3 cc	D 10% 1/4 NSS @ 10 cc/hr
term	3	0.3 cc	0.3 cc	0.38 cc	3.0 cc + 3.0 cc H2O	15 cc	———	1.3 cc	D 10% 1/4 NSS @ 13 cc/hr
1 mo	4	0.4 cc	0.4 cc	0.38 cc	4.0 cc + 4.0 cc H2O	20 cc	———	1.3 cc	D 10% 1/4 NSS @ 17 cc/hr
3 mo	5.5	0.55 cc	0.55 cc	0.38 cc	5.5 cc +5.5 cc H2O	28 cc	———	1.4 cc	D 10% 1/4 NSS @ 23 cc/hr
6 mo	7	0.7 cc	0.7 cc	0.38 cc	7.0 cc	35 cc	14 cc	1.8 cc	D 10% 1/4 NSS @ 29 cc/hr
1 yr	10	1.0 cc	1.0 cc	0.5 cc	10.0 cc	50 cc	20 cc	2.5 cc	D 5% 1/4 NSS @ 42 cc/hr
2 yr	12	1.2 cc	1.2 cc	0.6 cc	12.0 cc	60 cc	24 cc	3.0 cc	D 5% 1/4 NSS @ 46 cc/hr
3 yr	14	1.4 cc	1.4 cc	0.7 cc	14.0 cc	70 cc	28 cc	3.5 cc	D 5% 1/4 NSS @ 50 cc/hr
4 yr	16	1.6 cc	1.6 cc	0.8 cc	16.0 cc	80 cc	32 cc	4.0 cc	D 5% 1/4 NSS @ 54 cc/hr
5 yr	18	1.8 cc	1.8 cc	0.9 cc	18.0 cc	90 cc	36 cc	4.5 cc	D 5% 1/4 NSS @ 58 cc/hr
6 yr	20	2.0 cc	2.0 cc	1.0 cc	20.0 cc	100 cc	40 cc	5.0 cc	D 5% 1/4 NSS @ 63 cc/hr
7 yr	22	2.2 cc	2.2 cc	1.1 cc	22.0 cc	110 cc	44 cc	5.0 cc	D 5% 1/4 NSS @ 64 cc/hr
8 yr	25	2.5 cc	2.5 cc	1.3 cc	25.0 cc	125 cc	50 cc	5.0 cc	D 5% 1/4 NSS @ 67 cc/hr
9 yr	28	2.8 cc	2.8 cc	1.4 cc	28.0 cc	140 cc	56 cc	5.0 cc	D 5% 1/4 NSS @ 69 cc/hr
10 yr	34	3.4 cc	3.4 cc	1.7 cc	34.0 cc	170 cc	68 cc	5.0 cc	D 5% 1/4 NSS @ 74 cc/hr

* Note: 10 x concentration

DEFIBRILLATION AND CARDIOVERSION

DEFIBRILLATION	CARDIOVERSION	PADDLE SIZE
2 watt/sec/KG (joules) for first dose	0.5-1.0 watt/sec/KG (joules) for first dose	Infant = 4 cm
4 watt/sec/KG (joules) for subsequent doses	2.0 watt/sec/KG (joules) for subsequent doses	Child = 8.5 cm Adolescent = 12 cm

SEIZURES

MEDICATION	DOSE	ROUTE	COMMENTS
Diazepam (Valium)	0.1-0.2 mg/KG/dose 0.5 mg/KG/dose	IV PR	• max rate = 1 mg/min • rapid push causes apnea • repeat dose as often as needed or double dose
Lorazepam (Ativan)	0.05-0.1 mg/KG/dose	IV/IM	• same as for Valium
Phenobarbital	neonates = 20 mg/KG 2 mo-1 yr = 15 mg/KG over 1 yr = 10 mg/KG	IV/IM	• max dose = 500 mg
Phenytoin (Dilantin)	18-20 mg/KG	IV	• max rate = 1 mg/KG/min • max dose = 1500 mg

Phone List

MFP Office	277-0964
MFP Private Line	277-0976
MFP Fax	270-2184
MFP Service	354-8778

BEEPERS -- MFP

Bluestein (290)	975-8784	Amoah	(610) 318-0108
Evans (610)	963-6640	Darby	(610) 309-1636

Hospital	270-2000
CCP	272-3253

DEPARTMENTS

Lab	2170
Chemistry	2190
Micro	2187
Pathology	2173
Heme	2174
Blood Bank	2185
Library	2232
Medical Records	2115
Radiology	2050/2260
Reports2332*	
ER	2060
ICU	2428
Peds	2110
Psych	2013
3 oncology	2017
3 southwest	2337
maternity	2020
L&D	2271
Nursery	2027
Spec care nursery	2275
4 southeast	2828
4 southwest	2347
5 west	2359
6 east	2363
intern call room	2075
2 south	2336
CCU	2228
upper year call room	2237
doc's dining room	2242
pharmacy	2089
social work	2030
heart station	2028
ER Fax	272-2652
home care	272-1080
Smith-Kline	631-4200
dictation	(215) 396-5365

Night Float

1st year 963-4446
2nd year 963-4299
3rd year 963-4765

Fox (807)	254-3706
Solomon (610)	309-2524
Rodgers (148)	254-3717
Rose (610)	501-2575
Warren (610)	963-7488
Ciccone (215)	872-0227
Edde (610)	963-6058
Cruz (610)	501-8029
Martin (610)	963-4730
Bautista	(610) 975-8709
Cabrera	(610) 254-3281
George	(610) 963-3706
Gulati	(610) 254-3715
Liu	(610) 501-3889
Nguyen	(610)254-3722
Student	963-2385
Crystal Franklin	501-0338
Ana Santiago	305-0779
Office Number	277-0964
Office Number	277-0976
Fax machine	270-2184
Residency Fax	277-7065
Voice mail	277-4121
Office from hosp	ext-2928
Office from hosp	ext-2927

BEEPERS -- CCP

Belasco	303-3245
Belber	307-8660
Buonocore	309-5202
Casey	307-8947
Cohan	309-5206
Foreman	(215) 330-8180
Magargee	(215) 304-4104
Mercier	309-5204
Moscowitz	(215) 330-8377
Schwartz	303-4035
Vaganos	(215) 304-4104
Waxler	815-0097

Minhas	(610) 318-0109
Li	(610) 318-0114
Zeljko	(610) 222-9841
Georges	(610)309-0401
Akinkunmi	(610) 975-8744
Fazili	(610) 305-9197
Pellegrino	(610) 309-1950
Proshkina	(610) 221-9651
Qazi	(610) 963-1425
Yun	(610) 963-1426

INTERN SURVIVAL GUIDE

This is a short set of notes to help get you through the novelty and anxiety of your first few weeks/months of internship. It is not meant to replace your copies of the Washington Manual or Harrison's, but to supply a simple, general approach to some of the common problems you will face this year on call. As time goes on, you will find less and less need for these suggestions, and will be able to establish a far broader differential diagnosis and more comprehensive treatment plan for each of these situations. Medicine is a lot like riding a bicycle: the more you do it, the better you get. It doesn't require brains as much as it requires dedication and hard work. Corny, but true. GOOD LUCK!

The Ten Commandments

1. Never discontinue Foley catheters in the evening!

2. Always write a short note in the chart if something major has occurred while on call. If uncertain whether or not a note is required, write one.

3. Always see admission patients and write admission orders as soon as possible. If you receive several admissions at the same time, see each one quickly and write a quick set of admission orders. You can always come back to do an H&P. H&P's are required within 24 hours.

4. When on call, always see patients you are called about who have serious complaints -- chest pain, shortness of breath, falling out of bed, agitation, etc. It's impossible to judge a patient's condition over the phone.

5. Always be nice to the secretaries and nurses of the floor, ER and medical clinics. Show respect for their judgment – they've had a lot of experience. They take care of your patients. They can make your life easier. They can make it difficult. Very difficult.

6. NEVER hesitate to call for help or advice from an upper year resident or attending. There is no such thing as a dumb question.

7. Never leave the hospital at the end of the day without tying up loose ends. Check lab results, important x-rays before going home. Sign out only items with plans in place – don't leave an intern with midnight decisions of care to make.

8. ALWAYS check the charts for allergies before starting drugs.

9. Never eat anything from the refrigerator without checking the date.

10. Remember there are times when compassion can cure as well as medicine.

Family Practice Service

Taking care of 10 to 20 patients a day is difficult even when you know them well. Taking care of our family practice patients plus answering calls on an additional 40 to 70 CCP patients when you are on call at night while doing five admissions is aided by a good set of sign-out sheets. Sign-out sheets will never be available from CCP. Generally, we have a practice of only signing out active issues of Family Practice patients to the resident on call. All other info needed on a patient should be available directly from the chart. Learning to access that info quickly when you need it for a new problem is great training for house doc or locum tenens work later in life. Some hospital teams use sign-out sheets. In an ideal world, these would be short but thorough. And READABLE. They can include name, room #, reason for admission, a short list of pertinent PMHx, meds, and things to be aware of. For instance:

J.S.	Rm. 344 W	CC: CHF s/p MI X 2 IDDM	Lanoxin Lasix NPH am/pm	angina = jaw pain, placed subclavian line today, cover sugars > 400	
T.J.	Rm. 351 D Procan	CC: s/p MI	NTP	keep PTT 50 - 70 Heparin	Hx V Tach

Such sheets should NOT be copied for distribution per Dr. Rodgers. Naturally, if such info is recorded for use, confidentiality is important to maintain – be careful not to lose track of sign-out sheets, your notes or other paperwork in the hospital.

A member of the team on service will meet you at 5 PM in the Physician's Cafeteria to pass on any important info regarding family practice patients. The upper year on call often does not attend this meeting as office hours start at 5 PM as well. Meet again with the team at 7 AM after your call to pass on any info regarding overnite issues, new consults or admissions.

On weekends, the team writes notes for family practice patients on Saturday mornings. As the Saturday intern on call, you will be expected to round on family practice patients when the intern on service has the weekend off. Divide the work at the 7 AM meeting. On days you need to round, be flexible. You will also have CCP admissions, OB responsibilities and in-house calls as well. There is always an on-service upper year present for Saturday rounds unless s/he is on call that weekend. (We try not to schedule that way, but…) The upper year on call has Saturday AM office hours. After AM rounds/notes, meet with the inpatient team and the attending for sign-outs. Take notes! You need to pass on any relevant patient info to the Sunday team (e.g., labs to check, if a patient is expected to be discharged on Sunday, etc.).

Sundays and holidays, you and your upper year on call do the notes. Get info required for the day from the Saturday intern at 7 AM, divide the work and plan on meeting with the attending at noon. Again, be flexible. Holidays are just like Sundays. So if you normally wouldn't be here on a Sunday – don't come in for the holiday unless scheduled for call.

The intern/resident on OB will round on moms and babies Saturday or Sunday – sometimes both are covered. Friday conference is when this announcement is made. If no one is covering OB notes, you write them on clinic/FP babies and moms.

In Friday conference, the general presentation style is:
For new patients who have never been presented on Friday afternoon:
CC:
HPI: Brief with pertinent positives/negatives only
Meds: /
All: | List
PMHx: |
PSHx: \

SocHx: /
FamHx: | Pertinent info onlyROS: \
PE: Include vital signs. Present pertinent positives and <u>pertinent</u> negatives from admission <u>and</u> from your initial exam if different from admission.

Labs: Include EKG, X-rays

Differential on admission
What was done.
Continuing problems and plan (including code status, discharge plan).

1. For patients who have been presented before:

   A one-sentence reminder of who the patient is and what s/he is in for and problem list, then continuing problems and plan.

Call

Your responsibilities on call:

1. Admit family medicine patients:
   The upper year will call you to work together on an admission for teaching purposes. You will be asked to evaluate the patient yourself initially and write orders. Then, you will discuss the admission and plan with the upper year and you or the upper year calls the attending to present.

   If the ER nurses are bugging you about getting the patient out, remind them that you are learning and don't let them rush you. But also consider the patient's comfort and work as quickly as you can to get them upstairs and settled safely.

2. CCP – Cardiology Consultants of Philadelphia and other groups

   The ER attending will be calling you with admissions. You are supposed to admit up to 5 admissions (cap) or up to midnight during week days and 7 patients during week-ends and holidays. In addition, FP admissions, OR patients and critical care admissions need to be seen even after midnight. You will handle these admissions like Family Practice patients. You will be the one calling the attending always for these admissions and not the upper year. Do not be overwhelmed. If you can not take the admission because there is an emergency the ED physicians are very understanding and will call you later or ask you to let them know when you are not tied up with emergencies anymore.
   For CCP patients, the CCP group number is **610-272-3253.** Dial it and ask the service to page the attending. Present the patient briefly and your plan.
   They will help you fine-tune as needed. Write all orders and then write the H&P. Always write "H&P done" and for telemetry patients if stable "may transport off monitor" on the order sheet to avoid an extra call from the floor. Be sure to include an assessment (one or two lines) along with a problem list and treatment plan.

3. OB

   You will also be responsible for evaluation of clinic OB patients, including phone calls after 5:00 p.m. You will be responsible for evaluating any patients you bring into L&D or the ER and discussing this with the OB attending on call. If a patient is found to be in active labor, you will be expected to write an admit note, and progress notes every 2 hours and periodically update the OB attending on call. You may be asked to perform amniotomy, fetal scalp monitors, and IUPCs. After delivery you will need to complete a delivery note (see page), OB report sheet, the face sheet, and Postpartum order sheet. **If you deliver a baby, you need to examine the baby and write the baby's admission H&P** if it's an MFP or clinic baby. (C-section babies usually belong to a pediatrician.) All OB management decisions must be approved by the OB attending covering clinic that night. You are responsible for any MFP baby's in the nursery. Call the upper year with any problems. You also may be called to attend the delivery of a private patient if their OB is not yet in house. Don't forget to introduce yourself.

4. Coverage

   You will be responsible for covering all phone calls regarding all patients in the hospital who are on Telemetry (4SE, 4SW), 2S, CCU, L&D and Nursery from 5 pm to 7 am. The upper year covers outside family practice calls, after-hours ER visits in addition to FP service . S/he will be available as well to back you up, if necessary. The House Doctor covers the rest of the hospital and codes starting at 5 PM and 24 hours on weekends (Saturday and Sunday nite). You are expected to go to <u>every</u> code unless handling another <u>emergency</u> issue -- often the house doctor is not there yet and you must be in charge.

   If you are called to see a patient or the problem is something potentially serious, always GO SEE THE PATIENT. Phone orders are very nice, but you – and more importantly the patient -- can get in serious trouble if you or the nurse are misdiagnosing over the phone. Remember that anxiety can be a symptom of MI or oxygen deprivation/CO2 narcosis.

5. Phlebotomy/IV's
   You may be called to place IV's if no floor nurse can do it or to draw blood from central lines. If you are unable to obtain the IV have the nurse call anesthesia to put one in, but hospital policy is that you try first.

6. Priorities

   A patient on the floor in an emergency is first priority. Try to get ER admission orders done as soon as possible, and go back later to write up the H&P if you are swamped. Never hesitate to call the Upper Year if you are swamped or have a question – the patient's well-being is most important!

7. Observation patients

   These are patients admitted for temporary assessment/evaluation for up to 24 hours. This order should be used whenever an admission is "soft" or very straightforward – e.g., dehydration in an otherwise stable adult.

   Situations for which observation/outpatient-in-a-bed is an appropriate alternative setting are:

   Non-acute, non-emergent care (patient not meeting severity of illness/intensity of service criteria)
   Unsafe or inappropriate living conditions exist and an alternative must be determined
   Chronic renal failure patients requiring telemetry for a brief period
   Brief telemetry (excluding R/O MI, ICU/CCU admissions)
   Cardiac catheterization
   Diagnostic radiologic procedures, e.g., myelogram
   Short Stay Unit: patients requiring additional time after normal business hours

   The following are NOT appropriate for observation status:

   Psychiatric/substance abuse
   Seizure activity
   Requiring ICU/CCU/telemetry (with the exception noted above)
   Physician/patient convenience

8. Consults

   Consults are usually called in through the office. If you should receive one, pass it on to your upper year. S/he is responsible for writing it up.

Rules of the House of God

1. Gomers don't die.
2. Gomers go to ground.
3. At a cardiac arrest, the first procedure is to take your own pulse.
4. The patient is the one with the disease.
5. Placement comes first.
6. There is no body cavity that cannot be reached with a #14 needle and a good strong arm.
7. Age + BUN = Lasix dose
8. They can always hurt you more.
9. The only good admission is a dead admission.
10. If you don't take a temp, you can't find a fever.
11. Show me a BMS who only triples my work and I'll kiss his feet.
12. If the radiology resident and the BMS both see a lesion on the CXR, there can be no lesion.
13. The delivery of medical care is to do as much of nothing as possible.

Writing Orders

1. **A** - Admit
2. **D** - Diagnosis
3. **C** - Condition
4. **V** - Vitals
5. **A** - Allergies
6. **A** - Activity
7. **N** - Nursing
8. **D** - Diet
9. **I** - IVF
10. **M** - Medications
11. **E** - Extra Studies (i.e. echo, carotid dopplers, etc.)
12. **L** - Labs
13. **C** - Consults

Discharge Summary

D/C summary required in all except < 48 hours or uncomplicated maternal/newborn

1. Pt name and unit record number
2. Pt birthdate
3. Admit date
4. Discharge date
5. Attending Physician
6. Admitting Dx.
7. Discharge Dx.
8. Procedures
9. Consultants
10. Discharge medications
11. Brief HPI
12. Pertinent + on admission incl. PE, meds & labs
13. Hospital Course incl. pertinent labs & studies
14. Condition on discharge
15. Pt. Instructions (diet, etc.)
16. Follow-up
17. Copy to MFP & any consultants

On-Call Emergencies

Chest Pain

The most common complaint. There are only about four important causes of chest pain which should be diagnosed/treated at night; the other causes can wait until morning. The five:

1. angina/MI -- most common cause and takes many forms: chest, arm, back, jaw pains, sometimes dizziness, nausea and vomitting
2. pericarditis -- sharp or dull ache, patient wants to sit up, friction rub, pulsus paradoxus
3. aortic aneurysm -- "tearing pain," asymmetric pulses suspicious especially with pain to back or right side
4. pulmonary embolus -- sudden onset, often pain more peripheral, suspect especially with tachypnea and tachycardia, $pO2<80$
5. esophageal reflux/PUD/pancreatitis -- can masquerade as substernal chest pain; need to belch, burning sensation in throat
6. others -- costochondritis, pleuritic pain, anxiety

When called, check sign-out sheets, ask for vitals and for an EKG. Go to see patient. Is there IV access?

On arrival: BE CALM. Look at the patient. Check vitals, pulses. Ask about the pain. Is it positional? Pleuritic? Palpable? Radiation? Any Associated Symptoms? Get an EKG; major changes should go to the CCU. People with pacers or pre-existing LBBB have unreadable EKG's with respect to ST-T changes and you will have to judge clinically. EKGs are still useful for rhythm changes in these people.

Angina: Rx with sublingual NTG q 2-4 minutes. Keep checking BPs to be sure SBP > 90 before the next dose! Use dilaudid 0.5 to 1 mg IV if NTG unsuccessful. (Can also try Maalox 30 cc po.) Be aware that Procardia can cause a reflex tachycardia. Unrelieved angina or recurrent/prolonged angina in a post-MI patient should go to the CCU. Don't wait. Call the upper year resident. Acute ST elevations require IV nitro, heparin, TPA or streptokinase, lopressor if no contraindications (low BP, HR, CHF, RAD hx). For IV nitro, use Tridil 50/250 D5W, titrate to pain free and SBP > 100. Heparin 5000 u bolus, then run at 18 unit/kg/hour and check PTT in 6 hours. You must call in the attending (cardiology) to start TPA/strepto, or transfers to the unit.

Contraindications to thrombolytics:

Absolute	**Relative**
Active internal bleeding	Recent trauma or major surgery (<2mos)
Intracranial cancer or head trauma	BO> 180/10 on medical therapy
Prolonged, traumatic CPR	PUD or heme (+) stool
Suspected aortic dissection	Remote h/o CVA, tumor, CA etc.
Pregnancy	Known bleeding disorder or coumadin use
Pericarditis	Abnormal LFTs or renal failure
H/o hemorrhagic CVA	Streptokinase w/in 12 mo (if considering this agent)
H/o nonhemorrhagic CVA in last 6 mo	Prolonged CPR

Pulmonary embolus: Check ABG, check for cords in legs, evidence of DVT. CXR may help. Rx - heparin vs. thrombolytics. Will need V/Q scan and possibly venogram. (You can only get the V at night.)

Aortic aneurysm: Stat EKG and CXR; if still suspicious, CT of chest. Try to lower the BP (nitro or lopressor).

Basic ECG

WALL AFFECTED	**LEADS**	**POSSIBLE ECG CHANGES**	**POSSIBLE ARTERY INVOLVED**	**POSSIBLE RECIPROCAL Δ's**
Inferior	II, III, AVF	Q, S-T, T	RCA (90%), CIRC (10%)	I, AVL
High Lateral	I, AVL	Q, S-T, T	Early diag, circ branch	V1, V3
Lateral	I, AVL, V5-V6	Q, S-T, T	Diag branch-LAD, circ, early marginal	I, III, AVF
Anterior	V1-V4, I, AVL	Q, S-T,T, loss of R wave progression	LAD	
Posterior	V1, V2	R>S, S-T dep, T wave dep	RCA, circ	
Apical	V3-V6	Q, S-T, T loss of R wave progression	LAD, RCA	
Anterolateral	I, AVL, V5-V6	Q, S-T, T	LAD, circ	I, III, AVF
Anteroseptal	V1-V4	Q, S-T, T, loss of septal R wave in V1	LAD	

1. ECG Interpretation
    a. P wave (duration = 0.12)
        - ↑ In LAE (acutely or chronically).
        - Inverted in A-V junctional rhythm or atrial ectopia.
        - Absent in junctional / ventricular rhythms, S-A block
        - Peaked in leads II and III with right artrial overload (p pulmonale).
    b. P-R Interval (normal 0.12-20 sec or 3-5 boxes, measure beginning P to end QRS)
        - ↓ lin WPW, A-V junctional rhythm, HTN, low atrial rhythm, pheo, Fabry's dz.
        - Lengthened in A-V block, hyperthyroidism, or as normal variation.
    c. P-R segment → displaced in acute pericarditis, atrial infarction.
    d. QRS complex: (normal < 0.10 sec or 2.5 boxes)
        - ↑ length in BBB or ventricular dysrhytmia.
        - ↓ amplitude in failure, effusion, CAD, amuloidosis, myxedema.
        - ↑ amplitude → IHSS, also see LVH.
    e. S-T segment
        - elevated in ischemia, transmural injury, early repolarization (benign), pericarditis, LV aneurysm, occ. in young black males.
        - Depressed in subendocardial injury.

f. Q-T duration (should be < ½ the proceeding R-R interval during NSR or 7-10 boxes).
   - QTc should be < 0.46; QTc = QT/square root of R-R interval.
   - ↑ in CHF, idiopathic, ischemia, rheumatic fever, myocarditis, hypokkalemia, hypocalcemia, MVP, CVA, and some antiarthmics.
   - ↓ in hyperkalemia, hypercalcemia, dig toxicity.

g. T wave (Normally ↑ in I, II, V3-6; variable in II, aVL, aVf, V1-V2; ↓ in a VR)
   - Pointed / Peaked (> 10 mm) in hyperkalemia, CVA, MI
   - Inverted in ischemia / injury; notched in children and pericarditis

h. U wave: small wave following T, with same polarity.
   - Seen with dig, quinidine, hypokalemia, thyrotoxicosis, epinephrine.
   - Inverted with LAD or left main disease.

1. Patterns
   a. Calcium: ↑ Ca: short QT; ↓ Ca: long QT.
   b. Digoxin toxicity: PVC's, VT, VF, afib, depressed S-T segment.
   c. Magnesium
      - Hypermagnesemia: peaked T's, bradycardia, hypertension.
      - Hypomagnesemia: flat T's, ST depression, QT prolongation.
   d. Pericarditis: precordial ST segment elevation and PR depression.
   e. Potassium
      - Hyperkalemia: (in order) Thin peaked T's → Flat p waves → ↑PR → ↓ST's → Wide QRS → ↑QRS → sine waves → VT → VF (or asystole).
      - Hypokalemia: PAC's, PVC's, flat T's, U wave, ↓ST's, dig toxicity.
   f. PE: sinus tat, non-specific ST changes, RBBB, S1Q3T3 pattern.
   g. Ventricular aneurysm: ↑ST after MI that does not return to baseline w/ time.
   h. Ventricular strain: ↓ST in V1-2 for right strain, and in V5-6 for left strain (in presence of criteria for LVH).

1. Conduction
   a. Heart block: AV block.
      - 1st degree: normal P-QRS-T with increased PR interval (PR >0.26 sec).
      - 2nd degree: Mobitz I (Wenckebach) → PR progressively ↑'s until QRS lost and Mobitz II – PR is fixed; more P waves than QRS's; QRS is dropped.
      - 3rd degree: completee dissociation.
   b. Bundle branch block:
      - RBBB: ↑ QRS; V1 (+); I, V6 with small R and large S, RSR' in V1 ± V2
      - LBBB: ↑ QRS; V1 (-); RSR in V5 ± V6, monophasic I and V6
      - Left ant. hemiblock: qR in I, AVL; rS in II, III, AVF; LAD –30 → -90
      - Lest post. Hemiblock: rS in I, AVL; qR in II, III, AVF; axis +70 → +120
   c. Wolf-Parkinson-White (WPW)
      - Premature excitation of septum via accessory bundle of Kent.
      - Delta wave, ↓PR interval (<0.12), ↑QRS.

1. Hypertrophy
   a. Atrial hypertrophy:
      - Right = biphasic P in precordium or > 3 mm in II, III.
      - Left = P duration > 0.12 sec, biphasic in V1 or notched in II, III.
   b. Ventricular hypertrophy
      - RVH: ↑R in V1 & V2 (R/S ratio >1); R in V1 > V5; Axis > 110; QRS < 0.12.
      - LVH:

Estes Criteria: LVH > 5 pts

R or S in limb lead > 20 mm	3	QRS > 0.09 sec	1
S in V1, V2 or V3	3	P terminal force in V1 > 0.4s	3
ST-T charges (with Dig)	3 (1)	I.D. in V5-6 > 0.04s	1
R in V4, V5 or V6	3	LAD –15 or more	2

Casales Criteria: Males	**Females**
R in aVL + S in V3>35mm	R in aVL + S in V3>25 mm
R in aVL + S in V3>22mm, T in V1>0mm, <40y/o	R in aVL + S in V3>12 mm, T in V1>0mm, <40y/o
R in aVL + S in V3>35mm, T in V1>2mm, >40y/o	R in aVL + S in V3>12 mm, T in V1>2mm, >40y/o

1. Interpretation
   a. Heart Block: PR > 0.2 sec
      1st degree: increased PR interval
      2nd degree: Mobitz I (Wenckebach) – PR progressively longer until drop QRS

Mobitz II – PR fixed, QRS dropped
3rd degree: no assoc. between P wave and QRS, ventricular rate 40-60

b. Bundle Branch Block
RBBB: widened QRS, RSR' in V1 +/- V2,
LBBB: widened QRS, RSR' in V5 +/- V6
Left ant. Hemiblock: qR in I, AVL; rS in II, III, AVF, LAD
Left post hemiblock: rS in I, AVL; qR in II, III, AVF

c. Wolff-Parkinson-White (WPW):
Premature depolization of a portion of the ventricles via accessory bundle of Kent
Delta wave = prematurely depolarized portion of the ventricles
Shortened PR, delta wave, widened QRS

d. Hypertrophy
Atrial: Right – biphasic P in V1, initial P > terminal P, P>2.5mm high in limb leads
Left – biphasic P in V1, terminal P > initial P
Ventricular: RVH: R>7mm in V1

Shortness of Breath/Dyspnea

1. While on phone
   a. Questions to ask:
      - Admitting diagnosis.
      - Events leading up to SOB.
      - Vital signs, especially RR. Is pt. In severe respiratory distress?
   b. Consider ordering:
      - Oxygen (if severe COPD, initial goal is pulse-ox 90-92%).
      - Stat ABG/pulse ox/portable CXR/EKG.

1. Differential Diagnosis:
   a. Sudden onset
      - PE $\rightarrow$ recent surgery, DVT, immobilization, CA, post-partum.
      - Flash pulmonary edema.
      - Pneumothorax-sudden pleuritic CP with SOB, trachycardia, hx of trauma, severe CODP, ventilator pt. $\rightarrow$ Get inspiratory and expiratory CXR's.
      - ARDS- fat (esp. long bone fractures) or amniotic fluid emboli.
      - Foreign body aspiration.
   b. More gradual onset
      - CHF exacerbation.
      - Pneumonia – fever, sputum.
      - Asthma/COPD.
      - Hyperventilation - $\uparrow$ pH, $\downarrow$ pCO2, $\uparrow$ pO2.
      - Pleural effusion.
      - Anemia.

Basic ABG information

1. Aa (Alveolar-arterial) gradient =[(FiO2 x 713) – pCO2/0.8] - pO2.
   a. Normal Aa gradient = 10-20 (Addis uses 40 as borderline abnormal).
   b. Aa gradient increases with age: normal = age/4.
   c. $\uparrow$'s 5-7 mm with each 10% increase in FiO2.

1. FiO2 $\rightarrow$ increases about 4% with each additional liter O2.
   a. RA = 21%, 1L – 4L NC 25-37%.
   b. VM – read off of mask.
   c. PRB mask approximately 60-75 %.
   d. NBR mask approximately 80-100 %.

1. Respiratory vs. Metabolic:
   a. Δ pCO2 of 10 = ΔpH of 0.8 (more acute).
   b. pH change not explained by this is from metabolic causes.
   c. ΔpH of 0.15 = ΔHCO3 of 10 (more chronic).

Pulmonary Embolism

1. Risk factors: inactivity, venous stasis, post-op (esp ortho and urology), hx of DVT, cancer, pre or post-partum, OCP's, HRT, CHF, COPD.

2. Signs/symptoms: tachypnea, dyspnea, pleuritic chest pain, sinus tachcardia (or bradycardia, esp w/ beta blocker), anxiety, S1/Q3T3, new RBBB, RAD.
3. Tests
   a. Stat ABG – resp. alkalosis with normal/↓ pO2 (and poor response to O2) (90% with PE have low pO2; therefore, 10% of PE presents with nml O2).
   b. CXR (need to r/o pneumothorax, CHF, pneumonia).
   c. scan vs angiogram (THG does own angios) → call attending.
   d. NILES (non-invasive lower extremity study) – U/S for DVT
4. Treatment: Heparin (high protocol), IVC filter (if contraindication to AC or thrombolytics).

Asthma/COPD Exacerbation

4. β_2 agonists (get pre- and post-tx peak flows)
   a. Albuterol Nebulizer until dose (frequency depends on symptoms).
   b. Brethine SC, epinephrine SC (less used but may help).
1. Atrovent Nebulizer until dose q6hrs.
2. Aminophylline – bolus 5-6 mg/kg, drip 0.5-0.9 mg/kg/h.
3. Steroids (help begins in 1 hour, peaks at 6 hours)
   a. Methylprednisolone (Solu-medrol) 60 mg IV q6h or 80 mg IV q8h.
   b. Hydrocortisone (Solu-cortef) 100-200 md IV q6h.
   c. Prednisone 40-60 mg/day; 5-7 day short course or taper as tolerated.
   d. Discharge with steroid inhaler for 2 weeks (COPD) to 4 weeks (asthma).
1. O2 (use sparingly in COPD – watch for CO2 retaining)
   a. Maintain PaO2 b/w 55-60 via 1-3L NC or 24-35% VM.
   b. Check ABG since pulse ox may not be reliable.
   c. Maintain oxygena tion even in face of hypercapnia.
6. Bactrim, doxycycline, Augmentin and ampicillin have all been shown to shorten course of COPD even if there is no pneumonia on CXR.

Asthma classification (NIH guidelines)

Step	Symptoms	PFTs	Treatment
1: Intermittent	< 1/week Waken < 1/month	PEF/FEV > 80% Variability < 20%	Short acting β-agonist
2: Mild persistent	< 1/day > 1/week Waken < 2/month	PEF/FEV > 80% Variability 20-30%	1 controller +/- salmeterol
3: Moderate persistent	Daily Waken > 1/week	PEF/FEV 60-80% Variability > 30%	Inhaled steroid + salmeterol
4: Severe persistent	Continuous Waken frequently	PEF/FEV < 60% Variability > 30%	Oral + Inhaled steroids + salmeterol

PEF = peak expiratory flow
Controller = low dose inhaled steroid, cromolyn, nedocromil, oral SR theo
Not on chart, but also consider anti-leukotriene (Singulair) for mild-moderate persistent asthma.

Intubations

INDICATIONS FOR INTUBATION -- There are no hard and fast rules, but generally intubate if:

1. Respiratory rate > 35-40 for extended period of time (minutes can count in a severely debilitated patient.

2. pCO2 > 60 in patient who does not chronically retain CO2

3. pO2 < 50-55 despite therapy and high FiO2 in patient without chronically low values

4. Gross respiratory distress, especially if it is apparent that patient is tiring or too weak to continue arduous respiration for much longer

Be sure that patient is not a DO NOT INTUBATE before initiating process. Call anesthesia to place the tube and consult pulmonary for ventilator management.

NOTE: Most people get into trouble by thinking about intubation too late, rather than too early. Don't intubate without calling an upper year resident -- unless it's too late to wait!

5. Always look at the pt. The decision to intubate is a clinical one!

6. Signs/symptoms of acute respiratory failure:
   * Resp rate > 35 * tachycardia * PaCO2 > 55 (acute)
   * Cyanosis * change in mental status * PaCO2 < 70 on supplemental O2
   * Severe metabolic acidosis with respiratory distress
7. Intubate if:
   a. Response to tx is inadequate.
   b. Airway obstructed or unstable.
   c. Work of breathing becomes overwhelming w/ other organ system failure.
   d. Inability to protect airway (decreased LOC with no gag/cough).
1. If you need to intubate…Page anesthesia for all intubations
   a. Page anesthesia for all intubations (but ask if you can do it).
   b. Meds down ETT = LANE = Lidocaine, Atropine, Narcan, Epinephrine
   c. Stop CPR, squirt drug, bag x2, resume code
   d. Versed (0.1mg/kg), Vecuronium (0.01mg/kg), succinylcholine (1.5mg/kg)
   e. Check placement with end-tidal CO2, t/c NGT, OGT
1. Ventilator Modes
   a. AC (assist/control)- allows pt. To intiate breaths, then assists to full TV; backup default rate in absence of spontaneous breaths.
   b. CMV (controlled mech vent)- provides preset rate and TV.
   c. IMV (Intermittent mech vent)- same as CMV, but spont. Breathing can occur b/W mandatory breaths. Not long term-like breathing through a straw.
   d. SIMV (sych IMV)- IMV except that pt's spont. Breaths are assisted andubstitute for mand breaths; w/o spont breaths vent provides min rate.
   e. PSV (pressure support) – vent provides preset pressure when pt's triggers.
1. Generic Initial vent settings
   a. Size of tube: as large as possible, but 7.5 or more.
   b. AC/ rate: 12/FIO2 100% TV 750 (usu 10-12 ml/kg of ideal body weight).
   c. ABG 20 min after intubation and adjust to keep PaO2 > 60 or pox > 90%.
   d. Pressure support: none initially.
   e. PEEP: none initially.
1. "Tweeking the Vent
   a. ↑/↓ vent rate → ↑/↓ CO2 and ↑/↓ pH.
   b. ↑/↓ FIO2 → ↑/↓ PaO2 (adjust FiO2 in increments of 10-20%).
   c. Adding PEEP can increase PaO2 (then you can FiO2).

   ****Recheck ABG 30 min after change****
8. Weaning parameters: Forced Insp. Pres> -20, VC > 10cc/kg.min vent<10L, TV>5cc/kg.
   Endotracheal tube: size >7.5.
   Alkalosis: since CO2 drives resp., alkalosis needs to resolve before extubating. Try rehydrating with Cl- or decreasing citrate in TPN.
   Neuromuscular status: may be fatigued from autoPEEP → Hyperaeration.
   Secretions: will pt. Be able to protect airway?
   Nutrition: avoid under or overfeeding (↑ CHO load → CO2…bad in COPD).
   Obstruction/wheezing: optimize respiratory status. Diuerese CHF.
   Wake the pt: cooperation is important. If anxious (↑ RR) try Haldol, not benzos)

Smoking Cessation

USPHS Guidelines – The "five A's"

1) **Ask** – "Do you smoke?" If YES, then:
2) **Advise** – "Quitting smoking is the most important action you can take to stay healthy."
3) **Assess** – if the patient is interested in quitting at this time. If NO, then identify barriers to quitting, discuss the risks of continued smoking, and offer to help when the smoker is ready to quit.
4) **Assist** – have the smoker set a quit date, make a plan (especially if prior quit attempts failed), offer behavioral support and pharmacotherapy.
5) **Arrange** – follow-up. This is Essential!

Nicotine Replacement Therapy (NRT)

1. Patch – best adherence of all NRT; OTC; start at highest dose, taper after 4 weeks. Side effects include skin irritation (rotate patch sites) and sleep disruption (remove at bedtime)
2. Gum – available OTC in 2 mg (<25 cigarettes/day) and 4 mg (25 or more/day) forms. Patient should chew one piece every 1-2 hour. Patient after chewing and "parking" each piece in buccal area for 30 minutes. Can use up to 12 weeks.

3. Inhaler – Rx only – 4 inhalers, each containing 500 puffs, per day. Us up to 6 months; taper dosage during last 6-12 weeks of treatment.
4. Nasal spray – Rx only – up to 4 sprays/hr or 80 sprays/day. Can cause nasal irritation, rhinorrhea, and nauseas.

Zyban, aka Buproprion, aka Wellbutrin SR

Can and should be used concurrently with NRT. May be the best initial choice to our patients because insurance will pay for it. Start at 150 mg qd for first 3 days, then 150 mg BID. Must start at least one week before the patient's scheduled qui date. Treatment should be continued for at least 7-12 weeks after smoking cessation and up to 6 months for heavy smokers. Do not need to taper dose.

Dissecting Thoracic Aortic Aneurysm

a. Presentation: CP → upper back pain → low back pain (restlessness). CVA sx, ↓BP, ↓distal pulses, BP dif in each arm (root dissection), new Al murmur.
b. Stat type and cross for 6 units of packed RBC's.
c. Consider CT Scan or TEE. If suspicion is high and CT neg → get spiral CT.
d. THG usually does own aortograms; others will get stat Radiology consult.

Acute Congestive Heart Failure

A. Assessment
   a. Rapid history, vital signs, exam of neck, lungs, heart, extremities.
   b. Sit patient up with legs off bed.
   c. IV access.
   d. STAT pulse ox (ABG), portable CXR, EKG (if arrhythmia/ MI suspected).
   e. Consider serial cardiac enzymes and EKG's.

A. Treatment.
   a. Raise head of bed, legs over side if possible
   b. Oxygen: 2-4L NC, 30-40% VM or NRB (follow pulse ox, watch out in COPD – Co2 retainer?). Repeat ABG after O2. Consider intubation!!!
   c. Diuretics Lasix 20-80 mg/ Bumex 0.5-2 mg IV, repeat q 1h pm. Start with twice normal daily dose. MSO4 2 mg IV, ↑ing doses prn but be ready to intubate! (Narcan nearby).
   d. Nitropaste 1" (watch for hypotension). IV NTG better, but must be in IICU.
   e. Consider inotropes – dopamine, dobutamine (only in IICU or CCU).
   f. Afterload reduction helpful, esp. nitroprusside (discuss with attending).

A. Other things to consider
   a. Alternating leg tourniquets, phlebotomy if truly desperate.
   b. Check electrolytes and replace K+ early, especially if heavy diuresis.
   c. Swan- Ganz line may be helpful if hemodynamically unstable. *Remember:* CHF and bilateral pneumonia can be hard to differenciate. PCWP helps.
   d. Intra-aortic balloon pump for cardiogenic shock from acute MI.

Ten commandments to Heart Failure Treatment

1. Maintain patient on 2-3 g sodium diet. Follow daily weight. Monitor standing blood pressure in the office, as these patients are prone to orthostasis. Determine target/ideal weight, which is not the dry weight. In order to prevent worsening azotemia, some patients will need to have some edema. Achieving target weight should mean no ortho[nea or paroxysmal nocturnal dyspnea. Consider home health teaching.
2. Avoid all nonsteroidal anti-inflammatory drugs because they block the effect of ACE inhibitors and diuretics. The only proven sale clcium channel in heart failure is amlodipine.
3. Use ACE inhibitors in all heart failure patients unless they have an absolute contraindication or intolerance. Use doses proven to improve survival and back off if they are orthostatic. In those patient who cannot take an ACE inhibitor, use an ingiotensin receptor blocker.
4. Use loop diuretics in most NYHA class II-IV patients in dosages adequate to relieve pulmonary congestive symptoms. Double the dosage (instead of giving twice daily) if there is no response or if the serum creatinine level is > 2.0 mg/dL.
5. For patients who respond poorly to large dosages of loop diuretics, consider adding 5-10 mg of Zaroxolyn one hour before the dose of furosemide once or twice a week as tolerated.
6. Consider adding 25 mg spironolactone in most class III-IV patients. Do not start if the serum creatinine level is 2.5 mg/dL.

7. Use metopolol, carvedilol, or bisoprolo in all class II-III heart failure patients unless there is a contraindication. Start with low doses and work up. Do not start if the patient is decompensated.
8. Use digoxin in most symptomatic heart failure patients.
9. Encourage a graded exercise program.
10. Considere a cardiology consultation in patients who fail to improve.

New York Heart Association Functional Classification of Congestive Heart Failure

Class I: Patients with cardiac disease but without limitation of physical activity. Ordinary physical activity does not cause fatigue, dyspnea or anginal pain.
Class II: Patients with cardiac disease that results in slight limitation of physical activity. These patients are asymptomatic at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea or anginal pain.
Class III: Patients with cardiac disease resulting in marked limitation of physical activity. These patients are usually asymptomatic at rest. Less than ordinary physical activity causes fatigue, palpitation, dyspnea or anginal pain.
Class IV: Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms may be present even at rest;If any activity is undertaken , discomfort is increased.

OTHER

1. ARDS -- Keep this in mind; looks like CHF but will not clear with lasix and the patient needs intubation and PEEP.

2. Atelectasis -- SOB with lobar increased breath sounds, egophany, occasionally with pleuritic chest pain.

3. Pneumonia -- Usually not acute without previous awareness of it. Don't forget that PCP can be the presenting complaint in AIDS with an initially okay CXR and poor pulse ox.

4. Pneumothorax -- decreased breath sounds on one side, recent procedures (central lines, thoracentesis), PMHx.

5. Metabolic acidosis (sepsis, DKA) -- easily missed if not thinking about this! Fever? Hx of DM?

6. Peri-MI -- can initially present as acute SOB +/- CHF. May not have CP, especially if diabetic. Get an EKG.

7. Aspiration/obstruction -- aspiration not always apparent, especially if patient less responsive (i.e., NSH patient). [NSH = Norristown State Hospital]

8. Severe anemia.

When called, check vitals and signout sheets, then GO CHECK THE PATIENT. Remember, anxiety can result from CO2 retention. Never prescribe sedatives when in any doubt.

On arrival: looking at the patient and listening to his/her lungs will usually make the diagnosis easy. But not always right. Keep an open mind!

Get an ABG for patients in distress (pulse ox tells you nothing of CO2 status), stat portable CXR if you think they will help.

COPD/asthma: Stat minineb tx with 0.5 cc Proventil +/- 0.5 mg Atrovent. Request airway suction or chest PT with postural drainage if patient has coarse breath sounds, secretions. Never withhold the O2, but watch carefully not to increase FiO2 too high. Many COPD patients are CO2 retainers, but because CO2 narcosis takes more than a few minutes to present itself, you have time to check the chart. Give the O2 FIRST, then check the record. For CO2 retainers in whom you have increased O2, make sure you check an ABG afterwards and watch their mental status.

CHF: Give IV lasix 40-100 mg stat, depending on the severity of CHF and the patient's previous tolerance for it. (A good starting point is one to two times usual dose.) May add nitropaste 1/2 to 1 inch if BP adequate, or morphine sulfate 2-4 mg IV if SBP > 90. Patients unresponsive to lasix may respond to bumex 2-3 mg IV. Lasix may be given IM if no access is available, but with slower and less dependable onset of action. Give O2 -- nasal cannula up to 100% nonrebreather may be necessary to maintain appropriate pO2. Remember, many of these patients are also CO2 retainers. Call anesthesia to intubate if necessary.

Pulmonary embolus: Also chest pain. Diagnose with lung scan. ABG is helpful; look for increased A-a gradient. If strongly suspect and cannot get study, heparinize if no contraindications. Check with attending first!

Pneumothorax: Confirm by CXR. Requires chest tube if > 15%.

Aspiration: Suction, postural drainage. Keep patient elevated subsequently. Consider IV antibiotics.

Metabolic acidosis: For any diabetic SOB, consider STAT chem 6. Fever & SOB suggest sepsis if lungs are relatively clear and ABG has high pO2.

OXYGEN

Other than intubation, 3 basic easy ways to get O2:

Nasal cannula: 2 to 10 L O2/min. Mouth breathers get NC O2 at approximately the same rate as nose breathers – don't worry about it. Humidify greater than 4L/min.

Aerosol mask: 24, 28, 32, 35, 40, 50%

Non-rebreather O2 mask: 60, 90, 100% O2

INTERMEDIATE -- Consider BIPAP

Good if patient is not yet critical but just tiring as in severely anemic patients in for transfusion without other lung compromise and pure respiratory acidosis on ABG (usually good pulse ox). Need a pulmonary consult for suggested initial settings.

Respiratory Failure $\underline{\text{A-a gradient}} = \underline{FiO_2(713 - PaCO_2) \times 1.2}$

- Increased pCO_2
  - Nl A-a gradient: CNS- drugs, Pickwickian
    - Metabolic Alkalosis
    - Neuromuscular
    - $ETCO_2 = PaCO_2$
  - Abnormal A-a gradient:
    - Increased dead space (COPD, Pulm edema)
    - $ETCO_2 < PaCO_2$
- Decreased O_2
  - Low venous O_2
    - Decreased CO
    - High O_2 consumption
    - Increased shunt
  - Neuromuscular
  - VQ Abnormality
    - Increased dead space
    - Increased shunt

$ETCO_2$ = End Tidal CO_2 $PaCO_2$ = arterial CO_2

Hypertension

Emergency Hypertension

Bp>160/100 (stage2HTN (JNC7)) and/or signs or symptoms

A. DO NOT USE SL NIFEDIPINE (PROCARDIA).
B. Aim to decrease MAP 25% over 2-4 hrs.

Don't use Ca Blockers if concerned of cardiac ischemia (steal phenomenon).

A common telephone call at night, not usually dangerous. Often secondary to labile HTN or small BP cuffs. Ask to have the BP rechecked in 5 to 10 minutes before treating: often the numbers will be more normal on repeat. Is the patient agitated? Consider a mild sedative. Is the patient admitted with a stroke or TIA? -- don't overmedicate!

Systolic HTN: Not as dangerous as diastolic HTN. Try to keep SBP < 190 - 200. Don't drop SBP too much!!! Especially in CVA/TIA patients. "Norm" SBP = 100 + age. Some patients have adapted to high SBP. Try: Vasotec 1.25 to 2.5 mg IV, nitropaste 1". Consider lopressor 5 mg IV. Severe HTN may require IV nitro or nitroprusside and transfer to ICU.

Diastolic HTN -- if DBP > 120-130 this requires IV nitro if not quickly controlled and is verified on floor. DBP 100-120 can be treated with nitropaste. Always check the BP yourself on arrival to floor and be sure cuff size is appropriate.

Medication (refer to pharmacopia for prescribing info)

Labetalol, Enalapril, Nitoprusside, Nitroglycerine, Esmolol, Metoprolol, Hydralazyne, Clonidine, Verapamil

NOTE: Careful with B Blockers and COPD/Asthma Heart failure, bradycardia
Careful with ca channel blockers and heart failure, bradycardia

Hypotension

MABP (mean arterial blood pressure) = DBP + (SBP - DBP)/3; keep > 70. This is critical and must be managed at the bedside.

1. Cardiac failure -- CHF/MI, common. S3: new murmur of MR/AI? Rales up further that the bases?
2. Dehydration -- common. Poor intake, over-diuresis, diarrhea, ng tube, third spacing with ascites/peripheral edema?
3. Drug induced -- often several BP meds are given at the same time -- i.e., captopril, procardia, nitropaste are all q 6 hour meds. May keep same meds and stagger schedule.
4. Sepsis -- fever, SOB (acidosis), warm extremities?
5. Arrhythmia -- HR > 120, < 40? Irregular?
6. Acidosis -- Kussmaul breathing? Hx of IDDM?
7. Pericardial tamponade -- Pulsus paradoxus? Tachycardia, JVD, pulsatile liver without signs of rales or left heart failure?
8. Hypoglycemia
9. Pulmonary embolus (see above).
10. Anemia

When called: order patient in trendelenburg, have any nitropaste removed, hold all antihypertensive meds, get one liter NSS to bedside and make sure patient has an IV/heplock available. Check for fever, heart rate. Ask about any drips currently running. Go see the patient.

On arrival: LOOK AT THE PATIENT. Check BP, respiratory rate, HR, neck. Listen to lungs, heart. If no evidence of pulmonary edema, may start NSS wide open until BP responds; those with ascites/peripheral edema may benefit more from Hespan. If the patient has a history of CHF, try just a 250 cc bolus and consider ½ normal saline. Try to establish etiology! Stat Chem 6, EKG, ABG. Call upper year resident. May require pressors IV (dopamine, dobutamine) in ICU if not able to control. Bradycardia -- give atropine 0.5-1.0 mg IV. Tachycardia -- differentiate VT/SVT/ST.

Atrial Fibrillation

11. Causes
    a. Independent risk factors: CHF, age, valvular heart disease, HTN, DM, AMI
    b. Other major risk factors:
        - Cardiac: CAD, myocarditis, cardiomyopathy, dilated LA, LVH.
        - Pulmonary: PE, COPD, pneumonia, lung cancer, chronic lung disease.
        - Other: thyrotoxicosis, EIOH, fever, surgery
    c. Tests: Echo, CBC, BMP, Ca, Mg, PO4, TSH, EtOH, cardiac enzymes, CXR.
1. Initial management:
    a. Rate control.
        - Factors favoring rate control: LA > 5 cm, > 12 months, pt is asymptomatic with rate-controlled AF, normal LV function, older/less active, sustained AF, previous failure of cardioversion and antiarrhythmics.
        - Achieve with β-blockers, calcium blockers or digoxin (best-to-worst).

- Need indefinite AC (or aspirin if < 65 years of age with no risk factors: valvular heart disease, previous stroke or TIA, HTN, DM).

b. Cadioversion
   - Factors favoring cardioversion: LA < 5 cm < 12 months, CHF or fatigue despite good rate control, poor LV f(x), contra to AC, young/active, PAF.
   - If cardioversion candidate and duration < 48 hrs, may cardiovert immediately if TEE neg for LA thrombus.
   - If > 48 hrs (+ thrombus) rate control and AC for 3-6 weeks, then cardiovert.
   - Electrical cardioversion with 100 J, 200 J, 300 J, 360 J; avoid if pt has been loaded with dig in last 6 hours or is dig-toxic (risk of Vfib); maintain NSR afterward with amiodarone or βpace.
   - Cemical cardiovaersion with corvert, amiodarone or betapace.
   - All cardioversiors should be followed by 3-4 weeks of coumadin (INR 2-3).

Allergic Reactions

Etiologies:

Drugs, IV contrast dye, blood products
ASA, NSAIDS
Foods

Mild reactions: Benadryl 25 to 50 mg IV; +/- Solumedrol 40 to 60 mg IV

Anaphylaxis: Epinephrine 0.3 to 0.5 cc of 1:1000 solution subcutaneously or 0.3 to 0.5 cc of 1:10,000 solution IV (can be repeated once in 3-5 min). May repeat q 3 minutes as needed. NSS IV wide open. Solumedrol 100 mg IV or Benadryl 50 mg IV. Consider Aminophylline 6 mg/kg loading dose. Call upper year.

Fever

The list of most common etiologies is fairly short. Please see the patient -- you can often make the diagnosis by a quick physical exam. In hospitalized patients, the most common causes of fever are:

1. UTI
2. PE/DVT
3. infected IV site/wound
4. aspiration pneumonia
5. atelectasis
6. drugs/pseudomembranous colitis
7. sepsis
8. blood product reaction (transfusion)
9. carcinoma
10. EtOH withdrawal
11. hematoma

When called, ask for vital signs and check sign-out sheets.

On arrival: look at the patient. Any complaints of pain? Check vitals -- what is HR? RR? Is patient SOB? (Pulmonary source) Listen to lungs. Check IV sites for erythema/induration. Hx of active carcinoma? Diarrhea? Recent procedures? Check for calf tenderness, palpable cords, hidden decubiti. Check med list.

Consider culturing patient with two blood cultures 15 minutes apart, CBC, urinalysis with culture and sensitivity, sputum for gram stain and culture. CXR if + lung exam. Consider antibiotics if you are SURE about the etiology, if the patient appears septic (you don't have time to wait for culture results) or if the patient is neutropenic, immunocompromised (AIDS, chemo).

Remember, a nurse's call with a request for Tylenol may be a new onset fever -- ask appropriate questions before ordering simple symptomatic treatments for potentially serious problems.

Agitation

Don't be too quick to use Ativan. There are other etiologies for acute changes in mental status:

Hypoxia (CHF, COPD, PE)
CO2 narcosis (with a normal pulse ox!)
Sepsis/meningitis
Drug reaction (idiosyncratic)
Subdural hematoma
Carcinomatosis +/- CNS mets
Metabolic abnormalities
Pain/MI
EtOH withdrawal -- look for fever, tachycardia, tachypnea, history. May require 4-point restraints and high doses of Ativan/Librium

When called, ask for recent vitals and check signout sheets. Go see the patient.

On arrival: look at the patient. Is there fever? Go over his/her chart. Is DM present/possible (fingerstick)? Is there possible EtOH abuse? Remember that withdrawal can occur after binge drinking without chronic intake or even before EtOH levels reach zero. Check med list -- any new drugs started (esp. think of pepcid in the elderly)? Any recent (past two weeks!) falls – subdural hematoma? Hx of active CA? What were the recent lab values? With dyspnea, check ABG, chem 6.

Therapy: if you feel comfortable ruling out other causes of agitation, consider ativan 0.5 to 1 mg IV, IM or PO. Sometimes a mild sedative such as Benadryl or Restoril, or a pain killer can be more effective, depending on the etiology. **If elderly, patient may be sundowning try Haldol 1-5 mg IV/IM. Ativan may worsen patient.**

Fell out of Bed

Always requires seeing the patient and a short note. Nurses may also request your signature on the incident report. Check vitals, mental status, cranial nerves, point tenderness and ROM at all joints. Consider q 1 to 4 hour neuro checks. Be wary of those on coumadin/heparin. Consider restraints.

Oliguria

Less that 500 cc/day or 25-30cc/hour in a cathed patient. Often you will be called and told that renal output is decreased for one shift or one hour, but this can be normal. Be more concerned if the output is decreased for two or more shifts.

1. Pre-renal: Dehydration is most common. Look at intake. Minimal is 1 liter/day in CHF/hypotensive patient. Third spacing also common (ascites, excess body edema). Look for excess losses from diuretics, tube drainage (ng tube, wounds). Think about kidney perfusion in patients with LV dysfunction, hypotension, etc.

2. Renal:

   ATN
   - nephrotoxins (IV contrast, ATB)
   - pigment release (transfusion reaction, seizures, rhabdo, crush injury)
   - CHF/hypotension

   Others -- usually not acute
   AGN (hepatorenal syndrome, malignant HTN, vasculitis, uric acid nephropathy, hemolytic uremia, hypercalcemia)

1. Post-renal: usually a blocked foley. May also be bladder-urethral obstruction by prostate, CA

When called, ask DOES THE PATIENT HAVE A FOLEY, check input/output, vitals, check IV orders, any new meds, or any recent surgery. Get a set of urine electrolytes if cause not obvious. If no foley, put one in. If patient has a foley, ask to have the foley flushed with 50 cc NSS to see if it's patent. (Do this AFTER getting the urine lytes.) Hx of CHF, recent IV dye studies, change of drugs, fevers?

On arrival: percuss bladder -- is it distended? If foley is blocked, reinsert new foley. Dehydration is indicated by U Na < 15, a serum BUN/Creatinine ratio > 20:1, or orthostasis. Give 500 cc NSS over 2 hours and see if output improves.

(Don't do this if the patient is in CHF.) If no response, lasix 40 to 100 mg IV. Order strict I/O's. Place a foley if you think it is necessary.

	PRE – RENAL	POST – RENAL
U_{NA}	<20	>40
F_X (Na)	< 1%	> 1%
U_{OSM}	>500	<350
U/P (creat)	>40	<20
Sp. Gravity	>1.020	=1.010

Patients in ATN do not generally appear dry -- if you suspect ATN either by history or lab values, try the lasix first. Be careful to replace output with matched input and 500 to 1000 cc/day for insensible losses. Check strict I/O's daily or q shift urine lytes. Later complications are infection, an occasional profound anemia, electrolyte disorders, acidosis or the diuretic phase of ATN.

Pronouncing Death

Check for native heartbeat, spontaneous respirations, carotid pulses, response to deep pain, pupillary and corneal reflexes. When you are SURE the patient is dead, inform the Attending Physician immediately. You will have to fill out some state forms. Write a short note on the chart – Ex: Called to pronounce patient. Patient found asystolic on monitor (if patient in unit or telemetry). Pupils fixed and dilated, no native heartbeat, no spontaneous respirations, no central pulses. Time of death 08:00 pm on 07/01/03. Patients family notified. Attending and consultants notified.

Arrhythmias

It's ridiculous to cover this topic with a few sentences. The field is complex and requires years to master. Always call for an upper year resident if there is any question about the rhythm. When called, always check for vital signs and ASK FOR A STAT EKG along with stat K, Mg and Ca levels. Keep the K > 4.0. Check an ABG if patient is SOB. Ischemia/MI can be a cause and always check cardiac enzymes (CPK, CK-MB and Troponin I (TnI)). Some key points:

SINUS TACH -- etiologies: fever, sepsis, anemia, dehydration, anxiety, thryotoxicosis. Treatment aimed at underlying abnormality.

AFIB -- etiologies: idiopathic, enlarged left atrium, mitral valve disease, thyrotoxicosis, pulmonary embolus or any pulmonic disorder, sepsis, EtOH, HTN, med changes (esp. BP meds held). Sinus tach with high degree AV block can imitate AFib. Keep rate < 120 with verapamil/ lopressor/dig.

WIDE COMPLEX TACH: VENTRICULAR VS. SUPRAVENTRICULAR WITH ABERRANCY -- A very difficult diagnostic dilemma. There are two rules of thumb. If the patient is unstable, treat as V-TACH! And, if there is any question whether the rhythm is SVT or VT, treat as V-TACH! Both are regular, no P-QRS sequence, rate = 150-270, QRS > 0.12 sec (3 little blocks). If patient is stable, you may use this sequence to differentiate between the two:

1. Gently massage carotids -- cessation of tach or temporary slowing is indicative of supraventricular rhythm (SVT/AT/AF with BBB). Lack of response is nondiagnostic.

2. Check for AV dissociation. If there are P-waves marching through irregularly, or if you see sinus capture beats/fusion beats, this is probably V-Tach.

3. Check the QRS pattern. If all the complexes V1-V6 are upright/inverted (concordance) or if EKG shows LBBB, V-Tach is most likely. If EKG shows RBBB, V-Tach is still more likely if the left R is taller than the right in V1 or if both V1 and V6 show monophasic R waves.

BRADYCARDIA -- In general, only needs to be treated if symptomatic or if the block is high degree (Mobitz II or third degree AV block). Obviously, patients will need to be on monitored bed.

Seizures

Etiologies

Young adult (18 to 35 years old):	Trauma EtOH withdrawal Brain tumor Hypoxia
Older adult:	EtOH withdrawal CNS Dx (CVA, atrophy) Brain tumor Infection Metabolic: hypoglycemia, electrolyte imbalance, uremia, hepatic failure

When called: order valium 10 mg to bedside. Is patient already on dilantin/phenobarb? If no, get 1 g dilantin to room. Is patient diabetic? If yes, get 1 amp D50 to room and obtain fingerstick. Is there IV access? Start NSS drip. Get stat Chem 6. Go see patient and review sign out sheet.
On arrival: If patient is diabetic and the fingerstick not yet obtained, give the amp of D50 IV. Otherwise, begin valium 10 mg slow IV push (may repeat q5 min for a total of 30mg), or Ativan 2-5 mg slow IV push at 5 mg/min up to 0.1 mg/kg, followed by dilantin 15-20 mg/kg (usually 700-1000 mg) slow IV push, max 50 mg/min (if not already on dilantin). Watch BP. Order seizure precautions, protect airway, elevate head of bed 30 degrees for aspiration precautions. Give tylenol suppository for hyperpyrexia and obtain ABG/Chem 6 for acidosis. Consider O2. If no response to dilantin within 2 hours (it takes time to diffuse into the CNS), then Phenobarb IV 120-240 mg (10-15 mg/kg) slow IV push at 25-100 mg/min. Do not keep pushing valium to control the seizures -- you can induce respiratory arrest. Be patient. For continuous seizure, call anesthesia to consider intubation/general until control is obtained.

Maintenance doses for seizures:
1 1. Dilantin 4-7 mg/kg/day divided
2 2. Phenobarbitol 1-3 mg/kg/day divided

<u>Dilantin loading and maintenance:</u>
Load: 15 – 20 mg/kg by IVSS at a rate of delivery no faster than 40mg/min. Solute must be SALINE(Dilantin crystalizes in dextrose). May load PO by giving the same quantity one half now and then the second half in 8 hours. Maintenance: Start with 300 mg/day either QD or divided TID.
Therapeutic range is 10 – 20.

DKA

Check Urine Ketones, If negative duagnosis unlikely

Diagnosis
- Glucose > 250
- pH < 7.35
- low HCO3-
- high anion gap
- positive ketones

Useful calculations
- Anion gap = Na - (Cl + HCO3)
- Corrected Na = Na + [(glucose - 100)/100] x 1.6
- Effective osmolality = {2 [Na + K]}/18 + glucose/2.8 + BUN
- Evaluation for pure metabolic acidosis:
  pCO2 = the last two numbers of pH
  pCO2 = 1.5 [serum HCO3] + 8

Treatment
1. IV Fluids
   - If hypotensive,give bolus of NS 10-20 cc/kg peds or 500-1000 cc adult
   - Calculate fluid deficit (usually 10%) and replace over 24-48 hours
   - Total fluids = maintenance + deficit + ongoing losses
   - Initially use NSS and add K^+ to each liter using chart below
   - Change to D5 or D10 when serum glucose = 250 – 300
   - Use HCO3 ONLY for SEVERE acidosis (pH < 7.0) and ONLY as slow infusion
1. Insulin
   - 0.1u/kg regular insulin, single bolus IV push
   - <u>0.1 u/kg/hr</u> regular insulin coninuous IV drip (usually 5 – 7 u/hr.)

- check fingerstick q 30 min – 1 hour
- double the infusion rate at 2 hours if < 10% drop in glucose or no increase in pH or HCO3
- Patients on IV insulin drips need q 2-4 h Chem 7's.
- Stop IV insulin when BS reaches 200, **and acidosis has resolved!!!** Remember hyperglycemia will resolve before the acidosis. Either be sure acidosis has resolved on repeat ABG or check that there are no urine ketones.
- begin subcutaneous insulin before stopping IV insulin usually 0.5-1.3 u/kg/d divided 2/3 AM and 1/3PM with each dose divided 2/3 NPH and 1/3 R

TYPE	ONSET	PEAK	DURATION
Regular	30 – 60 min	2 – 4 hours	5 –8 hours
NPH	2 hours	6 – 8 hours	18 – 24 hours
Ultralente	4 – 6 hours	16 – 18 hours	0 – 36 hours
Humalog	10 min	1 hour	2 – 4 hours

3. Potassium
   - Replacement if urine output is brisk
   - 40 mEq/L adjusted to serum K
   - 40 mEq/HOUR if K < 3.0

Unresponsiveness

Must see this patient. The number of etiologies is large, but there is a quick way of treating or identifying most causes:

- Hypoglycemia
- CVA/subdural hematoma
- Postictal state
- Cardiovascular (hypotension, arrhythmia)
- Drug (narcotic, sedative)
- Metabolic/respiratory encephalopathy
- CNS tumor/meningitis

When called, quickly get vital signs, any recent narcotics, sedatives, falls? Hx of DM? Get a stat fingerstick, Chem 6, ABG. Make sure there is IV access. Order an amp of narcan, an amp of D50 and 100 mg of thiamine to the bedside.

On arrival: look at the patient and make sure respirations are reasonably normal (i.e., no need for intubation). Find a pulse. Check vitals, med list. Narcan, dextrose (first) then thiamine (ataxia, dementia, ophthalmoplegia) may be given. Do a quick and accurate neuro exam -- check pupils, CNs, limb tone bilaterally -- how does it compare to admission physical? Check past history -- seizures? Patient on anticoagulants? Scalp contusions? Head injury last two weeks? Consider stat CT.

Acid/Base Disorders

(Taken from *The ICU Book* by Marino)

Primary Metabolic Disorders:

1. Primary metabolic disorder – pH & Pco_2 change in the same direction
   pH is abnormal & Pco_2
2. Associated respiratory disorder –
   a. For metabolic acidosis: Expected $Pco_2 = 1.5(HCO_3) + 8(+/-2)$
   b. For metabolic alkalosis: Expected $Pco_2 = 0.7(HCO_3) + 20(+/-1.5)$
   If Pco_2 > expected then associated respiratory acidosis
   If Pco_2 < expected then associated respiratory alkalosis

Primary Respiratory Disorders:

1. Primary respiratory disorder – pH & Pco_2 change in opposite directions
2. Associated metabolic disorder or incomplete compensatory response –

a. Respiratory Acidosis –
- Acute uncompensated acidosis: pH changes 0.008 units for every 1 mmHg change in Pco_2
- Chronic compensated acidosis: pH changes 0.003 units for every 1 mmHg change in Pco_2

Change in pH/Pco_2	Disorder
>0.008	associated metabolic acidosis
0.003 – 0.008	partially compensated resp. acidosis
<0.003	associated metabolic alkalosis

b. Respiratory Alkalosis –
- Acute uncompensated alkalosis – pH changes 0.008 units for every 1 mmHg change in Pco_2
- Chronic compensated alkalosis – serum pH changes 0.002 units for every 1 mmHg change in Pco_2

Change in pH/Pco_2	Disorder
>0.008	associated metabolic alkalosis
0.002 – 0.008	partially compensated resp. acidosis
<0.002	associated metabolic acidosis

Mixed Metabolic – Respiratory Disorder:
1. pH = normal & Pco_2 is abnormal

Primary and Secondary Acid- Base Disorders

Primary Disorder	**Secondary Disorder**
Hiph PCO2 Respiratory Acidosis	High HCO3 Metabolic Alkalosis
Low PCO2 Respiratory Alkalosis	Low HCO3 Metabolic Acidosis
Low HCO3 Metabolic Acidosis	Low PCO2 Respiratory Alkalosis
High HCO3 Metabolic Alkalosis	High PCO2 Respiratory Acidosis

Expected Respiratory Response

Primary disorder	**Expected Response**
Metabolic Acidosis	PCO2 = 1.5 x HCO3 + 8 (+/- 2)
Metabolic Alkalosis	PCO2 = 0.7 x HCO3 + 20 (+/- 1.5)
Respiratory Acidosis	ΔpH/ΔPCO2= 0.008 (acute) or 0.003 (chronic)
Repsiratory Alkalosis	ΔpH/ΔPCO2= 0.008(acute) or 0.017(chronic)

Classification of Metabolic Acidosis:

1. Normal Anion Gap: diarrhea
   mild renal insufficiency
   volume infusion using chloride containg fluids
   compensation for respiratory alkalosis
   ureterosigmoidostomy
   renal tubular acidosis

2. High Anion Gap: Methanol
   Uremia
   Diabetic ketoacidosis
   Paraldehyde
   Isoniazid
   Lactic acidosis

Ethylene glycol
Salicylates

Analgesics

Opioid analgesics: Initial dose regimens for patients not previously on opioid agents

Opioid agonists and Combinations	Oral	Parenteral	Products and strengths
Morphine, immed. release	30 mg q 3-4h	10 mg q 3-4h 2- 10 mg q1-4h	Sulfate: Inj: 4, 8, 10, 15, 100, & 250 mg Supp: 10mg Tab: 15mg, 30mg Liquid: 10mg/5ml 20mg/5ml
Morphine, sustained release	90 – 120 mg q 12h	N/A	SR: 15mg, 30mg, 60mg, 100mg
Meperidine (Demerol)	Not recommended for short term use; Metabolite accumulates	25 – 100 mg q3h	Inj: 50mg, 75mg, 100mg Tab: 50mg
Codeine	60 mg q 3-4h	30 - 60 mg q2-3h (IM,SC)	Inj: 30mg, 60mg Tab: 15mg, 30mg
Oxycodone, reg. Release (alone & combo with ASA/APAP)	10 mg q3-4h	N/A	Tab: 5 mg Liquid: 5mg/5ml -5mg oxy with 325mgAPAP or ASA
Hydromorphone (Dilaudid)		2 – 4 mg q4-6h split dose: 0.5 – 1.0 mg q5min	

Narcotic Agonist Comparative Dose Chart

Drug	Onset (min)	Duration (hrs)	Equianalgesic dose (IM)	Equianalgesic dose (PO)
Codeine	PO: 30-60 IM: 10-30	4-6	130	200
Fentanyl	IM: 7-15 IV: 4-5	IM: 1-2 IV: 0.5-1.0	0.1	-
Hydrocodone (Diluadid)	10-20	4-8	1.5	10
Meperidine (Demerol)	PO/IM/SC: 10-15 IV: <5	2-4	75	200
Methadone	PO: 30-60 IV: 10-20	(4-6) acute (>8) chronic	10	20
Morphine	PO: 15-60 IM: 30-60 IV: <5	3-6	10	60 (acute) 30 (chronic)
Oxycodone	PO: 10-15	4-6	15	30
Propoxyphene	PO: 30-60	4-6	-	200 (napsylate) 130 (HCl)

When converting from one compound to another a lower dose than the equianalgesic dose is recommended for initial therapy

Oral 24-HR MSO4 Equivalent (mg/D)		Transdermal Fentanyl Dose (meg/h)	
45-134	585-674	25	175
135-224	675-764	50	200
225-314	765-854	75	225
315-404	855-944	100	250
405-494	945-1034	125	275
495-584	1035-1124	150	300

D/C morphine in 12-24 hrs. after duragesic patch placed

Potency Conversion (Morphine Equivalents)

Drug	*IM (mg)*	*PO (mg)*	*Rectal (mg)*
Morphine	*10*	*30* (60**)	-
Hydromorphone	*105*	*7.5*	-
Methadone		*5*	-
Oxycodone	*15*	*30*	-
Levorphanol	*2*	*4*	-
Oxymorphone	*1*		*10*
Heroin	*5*	*60*	-
Merperidine	*75*		-
Codiene	*130*	*200*	-

*****10mg of IV morphine = 30mg PO with chronic pain and 60 mg PO with acute pain***

With all opiods, if given around the clock, than ATC bowel regimens should also be given to prevent constipation and potential bowel impaction

When treating chronic pain (neuropathic or cancer related) a maintenance opioid is recommended as well as a breakthrough pain opioid. If the patient is using 3-4 or more doses of the breakthrough medication per day, than the maintenance dose should be titrated upward (generally a 50% increase) in an effort to better control the pain. If the maintenance dose is titrated upward, it is likely that the PRN doses should be increased as well (1/6 of the Q24 hr maintenance dose).

Neuropathic pain (nerve damage whether by trauma, infection (shingles), or disease process) can respond to antieoileptic or antidepressant therapy. Successful agents have been amitriptyline and gabapentin. Gabapentin has little or no drug interactions and is better tolerated from a side effect perspective that TCA's like amitriptyline. Other potential treatment modalities include lidocain patches and capsaicin cream or patches.

Antibiotics

On formulary at Montgomery Hospital:

Generic	Trade	Usual dose
Cefazolin (CFZ)	Ancef/Kefzol	1 gm IV q8
Ceftazidime (CAZ)	Tazicef/Fortaz	1 gm IV q8
Ceftizoxime (CZ)	Cefizox	1 gm IV q8 2 gm IV q8
Ceftriaxone	Rocephin	1 gm IV q24
Ampicillin (AM)	Omnipen	1 gm IV q4

		2 gm IV q6
Penicillin GK (P)		1 MU IV q4
Nafcillin (OX)	Unipen	1 gm IV q4 2gm IV q4
Piperacillin (PI)	Pipracil	3 gm IV q4 4 gm IV q6
Ampi/Sulbactam (A/S)	Unasyn	1.5 gm IV q6 3 gm IV q6
Gentamicin (GM)	Garamycin	80 mg IV q8
Tobramycin (TO)	Nebcin	80 mg IV q8
Levofloxin (LVX)	Levaquin	250 mg IV q24 500 mg IV q24
Clindamycin (CD)	Cleocin	600 mg IV q8
Doxycycline (TE)	Vibramycin	100 mg IV q12
Erythromycin (E)	Erythrocin	1 gm IV q6
Imipenem	Primaxin	500 mg IV q6
TMP/SMX (TS)	Bactrim	2 amp q6
Vancomycin (VA)	Vancocin	1 gm q12
Acyclovir	Zovirax	350 mg IV q8
Amphotericin B	Fungizone	35 mg IV QD
Fluconazole	Diflucan	200 mg IV q12 400 mg IV q12
Metronidazole	Flagyl	500 mg IV q6

Adult IV Dosing Guidelines in Renal Impairment (ClCr = (140 – age)/serum Cr)

ClCr (ml/min)	>50	10 –50	<10	HD
Ampicillin	1-2gm q6	1-2g q6-8	1-2g 8-12	SD
Cefazolin (Ancef)	1-2g q8	1-2g q12	1-2g q24-48	0.5-1g after HD
Ceftazidime (Fortaz)	1-2g q8-12	1-2g q24-48	1-2g q48-72	1g after HD
Ceftriaxone (Rocephin)	1-2g q24	1-2g q24	1-2g q24	Dose after HD
Clindamycin	600mg q8	600mg q8	600mg q8	-
Erythromycin	0.5-1g q6	0.5-1g q6	0.5-1g q8-12	-
Gent/Tobra	Q8-12	Q12-24	Q24-48	2/3rd dose after
Imipenem	0.5-1g q6	0.5-1g q12	0.25-0.5g q12	-
Nafcillin	1-2g q6	1-2g q6	1-2g q6	-
TMP/SMX	5mg/kg q6	5mg/kg q8-12	5mg/kg q24	-
Vancomycin	0.75-1g q12	0.75-1g q24	0.5-1g q48-72	1g q7-10 days
Fluconazole	100-200mg q24	100-200mg q24-48	100-200mg q48-72	200mg after HD
Flagyl	0.5g q8	0.5g q8	0.5g q12	-

Aminoglycoside Dosing Chart

1. Select loading dose in mgs (ideal weight) to provide peak serum levels in range listed below for desired aminoglycoside.

Aminoglycoside	Usual loading doses	Expected peak serum levels
Gentamicin	1.5 – 2.0 mg/kg	4 –10 us/ml (tr <2.0)
Tobramycin	1.5 - 2.0 mg/kg	4 –10 us/ml (tr <2.0)

1. Select Maintenance Dose (as %age of chosen loading dose) to continue peak serum levels indicated above according to desired dosing interval and the patients corrected creatinine clearance

Percentage of loading dose required for dosage interval selected

ClCr (ml/min)	Half life (hrs)	8 hrs	12 hrs	24hrs
90	3.1	84%	-	-
80	3.4	80%	92%	-
70	3.9	76%	88%	-
60	4.5	71%	84%	-

50	5.3	65%	79%	-
40	6.5	57%	72%	92%
30	8.4	48%	63%	86%
25	9.9	43%	57%	81%
20	11.9	37%	50%	75%
17	13.6	33%	46%	70%
15	15.1	31%	42%	67%
12	17.9	27%	37%	61%
10	20.4	24%	34%	56%
7	25.9	19%	28%	47%
5	31.5	16%	23%	41%
2	46.8	11%	16%	30%
0	69.3	8%	11%	21%

Ideal Body Weight:

Males: 106# for 5ft; add 6# for each 1 inch over 5ft (+10% over age 50)
50 kg for 5ft, add 2.3 kg for each 1 inch over 5ft
Females: 105# for 5ft; add 5# for each 1 inch over 5ft (+10% over age 50)
45.5 kg for 5ft; add 2.3 kg for each 1 inch over 5ft

Loading by Ideal Body Weight:

Gent/Tobra: 1.7mg/kg x IBW
Amikacin: 7.5 mg/kg x IBW

ClCr: roughly = (140 – age)/serum Cr

Therapeutic Peak Levels

Drug	Peak
Gentamicin	2 – 12
Tobramycin	2 – 12
Vancomycin	11 – 41
Amikacin	8 - 30

Dosing Chart

PMA (weeks)	Postnatal (days)	Dose (mg/kg)	Interval (hours)
≤ 29*	**0 to 7** **8 to 28** **> 29**	**5** **4** **4**	**48** **36** **24**
30 to 34	**0 to 7** **> 8**	**4.5** **4**	**36** **24**
≥ 35	**ALL**	**4**	**24**
***or Significant asphyxia, renal dysfunction, PDA, or treatment with indomethacin**			

Suggested Dosing Intervals

Levels at 24 hours (mcg/ml)	Half-life (Hours)	Suggested Dosing Intervals (Hours)
< 1.0	**= 8**	**24**
1.1 to 2.3	**= 12**	**36**
2.4 to 3.2	**= 15**	**48**
> 3.3		**Measure level in 24 hours**

Common Therapeutics

Nausea
- Tigan 250 mg po tid/qid or 200 mg im/pr q 6-8h
- Compazine 5-10 mg po, im or 2.5-10 mg iv (over 2 min) or 25 mg pr q 6-8h prn
- Phenergan 12.5-25 mg po, pr, im, iv q 4-6h prn
- Reglan 10mg Po/IV Q3-6h prn (If sure no obstruction)

Insomnia
- Benadryl 25-50 mg po or iv q HS prn | antihistamine, careful with patients at
- Vistaril 25-50 mg po or im q HS prn | risk for urinary retention
- Ativan 0.5-1 mg iv, im or po q HS prn
- Ambien 5-10 mg po q HS prn
- Temazapam 7.5 – 30mg po q HS prn

Diarrhea (NOT for infectious disease!)
- Immodium 4 mg po, may repeat 2 mg up to 16 mg/day
- Lomotil 2.5-5 mg po qid
- Kaopectate 60-120 mg po

Constipation
- MOM 30 cc po q HS prn
- Lactulose 15-30mg Po QD-QID prn
- Dulcolax 10 mg po/pr q HS prn
- Peri-Colace 100 mg po bid prn
- Soapsuds/tapwater enema
- Fleets enema (careful in renal patients)

Cardiology – dosing of common therapeutics
- Digoxin load (can vary by attending) e.g., 0.25 mg iv q 3-4 hours x four doses (hold for HR < 50) Need a total of 1 mg in 24 hours.
- Lidocaine 1 mg/kg iv bolus with 1-3 mg/min iv drip, 0.5 mg/kg rebolus in 5-10 min
- Atropine 0.5-1 mg iv, repeat as needed to max of 3 mg

"Yellow Jello" / "Banana Bag" -- IVF for EtOH abusers
- D5-1/2 NSS with the following additives to the first liter each day:
- 2 g MgSO4
- 100 mg thiamine
- 1 mg folate
- 1 amp MVI
- 0-60 mEq KCl (adjust based on levels)
- (***Thiamine*** **BEFORE** ***glucose***)

Treatment for Electrolyte Abnormalities

1. Potassium -- low. (Keep cardiac patients K>4.0, others >3.5.)
(**Know creatinine** on all patients you give K^+
- K-Tabs 10 mEq/tab
- K-Dur 10 or 20 mEq/tab
- Slo-K 8 mEq/dose
- Replace IV only in monitored patients, max 40 mEq/100 cc NSS over 1 hour; max in unmonitored patients is 20 mEq over 2 hours
- Elixir tastes bad but has improved absorption
- Monitor closely if on Digoxin
- Check Mg^+ (see below)
- For every 100 mEg K^+ given serum K^+ will increase by 1.0

Potassium -- high. Always **check for hemolysis.** If >6, be extremely concerned. Obtain EKG esp. if K >5.5. Look for tall peaked Ts, flattened Ps or widened QRS. Get an ABG for possible acidosis. Ask for another stat Chem 6 and an EKG. These patients have problems with cardiac de/repolarization and arrhythmias. Therapy aimed at lowering serum K and helping to excrete it is vital.

Therapy	**Mechanism**	**Dose**	**Onset**	**Duration**
Ca gluconate (10%)	antagonism	10-20 mL IV	1-3 min	30-50 min

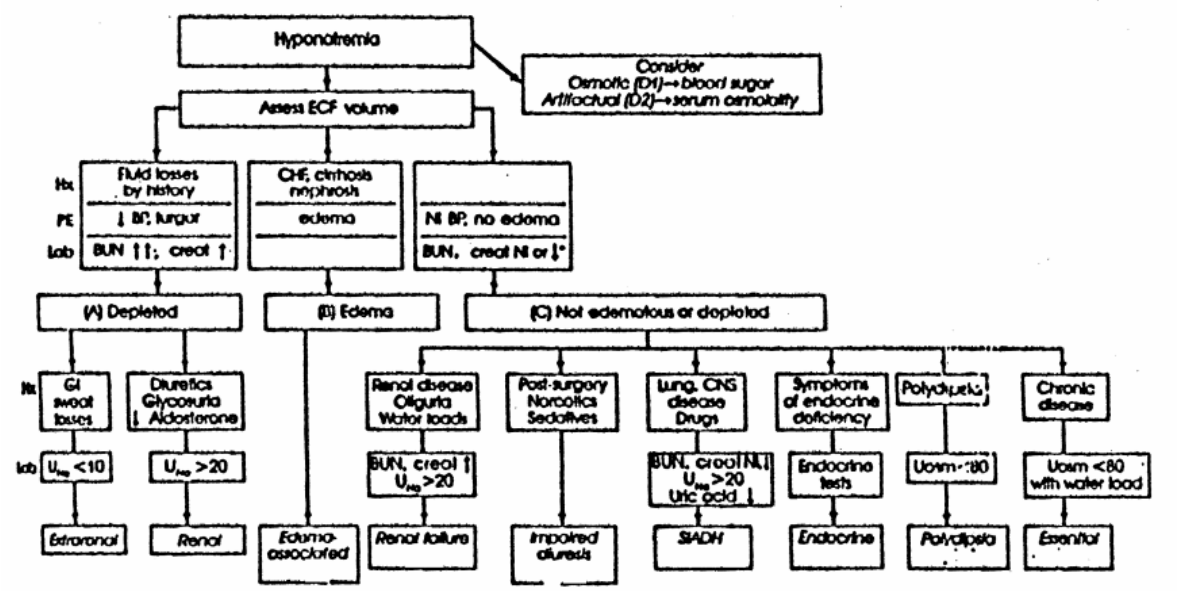
Na bicarbonate	antagonism & redist.	50-100 mEq IV	5-10 min	1-2 hr
insulin & glucose	redistribution	amp D50 + 10 u regular insulin IV	30 min	4-6 hr
loop diuretics	excretion	40-100 mg IV	w/ diuresis	w/diuresis
cation exch. resin (Kayexalate)	excretion	15-50 g po/pr w/sorbitol	1-2 hr	4-6 hr
peritoneal/hemo-dialysis	excretion	---	minutes	during

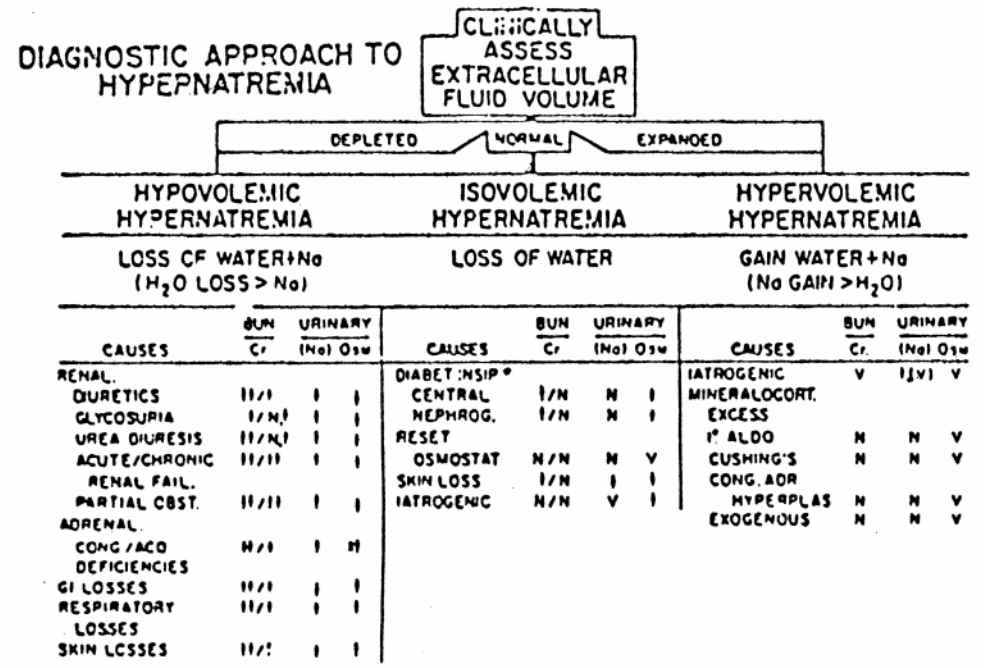
2. Calcium – high Aggressive IV hydration. Lasix. Steroids. Mithramycin

3. Calcium – low IV Ca Chloride 1 amp = 273 mg calcium
   Ca Gluconate 1 amp = 93 mg calcium
4. Magnesium – low IV Mg sulfate - by amp (1amp = 2g)
   PO Mg oxide 400mg tabs TID
5. Phosphorous – low IV KPhos 1 cc = 3 mmol Phos & 4.4 meq K
   NaPhos specify # of mmol desired
   PO NeutrPhos – K 1 tab = 8 mmol Phos & 14 meq K
   Neutr Phos 1 tab = 8 mmol Phos & 8 meq K
   Treat only If Symptomatic

6. Sodium – low Hyponatremia

   a. Hypertonic (serum osmo > 290)
      Ddx: hyperglycemia (Na (1.6 mEg/l for each 100mg (in glc > 100)
      Hypertonic infusions : glc, mannitol, glycine, glycerol, sorbitol, EtOH
      Tx: correct vol. Deficit, insulin slowly to correct glc., hypotonic saline to correst free water deficit (TBW x P_{Na}/140 –1)
   b. Isotonic (normal serum osmo)
      Ddx: hyperlipidemia, hyperproteinemia
      Tx: treat underlying cause
   c. Hypotonic (serum osmo < 270)
      1. Hypovolemic (treat with isotonic saline, or 3% saline, carefully
         Na deficit = 0.6(wt in kg)(140 – age) + 140(vol. deficit in L)
         (Renal (Una >20): diuretics, parenchymal damage (CRF), partial obstruction, adrenal failure, RTA, interstitial nephritis
         (Extrarenal (Una < 10): GI losses, 3rd spacing (ex. pancreatitis)


Hyponatremia
Consider
Osmotic (D1)→blood sugar
Artifactual (D2)→serum osmolality
Assess ECF volume
Hx
PE
Lab
Fluid losses by history
↓ BP, turgor
BUN ↑↑; creat ↑
CHF, cirrhosis nephrosis
edema
NI BP, no edema
BUN, creat NI or ↓*
(A) Depleted
(B) Edema
(C) Not edematous or depleted
Hx
Lab
GI sweat losses
Diuretics Glycosuria ↓ Aldosterone
U_Na <10
U_Na >20
Extrarenal
Renal
Edema-associated
Renal disease Oliguria Water loads
Post-surgery Narcotics Sedatives
Lung, CNS disease Drugs
Symptoms of endocrine deficiency
Polydipsia
Chronic disease
BUN, creat ↑ U_Na >20
Renal failure
Impaired diuresis
BUN, creat NL U_Na >20 Uric acid ↓
SIADH
Endocrine tests
Endocrine
Uosm <80
Polydipsia
Uosm <80 with water load
Essential


DIAGNOSTIC APPROACH TO HYPERNATREMIA
CLINICALLY ASSESS EXTRACELLULAR FLUID VOLUME
DEPLETED
NORMAL
EXPANDED
HYPOVOLEMIC HYPERNATREMIA
ISOVOLEMIC HYPERNATREMIA
HYPERVOLEMIC HYPERNATREMIA
LOSS OF WATER+Na (H2O LOSS > Na)
LOSS OF WATER
GAIN WATER+Na (Na GAIN > H2O)
CAUSES
BUN/Cr
URINARY (Na) Osm
RENAL
DIURETICS
GLYCOSURIA
UREA DIURESIS
ACUTE/CHRONIC RENAL FAIL.
PARTIAL OBST.
ADRENAL
CONG./ACQ DEFICIENCIES
GI LOSSES
RESPIRATORY LOSSES
SKIN LOSSES
DIABET. INSIP*
CENTRAL
NEPHROG.
RESET OSMOSTAT
SKIN LOSS
IATROGENIC
IATROGENIC
MINERALOCORT. EXCESS
1° ALDO
CUSHING'S
CONG. ADR HYPERPLAS
EXOGENOUS

7. Sodium - - high

Adjusting Lab Values

Heparin -- patients start with a 5000 u bolus, then run at 18 u/kg/h. The protocol used at Montgomery includes PTT checked in 6 hours, and:

- If PTT < 35, give 80 u/kg bolus and increase rate by 4 u/kg/h
- If PTT 35-45, give 40 u/kg bolus and increase rate by 2 u/kg/h
- If PTT 46-70, no change
- If PTT 71-90, decrease rate by 2 u/kg/h
- If PTT >90, hold for one hour and decrease rate by 3 u/kg/h
- Check PTT 6 hours after any change

Insulin -- when called to Rx blood sugars, make sure whether patient is IDDM/NIDDM, and whether insulin is given AM alone or AM/PM. In general, don't be too aggressive. Ask about usual doses. Here is an example of a reasonable insulin sliding scale:

- BS < 60, give OJ if awake, otherwise call MD [for amp D50 order] Once stable, for IDDM patients give half usual outpatient dose – assuming not NPO.
- BS 80-180, no Rx if NIDDM or half usual outpatient dose if IDDM and not NPO
- BS 181-250, 4 u regular insulin sq
- BS 251-300, 6 u regular insulin sq
- BS 301-350, 8 u regular insulin sq
- BS 351-400, 10 u regular insulin sq
- BS 401-450, 12 u regular insulin sq
- BS >450, 20 u regular insulin sq and call MD [R/O DKA R/O NKHH Dip Urine for Ketones, Chem 7 to determine gap, ABG for pH, serum acetone level and to consider insulin drip and hydration]

Rule of Thumb : 1 unit of regular insulin lowers BS by 10

If the patient has renal insufficiency or if the sliding scale is written as a supplement to baseline insulin or oral hypoglycemic therapy, decrease the above dosing schedule by 2-4 units at each level.

Hemoglobin -- transfusions at night are for emergencies, i.e., symptomatic anemia, or for unstable bleeds. Ideally, a consent has been obtained already (this means YOU if you admitted the patient). If not, it is required in all but extremely urgent situations. Always call the attending physician and consider contacting family members. Be aware of potential fluid overload, esp. in the elderly. May want MD to be called to auscultate after a unit is given and follow it with a small dose of lasix.

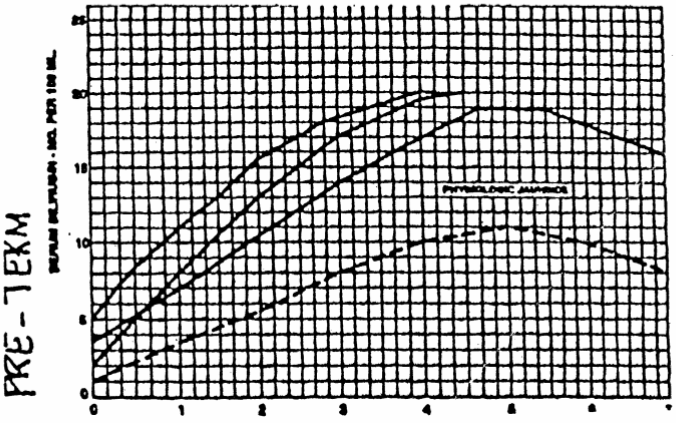
Coumadin -- dosing goals and schedules separate generally into two categories: orthopedic and cardiac/thrombotic. AM PTs are used to determine PM dose. A guideline:

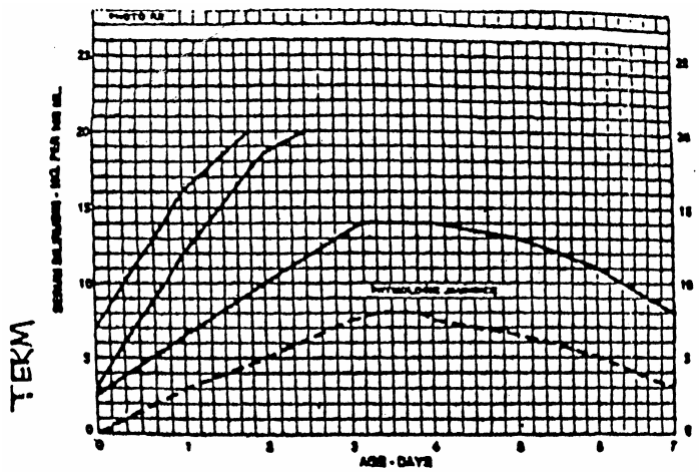
Ortho: They have their own protocol. Usually INR is better
- If PT > 20, call MD for exam and possible Vitamin K
- If PT > 16, no med
- If PT 15.1-16.0, 2 mg
- If PT 14.1-15.0, 2.5 mg
- If PT 13.1-14.0, 5 mg
- If PT 12.0-13.0, 7.5 mg
- If PT < 12, call MD for 10 mg order and ensure AM PT ordered

Cardiac:
- Goal DVT = INR 2.0-3.0
- Goal valve replacement, AFib, cardiac thrombus = INR 2.5-3.5
- Note, then, that an INR of 2.5-3.0 is good for all causes
- If INR > 4.0 or PT > 22, hold PM dose and confirm repeat PT for AM is ordered

Hyberbilirubinemia:

AGE (IN HRS)	CONSIDER PHOTOTHERAPY*	IMPLEMENT PHOTOTHERAPY	IMPLEMENT EXCHANGE TRANSFUSION IF PHOTOTHERAPY FAILS*	IMPLEMENT EXCHANGE TRANSFUSION
≤24 hours**	≥10 mg/dL (171 µM/L)	≥15 mg/dL (257 µM/L)	≥20 mg/dL (342 µM/L)	≥30 mg/dL (513 µM/L)
25-48 hours	≥13 mg/dL	≥18 mg/dL (220 µM/L)	≥25 mg/dL (308 µM/L)	≥30 mg/dL (513 µM/L)
49-72 hours	≥15 mg/dL (257 µM/L)	≥20 mg/dL (342 µM/L)	≥25 mg/dL (428 µM/L)	≥30 mg/dL (513 µM/L)





Some Helpful Numbers

I. Resting Normal Pressure Values:

Cardiac Chamber	Pressure (mm Hg)
Right Atrium	
Range	0 – 5
Mean	3
Right Ventricle	
Systolic	17-30
Diastolic	0-6
Pulmonary artery	
Systolic	15-30
Diastolic	5-13
Mean	10-18
Pulmonary artery wedge	
Mean	2-12

II. Hemodynamic variables from Right Heart Catheterization:

Hemodynamic Variable	Normal Range
Cardiac index	2.5 – 4.5 L/min/m^2
Cardiac output	3.0 – 7.0 L/min
Left Ventricular stoke work	60 – 80 gm
Stroke volume	70 – 130 cc/contraction

III. Interpretation of Pulmonary Function Tests:

III. Interpretation of Pulmonary Function Tests:

EXPIRATORY FLOW RATES	NORMAL	OBSTRUCTIVE	"SMALL AIRWAYS" DISEASE	RESTRICTIVE
FVC	>80% predicted	Normal or ↓	Normal	↓
FEV_1	>80%	↓	Normal	↓
FEV_1/FVC	>70-75%	↓	↓	Normal
FEF_{25-75} or MMF	>60%	↓	↓	Normal
LUNG VOLUMES				
TLC	>80%	↑ or Normal		↓
VC	>80%	Normal or ↓		↓
RV	>80%	↑		↓
DLCO	>70-80%	↓		↓

SIGNIFICANT RESPONSE TO BRONCHODILATOR

FVC	increases	≥ 15%
FEV_1	increases	≥ 15%
MMF	increases	≥ 25%

INDICATORS OF HIGH SURGICAL RISK

FEV_1	<2.0 Liters
MVV	<50% predicted
$PaCO_2$	>45 mms

BEST PREDICTOR FOR LUNG RESECTION
Post-op FEV_1 predicted >800 ml.

Some Helpful OB Tips

Prenatal schedule

First Visit: Blood pressure
CBC
Blood grp, Rh, Antibody screen
Rubella
RPR
Hep Bs Ag
HIV
U/A
UDS
Sickle cell (if appropriate)
Pap smear
GC/Ch culture

16 – 18 wks: offer Triple screen
18 – 22 wks: Ultrasound
28 wks: CBC, 1-hour glucola, Rhogam (if appropriate)
36 –37 wks: Beta strep culture

Pregnancy Dating

EDC = LMP- 3 months + 1 week

Uterus lemon/ baseball size	6 weeks
Uterus orange/ softball size	8 weeks
Uterus grapefruit size	10-12 weeks/ pelvic brim
Doppler FHT's	11-12 weeks
Uterus at symphysis	12 weeks
Uterus at umbilicus (20 cm)	20 weeks
Fundal height in cm =weeks	20-33 weeks

Common OB Phone Calls

Remember these are only guidelines. If you have any uncertainty it is always better to bring the patient in.

1. Ask every caller: name, age, parity, EDC
   bleeding, abnormal vaginal discharge, Pain, ctx, fetal movement, gush/trickle of fluid
2. Pain: intermittent vs. constant (ctx vs. abruption) Fetal movement?
3. Bleeding: Quantify how much – quarter-sized? How many pads/hour?
   Color? Changing?

Presence of pain?
Almost always come in, unless only painless spotting eg. After intercourse

4. Fluid leakage: How much?
   What were they doing at the time?
   Did it continue to trickle? Worse when lying down?
   Color, consistency, odor?
5. Contractions: When did they start?
   How long do they last?
   Can you walk through them? (try to stay on the phone through one of them)
   How often? (from beginning of one to beginning of next)
   Changing? (more frequent vs. location)
   Worse or better when standing and walking?
   Any rectal pressure?
   How far away do you live?
   Do you have transportation?
   Recommend coming in when q4-5min x 1 hour if primip., or when <q10 min for multips.
   ALWAYS ASK HOW LONG LAST LABOR TOOK!!!!!!!!
6. No fetal movement : usually a false alarm
   advise kick counts before having them come in:
   lie on left side in completely quiet room
   drink a high sugar drink to stimulate fetus
   count kicks (ie any movement)
   need minimum of 4 in 1hr, 6 in 1.5hr, or **10 in 2hr
   if less tell them to call immediately and come in.

Fetal Heart Rate Monitoring

1. Interpretation: a. Normal = 110-160
   b. Acceleration = 15 BPM increase for 15 seconds
   c. Variable deceleration = variable shape and timing, but usually abrupt in onset and return (V shape). Means cord compression.
   d. Early deceleration = decel mirrors contraction. Means head compression.
   e. Late deceleration = decels begins near mid-contraction, with slow return after contraction. If shallow, can be ominous! Means fetal hypoxia.

2.Tests: a. NST - reactive is 2 accelerations in 20 minutes.
   acceleration = 15 sec. elevation in fetal heart rate of at least 15bpm

b b. CST/OCT - negative = no late or variable decels when 3
   c contractions in 10 min
   d positive = presence of late or variable decels without
   e hyperstimulation

   a. BPP: 2 points each: NST, fetal tone, movement, breathing, amniotic fluid, occ placenta
   b. AFI: for term babies: <5 = oligo
   5-8 = borderline
   >8 = normal

Preterm Labor

1. **Review gestational dating**
2. DDx: infection, incompetent cervix (painless cervical dilation), wrong dates, dehydration, over activity
3. If <34 weeks needs transfer
4. External fetal monitoring, bedrest, sedation, hydration, left lat. decub position
5. Rule out ROM by hx and sterile spec exam; if no ROM then digital cervical exam; if ROM and in certain labor, still needs exam
6. Cultures: group B strep, GC, chlamydia, U/A with C&S
7. Urine tox screen if suspicious
8. Treatment: **IVF**: 500cc bolus of LR, then 120-180cc/hr

Ampicillin 2 g IV (if allergic clindamycin or ancef) then 1 g IV q4hr

Betamethasone 12mg IM q12h x 2 or q24h; second option is dexamethasone 4mg q6 x 4 (if <32 - 35 wks)

Terbutaline (if <36 wks) 0.25 mg SC then, q45-60 min x 3 if pulse < 120. Change to 2.5-10 mg po q4h after contractions controlled, before discharge.

OR

+/- MgSO4, if attending desires 4-6 g load over 20 min, then 2 g/h - 4g/h check Mg per attending

Premature Rupture of Membranes

preterm(PPROM) vs. pre-labor (PROM)

1. With either PROM or PPROM: Review gestational dating
   - Sterile speculum exam: pooling, ferning, nitrazine. If PPROM, attempt to get vaginal fluid for a specimen for PG testing (1-3cc)
   - External fetal monitoring q4h
   - Strict bedrest not necessary
   - Cervical checks: one is okay until in labor, esp. if concerned about positioning in which case consider ultrasound for presentation
   - Group B strep, GC, Chlamydia cultures, wet prep
   - CBC q12-24h if no labor
2. If PPROM:
   - Ampicillin 2 g IV, then 1 g q4h (if allergic, clindamycin 900mg IV q8h or cefoxitin 2 g IV q6h)
   - Betamethasone 12mg q12h x 2 if <34 wks
   - Consider tocolysis x 48h to give steroids time to work
3. PROM: likely transfer patient
   - discuss induction with attending
   - check for GBS status
   - watch for infection

Pre-eclampsia

1. Dx: 2 readings of >140/90 six hours apart after 20 wks PLUS proteinuria (>250mg/dl)
2. Associated labs: (BUN/Cr, uric acid >5.0, 24h urine for protein
3. (>300mg/dl) and creat. clearance < 100 ml/min, LFT's, Hgb, platelets: if DIC suspected get PT/PTT, fibrinogen and fibrin split products
4. Treatment: total IVF = 100-125cc/h
   - MgSO4 (40 g/L LR) 4 g IV over 10min, then 2-4 g/H. Mg levels q6h should be 3.5-7.0 Watch for loss of reflexes, low urine output, resp depression. (Ca Gluconate reverses - 10cc slow IV push)
   - if hypertensive: hydralazine 5 mg IV then 5-10mg q20 min
     labetalol 10-20 mg IV q10 min
     NO SUBLINQUAL PROCARDIA
   - for seizures: (eclampsia) Valium 5-10mg slow IV push (if already on Mg, if not on Mg then 4 g Mg slow IVP)

2nd or 3rd Trimester Bleeding

1. Hx. amount, painful
2. DDx: previa, abruption, labor (bloody show), marginal sinus bleed, local cervical causes
3. Vitals, including orthostatics
4. **NO** digital vaginal exam until previa ruled out (may do speculum)
5. **Continuous fetal monitoring ASAP**
6. If hypotensive: IVF, T&C, CBC, DIC labs
7. Rule out previa with U/S **AFTER** assuring no fetal distress via monitor

8. Always perform speculum exam to R/O local causes of bleeding (consider infection); if indicated do apt test (if suspect vasa previa) and look for (fetal) nucleated RBC's on smear
9. Apt test: Get a few cc's of vaginal blood and mix with a little tap water. Centrifuge then mix 5cc pink supernatent with 1cc 1%NaOH. Check the color after 2 minutes: if pink, blood, is fetal; if yellow-brown, is adult
10. Must always stay at least 12 hours for observation and monitoring
11. If Rh negative or blood type not known, give Rhogam (I vial IM)

Induction of Labor

1. Determine accurate gestational age (see dating criteria)
2. Assess cervix with **Bishop's Scale**:

Criterion	**0 points**	**1 point**	**2 points**	**3 points**
Dilation	0 cm	1-2 cm	3-4 cm	> 4cm
Effacement	0-30%	40-50%	60-70%	80-100%
Station	-3	-2	-1 to 0	+1 to +2
Consistency	Firm	Medium	Soft	----------
Position	Posterior	mid	Anterior	----------

If total score is <4, Prostin gel or Cytotec. If score > 8, Pitocin or Cytotec

1. Cytotec:
   Per protocol
   25 mcg q3h until active labor
   monitor per protocol
   heplock
2. Pitocin:
   start at 6 am (before shift change)
   20U Pitocin in 1 L LR
   begin at 1 mu/min (6 cc/h), increase 1-2 mu/min q20-30 min until contractions are q2-3 min and 40-60 sec long, or if fetal distress; per protocol
   continuous fetal monitoring, T&S
   notify MD if requiring > 20 mu/min, hyperstimulation, or fetal distress

Fetal Distress

1. Turn patient to side
2. Stop Pitocin
3. Oxygen (100%)
4. Cervical exam – R/O prolapse, scalp stim
5. IVF – wide open
6. Consider terbutaline 0.25mg SC if concerned about hyperstimulation
7. Consider amnioinfusion (sever variables, low AFI)
   10 cc/min warmed NS for 1 hr, then 3 cc/min

Shoulder Dystocia

Risk factors: DM, macrosomia, prepregnancy wt. >180, >45 lb. Wt gain, older mother, post-term, shorter maternal stature, previous history
Warning signs: prolonged first or second stage and "turtling" (head bobbing)
But can't always perdict:

1. **GET HELP** (call 2 additional RNs, obstetrician, footstools)
2. Episiotomy – consider it, although not a soft tissue problem
3. Legs hyperflexed (McRobert's maneuver)
4. Pressure – suprapubic, towards fetal anterior. **NO FUNDAL PRESSURE**
5. Enter vagina – adduct most accessible shoulder; shoulder rotation (Wood's screw: hand behind shoulder, pushing anteriorly)
6. Remove posterior arm, sweeping it over the head
7. Roll to all fours
8. Other options: clavicle fx, Zavanelli maneuver (push head back up and hold it on way to stat C/S)

Postpartum Hemorrhage

DDx: **Tone** – uterine atony, from overdistended uterus, multip, long labor, precipitous labor, etc.
Tissue – retained placenta
Tear – cervical or high vaginal laceration, ruptured uterus
Thrombin – coagulopathy

1. Uterine massage bimanual (one hand in the vagina & the other on the abdomen "FIST" maneuver
2. Have 2 IV's; type and cross match if severe
3. Call attending
4. Pitocin 20-40 U/Liter IVF, 200 cc/hr (watch for hypotension), or 10-20 U IM
5. Methergine 0.2mg IM q15min (can not use if hypertensive)
6. Hemabate (PG-F2 alpha) 0.25-1.0 mg IM (also intramyometrial) q15min, max=2mg
7. Inspect **again** for lacerations
8. Consider DIC labs; transfuse if necessary

Indications for Group B Strep Prophylaxis

1. If results from GBS at 35-37 weeks are available, treat if positive, and don't treat if negative
2. If results not known/not available, treat if following risk factors present:
   - Labor before 37 weeks
   - TermPROM >18 hours
   - Twin gestation
   - Mother has prior h/o infant with GBS sepsis
   - Mother has ever had GBS UTI/bactiuria
3. Caveat: with two readings of temp>100.4 during labor, must forget about prophylaxis, and evaluate and actually treat for chorioamnionitis
4. Treatment: Pen G 5 million units IV initially, then 2.5 million units q4h until delivery; if PCN allergic, clindamycin 600mg IV q8h or cephalexin

Chorioamnionitis

1. Risk Factors: Preterm labor, PROM, prolonged ROM, multiple vaginal exams, prolonged internal monitoring, + GBS or GC at delivery, presence bacterial vaginosis, decreased host resistence (HIV, DM, poor nutrition, drugs, ETOH)
2. Criteria:
   - Intrapartum fever > 100.4
   - Maternal tachycardia > 100 bpm
   - Fetal tachycardia > 160 bpm
   - WBC > 15,00
   - Foul smelling amniotic fluid
   - Uterine tenderness
3. Etiology: (in decreasing order of frequency)
   Ureaplasma urealyticum, gm – anaerobes, mycoplasma hominis, bacteroides bivis, gardnerella vaginalis, GBS, peptostreptococcus, E. Coli, Enterococci, Fusobacterium, Bacteroides fragilis

4. Treatment:
   - First line: Unasyn, Ticarcillin+clavulanic acid, cefuroxime, cefazolin+gentamycin, pipercillin, ampicillin+gentamycin
   - Second line: Mezlocillin, Cefoxitin, Erythromycin
   - PCN allergic: Cefuroxime, Cefazolin+gentamycin, Vancomycin+gentamycin
   - Contraindicated: Quinolones, Chloramphenicol, Tetracyclines

Medications safe in pregnancy

FDA Pregnancy Categories:
- A: No risk in controlled human studies
- B: No risk in controlled animal studies, and no risk seen in humans
- C: Small risk in controlled animal studies, but not seen/studied in humans
- D: Strong evidence of risk in humans, but benefit may outweigh risk
- X: High risk – never to be used in pregnant humans

Analgesics: Acetaminophen (B)
Codeine (C)
Nalbuphine (B)
Meperidine (B)
Morphine (B)

Antibiotics:	Penicillins (B)	Clarithromycin (C)	Miconazole (C)
	Clavulinic acid (B)	Nitrofurantoin (B-1st/D-3rd)	Butaconazole (C)
	Cephalosporins (B)	Metronidazole (D-1st/B-3rd)	Tioconazole (C)
	Clindamycin (B)	Sulfonamides (B-1st/D-3rd)	Terconazole (C)
	Erythromycin (B)	Trimethoprim (C)	Famciclovir (B)
	Azithromycin (B)	Clotrimazole (B)	Acyclovir (C)
	Permethrin (B)		

Antihistamines:	Chlorpheniramine (B)	Promethazine (C)	OTC equivalent
	Doxylamine (B)	Loratidine (B)	Sudafed 30-60mg q6
	Diphenhydramine (C)	Fexofenadine (C)	Benedryl 25mg q6
	Hydroxyzine (C)	Astemizole (C)	Actifed
	Brompheniramine (C)	Terfenadine (C)	
	Claritin		

Antitussives: Dextromethorphan (safe) – ie Robitussin DM
Codeine (C)

Decongestants: Pseudoephedrine (C)
Phenylpropanolamine (C)
Antiemetics: B6 (pyroxidine) 50mg BID

Indigestion/Heartburn: Tums, Mylanta, Maalox, Pepto-Bismol

Constipation: Metamucil, Milk of Magnesia (2 Tbsp qhs), Colace 100mg BID

Diarrhea: Pepto-Bismol, Kaopectate

Asthma – Proventil inhaler (C)
Metaproterenol (C)
Cromolyn sodium (B)

Miscellaneous: Insulin (B)

Pediatrics

Fever/ Rule Out Sepsis

History should include: perinatal complications
Height of fever
Underlying illnesses

Ill contacts
Caretaker's report of well being (Poor feeding, irritability, lethargy)
Caretaker's report of specific symptoms

Physical should include: Rectal temp.
Toxic appearing (lethargy, consolable)
Pulse, tachypnea,
Retractions, nasal flaring, grunting
TMs, pharynx
Fontanels

Etiology: Infectious – Viral
Bacterial – 0-2wks: Group B Strep, E. Coli, Listeria
2-8wks: Group B Strep, E. Coli, Listeria, N. Mening, H. Flu, S. Pneum.
>8wks: N. Mening, H. Flu, S. Pneum
Collagen Vascular Disease
Malignancy (leukemia, lymphoma)

Management: <3 months: Admit
CBC w/diff, cath U/A w/Cx., BCx, LP
CXR and stool cx if clinically indicated
3–36 months: based on history and physical

Respiratory Illnesses

1. Respiratory Distress
   a. DDx of wheezing: RAD, RSV, FB, croup, epiglottis, pneumonia, GERD, CF.
   b. Signs of distress
      - Severe retractions and flaring
      - Speaking in single words or less!!!
      - Pulsus paradoxus>20 mmHG
      - Low pO2, high pCO2
      - Peak flow<50% NL
      - Dec breath sounds
      - RR >50% avg
      - Pale/cyanotic
      - Less alert
   c. Consider ABG or capBG (for pH & pCO2; not pO2 since 20 less then ABG).
   d. CXR if first episode of wheezing, febrile, high WBC, or focal findings.
   e. Consider bedside cold agglutinins:
      - 4-5 drops of blood in purple tube, cap tube, ice water bath for 30-60s.
      - (+) Test when Floccular agglutination (clumping) resolves w/warming.
      - (+) Test freq. Correlates w/ cold agglutinin titer of >1:64.
      - 75-85% of pts w/ (+) test and atypical pneumonia will have mycoplasma
   f. Treatment
      - 1st line: Albuteral 0.5% soln. (2.5 mg/0.5 cc) in 2.5 cc NS via nebulizer
        - Unit dose or 0.01-0.03 cc/kg (0.05-0.15 mg/kg). Max dose = 0.5cc.
        - Q20 min for 1-2 hr. then wean. Consider cont neb if no response.
      - 2nd line: Steroids
        - Outpatient: prednisone 1-2 mg/kg/d qd or bid.
        - Inpatient: Solumedrol 2 mg/kg load, then 2 mg/kg/d dividend q6h.
      - 3rd line: Aminophylline? (check with attending).
   a. Admit pt. If not cleared with 3 nebs, toxic looking, abnormal blood gas,needs oxygen, etc.
   b. *Outpatient Management:*
      - SOP SMOKING!! (even "just outside"), dust precautions in house.
      - Infants, children <4,5 yrs
        - Home nebulizers (usu. albuterol/ intal) – "Common Meds" section.
        - Consider inhaled steroids, tradtionally Azmacort if >5 yrs.
      - Children >7-8 yrs:
        - Albuterol, intal, and inhaled steroids. (with aerochamber).

1. Bronchiolitis 75% caused by RSV
   a. CHOP scoring (>3 indicates patients with increased morbidity)

Points	**0**	**1**	**2**

Age	> 3 mo	< 3 mo	< 3 mo
EGA	> 36 weeks	34-36 weeks	< 34 weeks
Appearance	Well	Sick	Toxic
Resp. Rate	< 60/ min	60-70/min	> 70/min
O2 Sats	> 97%	95-96%	< 95%
CXR	Normal	Atelectasis	Atelectasis

b. Indications t/c Ribavirin ((’s hosp. Stay, time on O2, viral shedding (**$$$**).
- Cardiac dis/ congenital heart dis
- Bronchopulmonary dysplasia/ CF
- PCO2 >40, O2<60, <90% O2
- Immunodeficiency
- ± premature infants
- Mechanically ventilated

1. Croup
   a. Signs: barky cough, fever, ± resp. distress (rtx’s), URI, stridor, 3 mo-3 yrs.
   b. DDx: epiglottitis, RSV, pneumonia, bact. Tracheitis, FB, peritonsillar abcess
   c. Dx: stridor, steeple sign on cxr/lat neck (narrowed airway/subglottal edema).
   d. If suspect epiglottitis, **DO NOT EXAMINE PATIENT!!!**
      - This might aggravate the child enough to close off the airway completely.
      - Do not send to radiology (could crash) (Instead, stat consult ENT: needs intubation.
   e. Treatment
      - Croup tent (cool mist tent) with O2.
      - Racemic epi (vaponefrin) nebs 0.25-0.5 ml NS q2-6h.
      - Steroids: dexamethasone 0.6 mg/kg (to max 0f 10 mg) IV x 1.
        (or 0.15-0.2 mg/kg/dose PO q6h x 3)

Kawasaki’s Disease

1. Criteria:
   a. Fever of at least 5 days duration
   b. Presence of 4 of the following 5:
      - Bilateral conjunctival injection.
      - Mucosal changes (injected pharnyx, dry/fissured lips, strawberry tongue).
      - Extremity changes (edema or erythema of hands/feet, desquamation beginning periungually)
      - Rash (mostly truncal: polymorphous but nonvesicular).
      - Cervical lymphadenopathy (usually solitary and unilateral, >1.5cm).
1. **DDx**: measles, scarlet fever, Staph Scalded Skin Synd, toxic shock, RMSF, leptospirosis, Stevens-Johnson synd., JRA, drugs.
2. **Labs:** (wbc (w/ shift), (pits, normocytic anemia, mild (LFT, (ESR, sterile pyuria.
3. **Studies:** ECG and echo during 1st week (then 2nd/3rd wk and 1 mo later).
4. **Treatment:** ASA 80-100 mg/kg/d dividend quid: IVIG 2g/kg x 1 dose over 12h.

Diarrhea

1. **DDX:** viral GE (rotavirus, enterovirus), SSYC, C.difficile, parasitic, meds.
2. **Hx:** duration, severity, ass’d sx’s, **FEEDING, VOIDING**, sick contacts, fever, travel, water source, Abx.
3. **PE:** vitals esp. orthostatics, % dehydration.
4. **Labs:** cbc w/ diff, BMP (HCO3, ±BUN/Cr), U/A (sg), ±stool for WBC, rotazyme.
   (consider SSYC, E.Coli, C. Dif, ?cap gas)
5. Admit if acidotic (HCO3<15), poor po intake, unrelenting diarrhea or wt. Loss.
6. If not admitting, educate parents:
   a. Concept of sips: Children will **always** keep some volume down. Parental responsibility to find out that amount, can use dropper/syringe, at freq intervals.
   b. Daily clinic visits to follow weight and labs.
   c. PO fluids
      - 0-6 mo: sips of Pedialyte(1/2 stregth formula(full strength formula.
        (some attendings like Isomil DF-(fiber so bulks up stools).
      - >6 mo: Pedialyte(Clear liquids(BRAT diet(reg.diet.

Fluids and Electrolytes/ Dehydration

Severity of Dehydration

Criterion	Mild (-5%)	Moderate (-10%)	Severe (-15%)
Pulse	Normal rate, full	Rapid	Rapid, weak
Systolic BP	Normal	Orthostatic	Shoc
Urine Output	Decreaed	Oliguric	Anuric
Buccal Mucosa	Slightly Dry	Dry	Parched
Anterior Fontanelle	Normal	Sunken	Markedly sunken
Eyes	Normal	Sunken No tears	Sunken No tears
Capillary Refill	<2 sec	2-3sec	> 3sec
Skin Turgor	Normal	Decreased	Tenting
Skin	Normal	Coll	Mottled, acrocyanotic
Mental Status	Thirsty	Irritable/ Lethargic	Obtunded
Serum PH	7.40 – 7.22	7.30 – 6.92	7.10 – 6.80

1. Cap. Refill: affected by ambient/ body temp; do fingertip (heel ave.=2.5 sec).
2. Pattern of fluid loss:

Duration of Dehydration	ECF	ICF
< 2 Days	80%	20%
3-7 Days	60%	40%
> 7 Days	50%	50%

Rehydration:

1. **Bolus**: if shocky, 10-20 cc/kg NS or LR (no D5)(use well weight.
2. **Maintenance fluids** (alternating ways to calculate):
   - 100 cc/kg/day for first 10 kg (4 cc/kg/hr).
     Plus 50 cc/kg/day for next 10 kg (2 cc/kg/hr).
     Plus 20 cc/kg/day for wt over 20 kg (1 cc/kg/hr).
     - If > 20kg then weight + 40 = hourly rate

1. **Deficit fluids** (equals % dehydrated x wt in kg)
   - 5% = 50 cc/kg.
   - 10% = 100 cc/kg.
   - 15% = 150 cc/kg.

- **Replace 1st half in 8 hours and 2nd half in next 16 hours.**

Electrolytes Management

1. **Sodium** (note: NS = 154 mEq/L Na, ½NS = 77 mEq/L Na)
   a. Deficit (140 mEq/L x ECF deficit [Liters]) + maintenance (2-3mEq/kg/day).
   b. For infants, Na replacement/maintanence totals are approximately:
      - Isonatremia (130-150) (1/3 NS over 24 hours.
      - Hyponatremia (<130) (½ NS over 24 hours.
      - Hypernatremia (>150) (1/3 or ½ NS over 48 hours.
   c. Unless necessary, avoid using 1/3 NS ($$$ b/c it is prepared to order).
   d. Generally in isonatremic use: ¼ NS (<6-8years) and ½ NS (>8years).
   e. Rate of change: no more than 0.5-1 mEq/hr change, or 10mEq/day.
   f. SZ 2° (Na: 2-4 cc/kg of 3%NaCl over 1-2 hours (corrects about 5-10mEq).
1. **Potassium**
   a. Deficit (150mEq/L x ICF deficit in liters) + maintenance (1-2mEq/kg/day).
      - 10mEq KCI/L (add fluid after first void) (<6-8 years old.
      - 20mEq KCI/L (add fluid after first void) (>8 years old.

Acid/Base: (see "Medicine" section)

1. **Consider adding bicarb** if pH <7.1 or bicarb <6 (on chem 7 or ABG).
   a. + One amp sodium bicarb to a liter (compensate for the Na added!)
   b. Or ½ NS with ½ NaHCO3 (154mEq Na, 77 mEqCl, 77 mEq HCO3 per/L).

APGAR Scores

Criterion	0	1	2
Tone	Flaccid	Decreased Flexion	Increased flexion
Pulse	None	< 100	> 100

Reflex/Grimace	None	Grimace	Cry / Irritability
Color/Appearance	Pale blue	Body pink, extremity blue	All pink
Respiratory effect	None	Weak, irregular	Good, crying

Neonatal Tachypnea

1. Hx: suspect sespis if prolonged ROM, maternal fever, C-section, poor feeding, jitteriness, seizures, abd. Distention, jaundice.
2. DDx: TTN, pneumonia, sepsis, aspiration, meconium aspiration, RDS, PFC.
3. Complete PE: check RR for full minute in quiet setting.
4. Stat chemstrip, CBC with diff, CXR, CBG, Ca ++, change VS to q4hrs.
5. Hold feedings if RR > 70.
6. Follow with chemstrips q1-2h if well.
7. Discuss with upper level/attending possible transfer to IMCN/NICU.
8. If RR > 100 for 3-4h or NPO > 12 (transfer to IMCN for IVF.
9. If CBC shows >2 of these signs, then should be transferred:
    - WBC < 5000 or > 25,000
    - Bands > 1400
    - Pits < 150,000
    - Immature/total seg ratio (I/T) = bands/(bands + segs) > 0.20 ((sensitivity for sepsis but poorly specific).

Note: CBC at 12 hrs of life is better indicator of sepsis if newborn is stable.

Group B Strep Algorithm for Neonates:

(MUST STAY FOR 48 HOURS).
[For infants whose moms were GBS (+) & were tx'd w/ Abx] (from MMWR, 5/31/96)
1. If suspects sepsis or <35 wks: Full lab eval (cbc, bld cx, cxr ±LP) = empiric Abx.
2. If (35 wks, looks well but = 4hrs maternal Abx: Limited lab eval. (cbc, bld cx) @ 12 hrs, q4hr VS, and observation.
3. If = 35 wks, looks well and 2 doses of maternal Abx, both > 4 hrs prior to delivery: No lab eval. And no tx. Consider q4hr VS.

Hypoglycemia

(<30 mg/dl if <24h old, <40 mg/dl if >24 h old) (St Joseph's FP prog)
PLEASE REFER TO NEW POLICY
1. Screen baby if at risk.
    - SGA (<10%)/ LGA (>90%)
    - Perinatal distress/ resuscitation
    - Hematologic d/o
    - Maternal morbid obesity
    - Maternal drug hx.
    - HSM or liver d/o
    - Maternal DM
    - Neuro d/o
    - Hypothyroidism
2. Screen if symptomatic: tremors/jittery, cyanotic, seizures, apnea, poor tone/resp, resp. irreg., exaggerated tone, irritability, high-pitched cry, or poor feeding.
3. Remember hypoglycemia is a common symptom of sepsis
4. Treatment
    a. Glucose=25-40(give 10 ml/kg D5W by nipple/NGT(check @ 30min & 3hrs.
    b. Glucose<25, or persistent(IV D10W @ 3-4cc/kg/hr(transfer to NICU.

Jittery Baby

1. Consider seizures, mat, drug use, (magnesium, (calcium, (glucose, idiopathic.
2. Labs: CBC, CBG/pulse ox, glucose, Ca, (Mg, maternal drug screen.
3. Differentiation from seizures:

	Jittery	**Seizure**
Abnormal gaze/ eye movement	No	Usually
Stimulus sensitive	Very	No

Predominant Movement	Remor	Clonic jerking
When held	Usually stops	No change

Neonatal Jaundice

1. Clinically significant if:
   a. Clinically jauniced on day 1 of life (starts at head and moves down).
   b. Rises at a rate> 5 mg/dl/day.
   c. Peak > 13mg/dl in first four days (or > 15mg/dl in breastled infants).
   d. Direct bill > 1/3 total (traditionally > 2mg/dl).
   e. Persitis > 1 week in term infant, or >2 weeeks in pre-term infant.
1. Work Up
   a. Labs: total/direct bili, blood type, Coombs, Hgb, retic, (blood smear, (bcx.
   b. Explore history for TORCH infections.
   c. Family Hx: liver/GB disease, hemoglobinpathies, metabolic/endocrine d/o's.
1. Risk Factors: mat DM, cephalohematoma, BF, female infant, indiced, Asian, premie.
2. Causes of jaundice
   a. **Physiologic**
      - Starts day 2-3, peaks day 4-5 @ <13 (term) or <15 (pre-term).
      - Causes: (RBC volume, enteroheptic circulation, (RBC lifespan, hepatic uptake from blood, slow conjugation, (excretion (meconium retention).

   b. Unconjugated (indirect):
      - **Breast-Feeding Jaundice**:
        - Presents 6-14 days and peaks at 12-20 mg/dl.
        - Possible (but not nec advisable) to dx by stopping BF x 24 hrs. True BF jaundice if levels immediately drop by >1mg/dl. (pump or use supplemental nursing system(give formula via tube akin to finger-feeding or tape tube to breat to simulate BF while trying to dx/tx).
        - Theoretically **nenver** needs tx, but many rx with lights if >20-25mg/dl.
        - Pseudo-BF jaundice (Before milk is in): 2(to (bowel motility 2((PO.
      - **ABO incompatibility**: Coombs (=), high retics.
      - **Rh incompatibility** (erythroblastosis): Coombs +, high retics.
      - **Extravascular hem.**: cephalohematoma, bruising, internal/CNS hem.
      - Others: Enz def (Criggler-Najjar), polycythemia (iatrogenic: transfusions, milking cord; hypoxia), metabolic (G6PD, PK, hexokinase def.), genetic.

   c. **Conjugated (direct)**
      - **Infection-** sepsis, syphilis, toxo, rubella, CMV, varicella, herpes, TB, echovirus, coxsackievirus, leptospirosis)
      - **Metabolic-** galactosemia, fructosemia, glycogen storage diseases, tyrosinemia, neman-pick, gaucher's.
      - **Anatomic-** biliary atresia, neonatal hepatitis, stones, bile plug syndrome.
      - **Other-** trisomes 18 and 21, CF, alpha-1-trypsin, drugs.
1. Treatment for indirect only (for direct (treat specific cause and refer)
   a. Traditional Criteria (most attendings are conservative)

Treatment	Level < 24h	24-48h	48-72h	> 72h
Consider photorx	5-10	>11	>14	>17
Definite photorx	>10	>14	>17	>20
Consider Exchange	>15	>19	>25	>25
Definite Exchange	>20	>24	>30	>30

- **Photo**: (UV lights, wallabee, sunlight) isomerizes bili for faster excretion.
- **Exchange transfusion**: 85% rbc's & serum Ab's removed. Rarely done.
- While inpatient (bili q12, weights q12, watch for dehydration.

Sample Orders

Always write "H&P done" on orders or the floor will call you to do it.

R/O MI

Admit to CCP/MFP -- Telemetry/ICU/CCU [observation] bed
Diagnosis USA, R/O MI
Condition Stable/Serious/Critical

Vitals	q (unit) routine/ q shift / q 4hx4 then q shift
Activity	bedrest with/without bathroom privileges
Nursing	Strict I/O's, O2 2L/min via NC titrate pOx > 93%, Accuchecks qid, foley to gravity
Diet	cardiac/no added salt/1800 kcal ADA/renal
IVs	heplock/IVF if NPO
Meds	Heparin (see protocol)
	Tridil 10-100 ug/min titrate to pain free and SBP >100-110
	NTP 1" to CW q 6h, hold for SBP<90 (if no Tridil)
	Dilaudid 0.5-1 mg IV q 2h prn pain
	Ecotrin 81 mg po q day
	Tylenol 650-1000 mg po q 4-6h prn H/A
	Dulcolax 10 mg po/pr bid prn constipation
	Sleeper prn insomnia
Studies	EKG q AM X 3, echocardiogram, stress test (if appropriate)
Labs	CK with MB q 8h X 3, SMAC, TFTs (consider if elderly), CBC, Chem12
Consults	prn

GI Bleed

Admit	to CCP/MFP -- Telemetry/ICU/CCU [observation] bed
Diagnosis	upper/lower GI bleed
Condition	Stable/Serious/Critical
Vitals	q (unit) routine/ q 4hx4 then q shift
Activity	bedrest with/without bathroom privileges
Nursing	Strict I/O's, O2 2L/min via NC titrate pOx > 93%, Accuchecks qid, foley to gravity
Diet	NPO except meds
IVs	NSS or D5-1/2 NSS at [rate]
Meds	Pepcid 20 mg IV q 12h
	Lasix 20 mg IV after each unit PRBCs
Studies	Type & screen/cross 2-6 units; transfuse 1-2 units if Hg<8 or pt. symptomatic
Labs	CBC q 6h X 3, PT/PTT, lytes
Consults	GI

CVA/TIA

Admit	to CCP/MFP -- Floor/Telemetry/ICU/CCU [observation] bed
Diagnosis	CVA vs TIA
Condition	Stable/Serious/Critical
Vitals	q (unit) routine/ q shift / q 4hx4 then q shift
Activity	bedrest with/without bathroom privileges
Nursing	Neuro checks q 4h X 4 then q shift/assist with feeds as required/
	aspiration precautions/strict I/O's/O2 2L/min via NC titrate
	pOx > 93%/Accuchecks qid/foley to gravity
Diet	[NPO til speech eval] cardiac/no added salt/1800 kcal ADA/renal
IVs	heplock
Meds	Consider Heparin if CT negative (see protocol)
	Ecotrin 325 mg po q day (if no heparin)
	Tylenol 650-1000 mg po q 4-6h prn H/A
	Dulcolax 10 mg po/pr bid prn constipation
Studies	echocardiogram, carotid dopplers
Labs	PT/PTT, platelets, ESR, CBC, Chem 12
Consults	neuro, PT/OT, speech, rehab, podiatry, social service (D/C planning)

Target BPs in CVA patients -- Ischemic stroke + HTN Hx: target 180-185 systolic, 105-110 diastolic; maximum 220 systolic, 120 diastolic. Ischemic stroke + no HTN Hx: target 160-170 systolic, 95-100 diastolic. Hemorrhagic stroke, target prestroke BP levels. Dropping BP too much with overzealous treatment may only reduce perfusion and increase ischemia.

OB Admit Note

[Name] is a ____ yo ____ female with LMP ____, EDC ____ by (U/S, dates) at ____ EGA who presents with cc=[ROM, ctxns]. Pt denies/has vag. bleeding, ctxns, ROM, N/V, fever, swelling, H/A, etc. Prenatal course [first visit, freq, probs].

Prenatal labs
Meds
Allergies
PMHx/PgynHx
OB Hx
PSHx
FamHx
SocHx [drugs, tob, father of baby]
PE VS
HeartlLung
Cx/Eff/Sta/Presentation
?ROM
Peripheral edema, DTRs

Routine Delivery Note

____yo G_P_ female at ___ EGA progressed to full cervical dilation and began pushing over intact perineum. Patient delivered a viable baby girl/boy via SVD at 03:00 am on 07/01/98. Infant suctioned at the perineum and transferred to warmer. (nuchal cord X ___ reduced without difficulty) Apgars _____. Placenta delivered spontaneously/manually/expressed at 03:15 am, intact with 3 vessels. Note episiotomy (degree) and how repaired with what type of suture. Note position of any lacerations and how repaired. Mother and infant doing well. Note: if there were any complications you need to note these in the delivery note.

Infant H&P

____ yo G__P____ mother delivered a [wt.] W/B fe/male at [time,date] at ____weeks EGA. Prenatal course was un/complicated by ____
Labor began with [ctxns starting ___, ROM] at [time, date] and delivery was by [SVD, induction]
Apgars ____ at 1' and ____ at 5'

PE VS -- HR, RR, BP, T, HC, CC, L, Wt (with %iles), Dubowicz
HEENT -- AF, sutures, hematoma, RR, ears (pinna, TMs, pits), nares patent, palate intact, MM
Neck -- supple, clav intact
Heart/lungs -- murmurs, BS
Abd -- umbilicus, BS, HSM, masses
GU -- testes, hypospadias, chordee, patent anus
Extr -- hip clicks, fem pulses, color, sym movements, tremor
Skin -- birthmarks, mongolian spots, ecchymosis, rashes, turgor
Neuro -- suck, grasp, startle (Moro), root
Note: Remember when you are discharging a baby to take the office copy of the baby's discharge sheet and put it in the file drawer with the baby sheets. That way you have it when the baby comes in for his/her first visit.