Introduction to Anesthesia Booklet

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A

A_2	Aortic second sound
AA	**Anesthesiologist assistant**
AAA	**abdominal aortic aneurysm**
AAAA	**American Academy of Anesthesiologist Assistants**
AAF	**African-American female**
AAM	**African-American male**
AAPA	American Association of Physician Assistants
Ab; ab	**Abortion; antibiotics**
abd	**Abdomen, abdominal**
ABD	**Army battle dressing**
ABG	**Arterial blood gas**
ABL	**Allowable blood loss**
abn	**Abnormal**
a.c.	before meals (ante cibos, L)
ACL	**Anterior cruciate ligament**
ACLS	**advanced cardiac life support**
ACS	**Acute coronary syndrome**
ACT	**Activated clotting time**
A.C.T.H., ACTH	Adrenocorticotrophic hormone
ad	To, up to
ADD	Attention deficit disorder
ADHD	**Attention deficit and hyperactivity disorder**
ad lib `	As desired
adm.	Admission, administer(ed)
AF	**Atrial fibrillation (or A fib); atrial flutter**
A.F.B.	Acid -fast bacilli
AFP	Alpha fetal protein
A/G	Albumin-globulin ratio (blood)
AI	**Aortic insufficiency**
AICD	**Automated intra-coronary defibrillator device**
AIDS	**Acquired immuno-deficiency syndrome**
AKA	**Above the knee amputation**
AK	Above knee
alb.	Albumin
ALI	Acute lung injury
alk. phos.	Alkaline phosphatase
ALS	**Amyotrophic lateral sclerosis (Lou Gehrig's Disease)**
alt. die	Alternate days
alt. hor	Every other hour
alt. noc	Every other night
AMA	**Against medical advice, American Medical Association**
AMI	**Acute myocardial infarction**
amt	Amount
amp	**Ampule**
ant	Anterior

A&O x 3	**Alert and oriented to person, place, and time**
AODM	Adult onset diabetes mellitus
A_2, P_2	Aortic second sound greater than pulmonic second sound
A - P	Auscultation and percussion
A/P, AP	**Anterior-posterior, anteroposterior**
aPTT	**Activated partial thromboplastin time**
Aq.	Water
Aq. dist.	Water distilled
AR	**Aortic regurgitation**
ARC	Acquired immune deficiency syndrome related complex
ARDS	**Adult respiratory distress syndrome**
AROM	**artificial rupture of membranes**
A.S.	Left ear
AS	**Aortic stenosis**
ASA	**Aspirin, American Society of Anesthesiologist**
ASAP	**As soon as possible**
ASC	**Ambulatory surgery center**
ASCAD	Arteriosclerotic coronary artery disease
ASCVD	Arteriosclerotic cardiovascular disease
ASD	**Atrial septal defect**
ASHD	Arteriosclerotic heart disease
AST	**Aspartate aminotransferase (formerly SGOT)**
ATN	**Acute tubular necrosis**
AV	**Atrioventricular; assisted ventilation**
A/V	**Arterio-venous**
AVF	**Arteriovenous fistula**
AVG	**Ateriovenous graft**
AVM	**Arteriovenous malformation**
AVR	**Aortic valve replacement**

B

B	**bilateral**
Ba	barium
B.b.	drink
BCLS	**basic cardiac life support**
BCP	**birth control pills**
BE	barium enema
BF	**black female**
BH	**Bair Hugger**
b.i.d./B.I.D.	**twice a day**
B.I.N.	**twice a night**
BK	below knee
BLBS=	**bilateral breath sounds and equal**
BKA	**below the knee amputation**
BM	**black male, bowel movement**

BMI	**body mass index**
BMR	**basal metabolic rate**
BMT	**bilateral myringotomy tubes**
BP	**blood pressure**
BPH	**benign prostatic hyperplasia**
bpm	**beats per minute**
BRBPR	bright red blood per rectum
BS	**breath sounds; bowel sounds; blood sugar**
BSA	**body surface area**
BSO	**bilateral salpingo-oophorectomy**
B.S.P.	bromsulphalein test
B/U	back-up
BUN	**blood urea nitrogen**
BW	birth weight
bx	**biopsy**

C

c	**with**
°C	**degrees Celsius**
C-1, C-2,etc	**first cervical vertebra, etc.**
CA	**cancer, carcinoma**
Ca	**calcium**
CABG	**coronary artery bypass graft**
CaCl	**calcium chloride**
CAD	**coronary artery disease**
CaGl	calcium gluconate
CASHD	**coronary artery symptomatic heart disease**
Cal.	calorie
cap.	capsule
CAPD	continuous ambulatory peritoneal dialysis
CAT	**computerized axial tomography**
cauc.	caucasian
CBC	**complete blood count**
CBF	**cerebral blood flow**
cc	**cubic centimeter**
C_{CR}	creatinine clearance
CCU	**coronary care unit**
CEA	**carotid endarterectomy**
CF	**cystic fibrosis**
CFX	**circumflex coronary artery**
CHD	congenital heart disease
CHEM-6	**Na^+, K^+, Cl^-, CO_2, glucose, BUN**
CHEM-7	**Chem-6 + creatinine**
CHEM-14	total bilirubin, total protein, albumin, calcium, phosphorus, alkaline phosphatase, lactic dehydrogenase, SGOT, creatinine, uric acid,

	cholesterol, MSI, GGT, SGPT
CHEM-23	CHEM-6 + CHEM-14 + CPK, direct bilirubin, triglycerides
CHF	**congestive heart failure**
CHI	**closed head injury**
Chol.	cholesterol
CI	**cardiac index**
CICU	**cardiac intensive care unit**
CK	creatinine kinase
Cl	**chloride**
cm.	**centimeter**
$CMRO_2$	**cerebral metabolic requirement of O_2**
CMV	**cytomegalovirus**
CNS	**central nervous system**
c/o	**complained of**
CO	**cardiac output**
CO_2	**carbon dioxide, bicarbonate**
cong.	congested
COPD	**chronic obstructed pulmonary disease**
CP	**cerebral palsy; chest pain**
CPAP	**continuous positive airway pressure**
CPB	**cardio-pulmonary bypass**
CPK	creatinine phosphokinase
CPK-MB	creatinine kinase - MB band
CPR	**cardiopulmonary resuscitation**
Cryo	**cryoprecipitate**
CRNA	**certified registered nurse anesthetist**
C & S	culture and sensitivity
C/S	**Cesarean section delivery**
CSF	**cerebral spinal fluid**
CT; C/T	**computed tomography (see CAT), chest tube**
CTA	**clear to auscultation**
CTR	**carpal tunnel release**
CTS	**carpal tunnel syndrome**
Cu	copper
CV	**controlled ventilation / cardiovascular**
CVA	**cerebral vascular accident**
CVICU	**cardiovascular intensive care unit**
CVP	**central venous pressure**
c/w	consistent with
CXR	**chest X-ray**

D

D5W	**dextrose 5% in water**
D5 1/2NS	dextrose 5% in 0.45% normal saline

D5LR	dextrose 5% in Lactated Ringers
D10W	dextrose 10% in water
D50	**dextrose 50%**
D&C	**dilatation and curettage**
D/C	**discontinue**
DDD	**degenerative disc disease**
D.D.S.	**doctor of dental science**
def	defecation
DHEAS	dehydroepiandrosterone sulfate
DI	**diabetes insipidus**
DIC	**disseminated idiopathic coagulopathy**
DIFF.	**differential (blood count)**
dil.	dilatation
disc.	discharge
DJD	**degenerative joint disease**
DKA	**diabetic ketoacidosis**
dl	deciliter
DL	**direct laryngoscopy**
DLCO	diffusion capacity of lung-carbon monoxide test
DLT	**double-lumen tube**
DMD	Doctor of Medical Dentistry
DMV	**daily multi-vitamin**
DNR	**do not resuscitate**
D.O.	**Doctor of Osteopathy**
DOA	**dead on arrival**
DOB	**date of birth**
DOE	**dyspnea on exertion**
DPL	diagnostic peritoneal lavage
DPT	diptheria-pertussis-tetanus
dr.	dram
DT	**delirium tremens**
DTRs	deep tendon reflexes
DVT	**deep vein thrombosis**
dx; Dx	**diagnosis**
Dz	**disease**

E

EBL	**estimated blood loss**
EBT	endobronchial tube
EBV	**estimated blood volume; Epstein-Barr virus**
ECCE	extracapsular cataract extraction
ECG	**electrocardiogram**
ECMO	extracorporeal membrane oxygenation/oxygenator
ECT	**electroconvulsive therapy**

ED	**emergency department**
EDC	estimated date of confinement
EEG	**electroencephalogram**
EENT	eye, ear, nose, and throat
EEY	**erythromycin**
EF	**ejection fraction**
EGA	**estimated gestational age**
EGD	**esophagogastroduodenoscopy**
EJ	**external juglar vein**
elix.	elixir
EMG	electromyogram
ENT	**ear, nose, throat**
EOM	extra-ocular muscles
ER	**emergency room**
ESR	erythrocyte sedimentation rate
ESRD	**end stage renal disease**
ESRF	**end stage renal failure**
EST	electroshock therapy
ESWL	**external sound wave therapy**
$ETCO_2$	**end-tidal carbon dioxide**
EtOH	**alcohol**
ETT	**endotracheal tube**
EUA	**examination under anesthesia**
Ex lap	**exploratory laparotomy**
ext	extract
expir	expired

F

F.A.C.P.	Fellow, American College of Physicians
F.A.C.S.	Fellow, American College of Surgeons
FANA	**Florida Association of Nurse Anesthetists**
F.B.	**foreign body**
FBS	fasting blood sugar
$FeSO_4$	**ferrous sulfate (iron)**
FEV_1	**forced expiratory volume at 1 second**
FFP	**fresh frozen plasma**
FHx	**family history**
FHR	**fetal heart rate**
FHT	**fetal heart tone**
FIO_2	**fraction inspired oxygen**
fld.	fluids
fl. dr.	fluid dram
FRC	**functional residual capacity**
FROM	**full range of motion**

FSA	**Florida Society of Anesthesiologists**
FSH	follicle stimulating hormone
FTA	fluorescent treponemal/titer antibody
FT_3I	free triiodothyronine index
FT_4I	free thyroxine index
FTLB	full term living birth
FTNB	full term normal birth
FTT	failure to thrive
F/U	**follow up**
FUO	**fever of unknown origin**
Fx	**fracture**

G

GBS	gall bladder series
GC	gonococcus
GCS	**Glascow Coma Scale**
g/dL	**grams per deciliter**
GDM	gestational diabetes mellitus
GE	gastroesophageal
GERD	**gastric esophageal reflux disorder**
GGT	gamma glutamyl transpeptidase
GH	growth hormone
GI	**gastrointestinal**
gm	gram
gm%	grams per one hundred milliliters of blood
G/P	**gravida/para**
GPI	general paresis
G_6PD	glucose 6 phosphate dehydrogenase
gr	groin
grav.	gravida (pregnancy)
gh.	drops
GSW	**gun shot wound**
gtt	**drops**
GTT	glucose tolerance test
GU	**genitourinary**
GYN	**gynecology**

H

h, H	hour
H/A	headache
HAV	hepatitis A virus

HBsAb	hepatitis B surface antibody
HBsAg	hepatitis B surface antigen
HBV	hepatitis B virus
HCG, hCG	**human chorionic gonadotropin**
Hct	**hematocrit**
HCTZ	**hydrochlorothiazide**
HCVD	hypertensive cardiovascular disease
HD	hemodialysis
HDL	**high density lipoprotein**
H & E	hemorrhage and exudate (eye)
HEENT	head, eye, ear, nose, and throat
HELLP	**hemolysis, elevated liver enzymes, low platelets (a syndrome)**
Hg	**mercury**
Hgb	**hemoglobin**
HGH	human growth hormone
HIV	**human immunodeficiency virus**
HME	heat-moisture exchanger
hn.	tonight
H/O	**history of**
HOH	**history of headache**
H & P	**history and physical**
HPI	**history of present illness**
HPV	**human papilloma virus**
h.s.;H.S.	at bed time
HSV	herpes simplex virus
HTN	**hypertension**
HTLV	human T-cell lymphotrophic virus
HVA	homovanillic acid
HVD	hypertensive vascular disease
Hx; hx	**history**

I

IABP	**intra-arterial balloon pump**
IBW	ideal body weight
ICP	**intracranial pressure**
ICU	**intensive care unit**
I & D	**incision and drainage**
IDDM	**insulin dependent diabetes mellitus**
I/E	**inspiratory-to-expiratory time ratio**
Ig A,D,E,G,M	immunoglobulin- types A,D,E,G,M
IGP	**intragastric pressure**
IHHS	**idiopathic hypertrophic subaortic stenosis**
IHR	**inguinal hernia repair**
IJ	**internal juglar vein**

IM	**intramuscular**
IMA	**internal mammary artery**
IMP, imp.	impression
IMV	**intermittent mandatory ventilation**
inf.	infusion
inj.	Injection
INR	**internal normalization ratio**
I & O	**intake and output**
IOP	**introcular pressure**
IPN	intern progress notes
IPPB	intermittent positive pressure breathing
IRV	inverse ratio ventialtion
ITP	idiopathic thrombocytopenia purpura
IU	intrauterine
I.U.; IU	**international unit**
IUD	**intrauterine device; intrauterine death**
IUFD	**intrauterine fetal death**
IUP	**intrauterine pregnancy**
IV	**intravenous**
IVC	**inferior vena cava**
IVDA	intravenous drug abuse
IVF	in vitro fertilization
IVH	intraventricular hemorrhage
IVP	**intravenous pyelogram**

J

JODM	juvenile onset diabetes mellitus

K

K	**potassium**
Kcal, KCAL	kilocalorie
KCl	**potassium chloride**
kg	**kilogram**
KUB	**kidney, ureter, bladder (used when taking an X-ray)**
KVO	**keep vein open**

L

L	**left; liter**
L-1, L-2, etc.	**first lumbar vertebra, etc.**
LAD	**left anterior descending (coronary artery)**
lap.	laparotomy
lat	lateral
LAVH	**laparoscopic assisted vaginal hysterectomy**
LBBB	**left bundle branch block**
LBCD	left border cardiac dullness
LBP	**low back pain**
lbs	**pounds**
LBW	low birth weight
LCM	left costal margin
L & D	**labor and delivery**
LDH	lactic dehydrogenase
LDL	**low density lipoprotein**
LE	**lower extremity**
LE prep	lupus erythematosus cell preparation
LFT	**liver function test(s)**
LHF	left heart failure
LHRH	luteinizing hormone releasing hormone
Li	lithium
LIH	**left inguinal hernia**
LIMA	**left internal mammary artery**
LLD	**left lateral decubitus (position)**
LLE	**left lower extremity**
LLL	**left lower lobe**
LLQ	**left lower quadrant**
LM	left main coronary artery
LMA	**laryngeal mask airway**
LMP	**last menstrual period**
LOA	left occipital anterior
LOC	**loss/level of consciousness**
LP	**lumbar puncture**
LPN	**licensed practical nurse**
LPV	lymphopathia venereum
LR	**lactated Ringer's solution**
LSK	liver, spleen, kidneys
LSO	**left salpingo oopherectomy**
LTL	**laparoscopic tubal ligation**
LUE	**left upper extremity**
LUL	**left upper lobe**
LUQ	**left upper quadrant**
LV	**left ventricle**
LVAD	**left ventricular assist device**
LVE	left ventricular enlargement
LVEDP	**left ventricular end diastolic pressure**
LVH	**left ventricular hypertrophy**
LVS	left ventricular strain

LWMA	left wall motion abnormality

M

m	minimum
µg	**microgram**
µl	microliter
µM	micromole
M1	mitral first sound
MAC	**minimum alveolar concentration; monitored anesthesia care**
MAP	**mean arterial pressure**
MAST	military anti-shock trousers
MBC	maximal breathing capacity
MCA	**motorcycle accident**
mcg	**microgram**
MCH	mean corpuscular hemoglobin
MCHC	mean corpuscular hemoglobin concentration
MCL	**mid clavicular line**
MCV	mean corpuscular volume
MD	**Medical Doctor**
MDI	**metered dose** inhaler
mEq	**milliequivalent**
mEq/L	**milliequivalent per liter**
mg	**milligram**
mg/dL	**milligrams per deciliter**
$MgSO_4$	**magnesium sulphate**
MH	**malignant hyperthermia**
MID-CAB	**minimally invasive coronary artery bypass**
MICU	**medical intensive care unit**
min	minute
ml	**milliliter**
mm	**millimeter**
mmHg	**millimeter of mercury**
Mn	manganese
MOSF	**multi-organ system failure**
mOsm	milliosmole
MR	**mental retardation; mitral valve regurgitation**
MRI	**magnetic resonance imaging**
MRSA	**methicillin resistant staph aureus**
MS	**multiple sclerosis; mitral stenosis**
MSO_4	**morphine sulfate**
MSL	mid sternal line
MVA	**motor vehicle accident**
MV	**multivitamins**
MVP	**mitral valve prolapse**

MVR	**mitral valve replacement**

N

N; N_2	**nitrogen**
Na	**sodium**
N/A	**not applicable; not available**
NAD	no apparent distress
NaP	**sodium pentothal**
n.b.	note well
NB	newborn
NEC	necrotizing enterocolitis
ng	nanogram
NG	**nasogastric**
NH_3	ammonia
NI	not indicated
NICU	**neonatal intensive care unit**
NIDDM	**non-insulin dependent diabetes mellitus**
NKA	**no known allergies**
NKDA	**no known drug allergies**
nM	nanomole
NMR	nuclear magnetic resonance
N_2O	**nitrous oxide**
noct	at night, nocturnal
NP	**nurse practitoner**
NPH	**neutral protamine Hagedorn (insulin)**
NPN	non protein nitrogen
NPO	**nothing by mouth (nil per os)**
NR	don't repeat
NS	**normal saline**
NSAID	**non-steroidal anti-inflammatory drug**
NSR	**normal sinus rhythm**
NSU	**Nova Southeastern University**
NTG	**nitroglycerine**
NTT	**nasal tracheal tube**
N/V	**nausea and vomiting**
N/V/D	**nausea, vomiting, diarrhea**

O

O_2	**oxygen**
OB	**obstetrics**
OB/GYN	**obstetrician/gynecologist**

Occ	**occasional**
OD	**overdose**
O.D.	**right eye (oculus dexter)**
OETT	**oral endotracheal tube**
OH	occupational history
OHD	organic heart disease
Oint.	ointment
OLA	occiput left anterior
OLP	occiput left posterior
OP CAB	**off-pump coronary artery bypass**
OPS	**out patient surgery**
OR	**operating room**
ORIF	**open reduction internal fixation**
os	**mouth**
O.S.	**left eye (oculus sinister)**
O_2S	oxygen saturation
OSA	**obstructive sleep apnea**
O.T.	**occupational therapy**
OTC	**over the counter**
O.U.; o.u.	each eye
o/w	**otherwise**
oz.	**ounce**

P

p	**after**
P	phosphorous
P_2	**pulmonic second sound**
P & A	percussion and auscultation
$PaCO_2$	**partial pressure of CO_2 in arterial blood**
PA	**pulmonary artery**
PAC	**premature atrial contraction; pulmonary artery catheter**
PA-C	**physician assistant-certified**
PACU	**post anesthesia care unit**
PALS	**pediatric advanced life support**
PaO_2	**partial pressure of O_2 in arterial blood**
PAOP	**pulmonary artery occluded pressure**
Pap	Papanicolaou smear (Pap smear)
para	parity
PAT	**paroxysmal atrial tachycardia; preadmission testing**
Pb	lead
PBI	protein bound iodine
P.C.	after meals
PCA	**patient controlled analgesia**
PCN	**penicillin**

PCWP	**pulmonary capillary wedge pressure**
PD	**peritoneal dialysis**
PDA	**patent ductus arteriosus**
PD&C	postural drainage and clapping
PE	**pulmonary embolism**
P.E.	physical exam
PEA	**pulseless electrical activity**
PEEP	**positive end expiratory pressure**
PEG	**percutaneous endoscopic gastrostomy**
per	**by**
PERRLA	**pupils, equal, round, reactive to light and accommodation**
$P_{ET}CO_2$	**partial pressure of CO_2 in end-tidal gas**
PFO	**patent foramen ovale**
PFT	**pulmonary function test**
Pg	picogram
pH	**hydrogen ion concentration**
PH	past history
PI	present/previous illness
PICC	**percutaneously inserted central catheter**
PICU	**pediatric intensive care unit**
PID	**pelvic inflammatory disease**
PIH	**pregnancy induced hypertension**
PIP	**peak inspiratory pressure**
PKU	phenylketonuria
PLT/plt.	**platelets**
PMHx	**past medical history**
PMR	physical medicine and rehabilitation
PMS	**premenstrual syndrome**
PND	paroxysmal nocturnal dyspnea, post nasal drip
PNV	**prenatal vitamins**
PO	**by mouth**
PO_4	phosphate
POD	**post operative day**
PONV	**post-op nausea and vomiting**
post-op	**after operative**
p.p.	postprandial
PP	post partum
PPP	**pressure points padded**
PPD	**purified protein derivative(TB test)**
PPL	pleuropneumonia like
PR	per rectum
PRBC	**packed red blood cells**
preop	**before surgery**
p.r.n./prn	**whenever necessary**
PROM	**premature rupture of membranes**
PSHx	**past surgical history**
PSP	phenolsulfonphthalein test

PSV	pressure support ventilation
PSVT	**paroxysmal supraventricular tachycardia**
PT	**prothrombin time (a.k.a. protime); physical therapy**
PTA	prior to admission
PTCA	**percutaneous transluminal coronary angioplasty**
PTH	**parathyroid hormone**
PTT	**partial thromboplastin time**
PUD	**peptic ulcer disease**
PUO	pyrexia of undetermined origin
PVC	**premature ventricular contraction**
PVD	**peripheral vascular disease**
PVR	**pulmonary vascular resistance**

Q

q	**every**
qd	**every day**
qh	**every hour**
q2h	**every 2 hours**
q4h	**every 4 hours**
qHS	**every night**
qid	**four times a day**
qn	**every night**
qod	**every other day**
qqh	every four hours
QRS	**ventricular wave EKG**
q.s.	sufficient quantity
QV	as much
qwk	every week

R

R	**right**
RA	**rheumatoid arthritis; right atrium**
rad	unit of measurement of the absorbed dose of ionizing radiation
RAD	**reactive airway disease**
RAH	**right atrial hypertrophy**
RAI	radioactive iodine
RAP	**retrograde autologous prime**
RAST	radioallergosorbent test
RBBB	**right bundle branch block**
RBC	**red blood cell**
RCA	**right coronary artery**

RCM	right costal margin
RCR	**rotator cuff repair**
RDS	respiratory distress syndrome
RF	**rheumatic fever**
Rh	**Rhesus factor**
RHD	**rheumatic heart disease**
RHF	**right heart failure**
RLE	**right lower extremity**
RLL	**right lower lobe**
RLQ	**right lower quadrant**
RML	**right middle lobe**
RN	**registered nurse**
R/O	**rule out**
ROA	occiput right anterior
ROM	**range of motion**
ROP	occiput right posterior
ROS	**review of systems**
ROT	occiput right transverse
RQ	respiratory quotient
RR	**respiratory rate**
RRE	round,regular,equal
RRR	**regular rate and rhythm**
RSO	**right salpingo oopherectomy**
RSR	regular sinus rhythm
RSD	reflex sympathetic dystrophy
RSV	respiratory syncytial virus
RT	**respiratory therapy**
R/T	related to
RTC	return to clinic
RT_3U	resin triiodothyronine uptake
RUE	**right upper extremity**
RUL	**right upper lobe**
RUQ	**right upper quadrant**
RVAD	**right ventricular assist device**
RVH	**right ventricular hypertrophy**
RWMA	right wall motion abnormality
Rx	**therapy; prescription**

S

s	**without**
SA	**sinoatrial**
SAH	**subarachnoid hemorrhage**
SaO_2	**oxygen saturation of hemoglobin in arterial blood**
SBE	**subacute bacterial endocarditis**

SCD	**sequential compression device**
SD	septal defect
SDH	**subdural hematoma**
sed rate	sedimentation rate
SGC	**Swan-Ganz catheter**
SGOT	serum glutamic oxaloacetic transaminase (AST)
SGPT	serum glutamic pyruvic transaminase (ALT)
SHx	**social history**
SIADH	**syndrome of inappropriate anti-diuretic hormone**
SICU	**surgical intensive care unit**
SIDS	**sudden infant death syndrome**
SIMV	**synchronized intermittent mandatory ventilation**
SIRS	systemic inflammatory response syndrome
SL	**sublingual**
SLE	systemic lupus erythmatosus
SNP	**sodium nitroprusside**
SOB	**shortness of breath**
s.o.s.	if occasion arises
S/P	**status post**
sp. gr.	specific gravity
spec.	specimen
SpO_2	**saturation of hemoglobin in arterial blood from pulse oximetry**
SQ	**subcutaneous**
SR	**spontaneous respiration**
SROM	**spontaneous rupture of membranes**
ss	**half; sliding scale**
s/s	**signs and symptoms**
SSS	sick sinus syndrome
STAT	**supercedes tasks of all types (i.e. immediately)**
STD	**sexually transmitted disease**
STS	serological test for syphilis
SV	**stroke volume; supraventricular**
SVC	**superior vena cava**
SvO_2	**oxygen saturation of hemoglobin in mixed-venous blood**
supp.	suppository
SVR	**systemic vascular resistance**
SVT	**supraventricular tachycardia**
sx	**symptoms; surgery**

T

T	**temperature; thoracic**
T_3	**iodothyronine**
T_4	**thyroxine**
T & A	**tonsillectomy and adenoidectomy**

tab	tablet
TAH	**total abdominal hysterectomy**
TB	**tuberculosis**
TBSA	total body surface area
TEE	**transesophageal echocardiography**
TEF	transesophageal fistula
TENS	transcutaneous electrical nerve stimulation
THA	**total hip arthroplasty**
THR	**total hip replacement**
TIA	**transient ischemic attack**
TIBC	total iron binding capacity
tid	**three times a day**
tin	three times a night
tinct	tincture
TKA	**total knee arthroplasty**
TKR	**total knee replacement**
TMJ	**temporomandibular joint**
TOF	**train of four; Tetrology of Fallot**
TP	total protein
TPN	**total parenteral nutrition**
TPR	temperature, pulse, respiration
TR	**tricuspid (valve) regurgitation**
TSH	**thyroid stimulating hormone**
TUNA	transurethral needle ablation
TURB	**transurethral resection of the bladder**
TURP	**transurethral resection of prostate**
TVH	**total vaginal hysterectomy**
Tx	**treatment**
T & X	**type and crossmatch**

U

U	**unit**
UA	**urinalysis**
UCG	urinary chorionic gonadotropins
UE	**upper extremity**
UGI	upper gastrointestinal
ung.	ointment
UO	**urine output**
URI	**upper respiratory infection**
U/S	**ultrasound**
UTI	**urinary tract infection**
UUN	urine, urea, nitrogen

V

v	volt
V_T	**tidal volume**
VAE	**venous air embolism**
VATS	**video assisted thoracoscopic surgery**
VC	vital capacity
VCU	voiding cystourethrogram
VD	**venereal disease**
V_D	volume of distribution
V_D/V_T	dead space-to-tidal volume ratio
VDRL	venereal disease research lab(lab report)
VHD	valvular heart disease
VLBW	very low birth weight
VLDL	very low density lipoprotein
VMA	**vanillylmandelic acid**
vol.	volume
Vol%	volumes percent
V.O.	**verbal order**
V-P	**ventricular-peritoneal**
V/Q	**ventilation-perfusion ratio**
VS	**vital signs**
VSD	**ventricular septal defect**
VSS	**vital signs stable**
V-Tach	**ventricular tachycardia**

W

WBC	**white blood cells**
w.d./WD	well developed
WF	**white female**
wk	**week**
WM	**white male**
WMA	**wall motion abnormality**
W.N.	well nourished
WNL	**within normal limits**
WPW	**Wolff-Parkinson-White (syndrome)**
wt.	weight
w/u	**work up**

X, Y, & Z

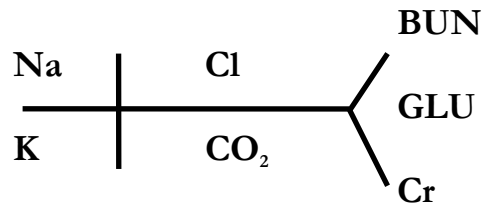
x	times

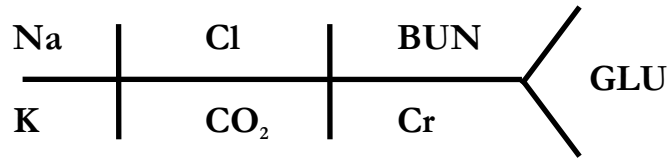
X-match	cross match
XR	X-ray
yo	**year(s) old**
Zn	zinc

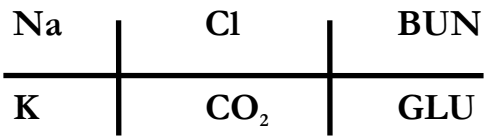
SYMBOLS

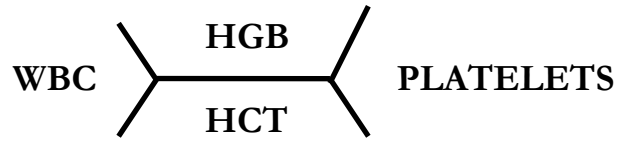
≈	approximately
@	at
Δ	change
√	check
↓	decrease, deficiency, depressed, diminished, inferior (position),
°	degree
/	divided by; per
=	equals
↑	increase, elevated, enlarged, rising, superior (position), upper
-	negative
#	number or pounds
∅	none, nothing
1°	primary
2°	secondary
3°	tertiary
c	with
s	without
p	after
.	decimal [Never use trailing zero (1.0mg) or leading decimal (.1mg)]

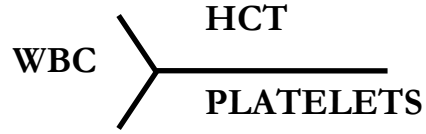
SYMBOLOGY-LABS*

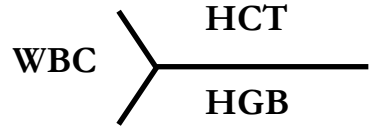












Medical Jargon

A-line (n.)

Refers to the words "arterial line" which is a catheter inserted into an artery usually to monitor pressure and waveforms.

Ex. *"He has an **a-line** in his right radial artery."*

Amnio (n.)

This is a shortening of the word "amniocentesis" where the obstetrician samples the amniotic fluid though the abdominal wall with a biopsy needle.

Ex. *"her **amnio** was negative."*

Bili (n.)

A shortening of the word "bilirubin" which is a yellow bile pigment resulting from the breakdown of hemoglobin.

Ex. *"This patient's total **bili** is up."*

Blue 100 (n.) (variants; Code Blue, Dr. Blue)

Ex. *" **Blue 100,** emergency room, **Blue 100,** emergency room, **Blue 100,** emergency room"*

A general hospital announcement to all medical staff that there is a life threatening medical emergency and usually involves cardiac resuscitation. The hospital operator repeats the phrase three times and location of the emergency. Every hospital has its own term for this situation.

bleeder (n.)

Usually refers to an arteriole that has been severed and is pumping blood into the surgical site.

Ex. *"Nurse, can you hand me a stitch, I have a small **bleeder** here."*

blower (n.)

Refers to a ventilator.

Ex. *"After we intubate the patient let's put him on the **blower**."*

Can also refer to a carbon dioxide blowing instrument used in cardiac surgery.

Ex. "*"Turn the **blower** on so I can get rid of some of this blood."*

bovie (n.)

Refers to any electrocautery device used in the operating room to cauterize wounds to staunch bleeding or oozing from capillaries or arterioles. The Bovie machines were the first widely available commercial electrocautery devices.

Ex. *"Nurse can you hand me the* ***bovie,*** *I have some bleeding here."*

break (v.)

The process of relieving an acute symptom that is continuous.

Ex. *"The patient has a laryngospasm , so I'm applying some positive pressure to* ***break*** *the spasm."*

bug juice (n.)

Refers to antibiotic solution.

Ex. "I need some **bug juice** to rinse out this wound."

cabbage (n.)

Ex. *" This patient had a* ***cabbage*** *done 4 years ago."*

A play on phonetic structure of "CABG" which is the abbreviation for coronary artery bypass graft.

cat scan (n.)

Refers to the radiologic technique known as **C**omputerized **A**xial **T**omography.

Ex. "*The patient has to go for a* ***CAT scan*** *first before they come down to the operating room."*

clamp (n., v.)

Refers to a surgical instrument shaped like scissors, however used to compress a blood vessel or other anatomic structure. Common example of such an instrument is a "hemostat"

Ex. (n.) *"Nurse give me a* ***clamp****, I have a bleeder."* (v.) *" I'm going to* ***clamp*** *the aorta."*

close (v.)

The act of closing the wound with suture or staples.

Ex. *"We're almost done. We'll* ***close*** *in about 10 min."*

code (n.,v.)

Ex. (n.) *"There is a* ***code*** *in progress down the hall. (v.) If this patient's blood pressure goes down he may* ***code****." (adj.)*

Refers to a medical emergency in which a designated team responds. Usually involves a cardiac resuscitation for cardiac arrest or irregular rhythm.

Code Blue (n.)

See **"Blue 100"**

crit (n.)

Refers to percentage of red blood cells per 100cc of whole blood sampled from the patient. The term is a shortening of the term hemato**crit**.

Ex. *"The patient has lost 500cc of blood. Let's get a **crit**."*

Echo (n.)

A shortened term for the word "echocardiogram" which is an ultrasonic evaluation of heart fuction.

Ex. *"the patient's **echo** showed damage to the left ventricle."*

epi (n.)

The term is a shortening of the term **epi**nephrine.

Ex. *The patient's pressure is down. Give them 100 micrograms of **epi**."*

foley (n.)

A shortened phrase for **Foley** catheter. A tube that is inserted through the urethra to drain the bladder.

Ex. *"The patient had a **foley** placed last night."*

flouro (n. or v.)

A shortened form of **fluoroscope or flouroscopy.** A for form of continuous x-ray for diagnostic and procedural assistance.

Ex. *"they are bringing in a **flouro (n.)** to see where the fracture is. They will **flouro (v.)** the leg in two places."*

gas (n.)

Refers to an arterial blood **gas** test.

Ex. *"The patient's lungs sound bad. Let's get a **gas** and see what the oxygen level is in his blood."*

glue (n.,v.)

Refers to an adhesive, methylmethacrylate that is used primarily by orthopedic surgeons to fix artificial joints to the supporting bones. This bone(s) is usually the femur and/or tibia. Placement of this substance sometimes has vasoactive effects on the circulation.

Ex. (n.) *"We are putting the **glue** into the femoral shaft now."*
Ex. (v.) *"We are going to **glue** the artificial hip to the femur now."*

K (n.)

Refers to the serum electrolyte potassium whose chemical symbol is K.

Ex. *"The EKG waveform looks odd. Let's draw some blood and see what the **K** is."*

lido (n.)

A shortening of the drug name **lido**caine.

Ex. "*The patient has premature ventricular contractions. Give 100 mg. of **lido**."*

lines (n.)

Refers to tubing used in intravenous administration and monitoring sets or cables used with physiologic monitors.

Ex. *"Watch how you transfer the patient onto the bed. You may get her **lines** tangled."*

lytes (n.)

A shortening of the term electro**lytes** referring to compounds found in the blood serum.

Ex. *"This patient has renal disease. Make sure we get **lytes** on him before we induce anesthesia."*

mayo (n.)

Refers to an equipment stand used by scrub nurses to hold instruments that can be positioned over the patient.

Ex. *"I'm raising the OR table. Watch your **mayo**!"*

mics (n.)

The word is pronounced "mikes." This is a shortening of the word **mic**rograms.

Ex. *"Give the patient 100 **mics** of neosynephrine."*

neo (n.)

Is a shortened form of **neo**synephrine.

Ex. *"Give the patient a 100 mics of **neo**."*

neuro (n.)

A shortening of the term **neuro**surgery and refers to that surgical specialty.

Ex. *"The **neuro** docs haven't evaluated the spine yet."*

orthopods (n.)

Refers to orthopedic surgeons.

Ex. *"The orthopods want this patient positioned on his left side up."*

on/off the pump

Refers to a patient being place or taken off of an extracorporeal bypass machine that is used to bypass the heart and lungs during cardiac surgery.

Ex. *"We'll be going **on the pump** in just a couple of minutes."*

penrose (n.)

Refers to a surgical item that is placed in wounds to drain them postoperatively. It is a tubelike device that is very pliable and usually made of latex. It is also used as a tourniquet when starting intravenous lines.

Ex. *"Is there a **penrose** on the cart? I need to start an i.v."*

plege solution (n.) *pronounced* "pleeg"

A solution used in cardiac bypass procedures, which is infused into the coronary arteries to disrupt the electrical activity of the heart and induce cardiac arrest. Administered by the perfusionist operating the bypass apparatus.

Ex. *"I have infused 200cc of **plege solution** and myocardial temperature is 32.1 °."*

relax (v., adv.)

Term that usually refers to paralyzing a patient temporarily by using drugs during an operation.

Ex.(v.) *"The surgeon is probably going to want us to **relax** the patient for this appendectomy."*
Ex (adv.) *"Use the twitch monitor to see if the patient is **relaxed**."*

road trip (n.)

Used to define anesthetic procedures done outside the operating room.

Ex. *"We're going on a **road trip** to cardiac cath lab for an AICD evaluation."*

roc (n.)

Shortening of the drug **roc**uronium.

Ex. *"I just gave the patient 10 mg. of **roc** because the patient moved."*

rod (n., v.)

Used to describe any number of orthopedic devices that primarily are inserted into the shaft of the damaged bone.

Ex. (n.) *"We will use a **rod** to repair that fractured femur."*
Ex. (v.) *"We'll be **rodding** this femur fracture."*

sat (n.)

Shortening of the term **sat**uration used in blood gas analysis. Saturation refers to the percent of hemoglobin that has oxygen bound to the molecule.

Ex. *"The patient's **sat** is only 91%. Let's increase the oxygen going to the patient."*

scope (n.,v.)

This term has several meanings. It is a shortening of the drug name **scop**olamine. It also refers to any instrument that is used to visualize internal anatomy, such as, a laryngo**scope.** It is also used as a verb in defining an action that uses an instrument to visualize internal anatomy.

Ex. (n.) *"Give the patient .2 mg. of **scope**."*
Ex. (n.) *"Hand me the **scope** so I can intubate this patient."*
Ex. (v) *"I'm going to **scope** this patient first and see if we can intubate."*

squirt (v., n.)

Used by surgeons and other physicians that use vascular catheters. Typically a dye solution that is
Ex. (v.) *"I'm going to **squirt** the aorta now."*
Ex. (n.) *"The patient had a **squirt** that showed a cerebral aneurysm."*

squirter (n.)

A word used to indicate a laceration of a large arterial blood vessel that sends a pulsating stream of blood into the surgical field.

Ex. (n.) *"Nurse hand me a clamp. I have a **squirter** here."*

stat (v.)

An expression that means to do something immediately. Usually follows a request or order.

Ex. (v.) "Give the patient 100 mg. of succinylcholine. STAT!"

stitch (n.,v.)

Used to denote a surgical suture or the act of suturing.

Ex. (n.) *"Don't tie the* ***stitch*** *to tight or it will break."*
Ex. (v.) *"Let's get this wound* ***stitched****."*

Sux (n.)

A shortened form of a drug name **su**ccinylcholine.

Ex. (n.) " Give the patient 100mg. of **Sux**."

Swan (n.,v.)

A shortened form of the name of a monitoring cardiac catheter called a **Swan**-Ganz catheter. Also used as a verb to describe the insertion of the **Swan-**Ganz catheter.

Ex. (n.) " The patient came from the intensive care unit and has a **Swan** in place."
Ex. (v.) " The surgeons are going to **Swan** the patient before they bring him to the OR."

wedge (n.,v.)

A term used for the reading acquired from Swan-Ganz catheter after it is properly positioned in the pulmonary artery. It is a term used to describe the positioning of the Swan-Ganz catheter to obtain a reading.

Ex. (n.) " The patient's **wedge** was 15."
Ex. (v.) " The waveform indicates that we have a **wedged** catheter."

Dangerous Abbreviations

Dangerous Abbreviations Or Dose Designations – Not Recommended

Abbreviation /Dose Expression	Intended Meaning	Misinterpretation	Correction
Apothecary symbols	dram minim	Misunderstood or misread (symbol for dram misread for "3" and minim misread as "mL").	Use the metric system.
AU	aurio uterque (each ear)	Mistaken for OU (oculo uterque—each eye).	Don't use this abbreviation.
D/C	discharge discontinue	Premature discontinuation of medications when D/C (intended to mean "discharge") has been misinterpreted as "discontinued" when followed by a list of drugs.	Use "discharge" and "discontinue."
Drug names			Use the complete spelling for drug names.
ARAºA	vidarabine	cytarabineARAºC	
AZT	zidovudine (RETROVIR)	azathioprine	
CPZ	COMPAZINE (prochlorperazine)	chlorpromazine	
DPT	DEMEROL-PHENERGAN-THORAZINE	diphtheria-pertussis-tetanus (vaccine)	
HCl	hydrochloric acid	potassium chloride (The "H" is misinterpreted as "K.")	
HCT	hydrocortisone	hydrochlorothiazide	
HCTZ	hydrochlorothiazide	hydrocortisone (seen as HCT250 mg)	
MgSO4	magnesium sulfate	morphine sulfate	
MSO4	morphine sulfate	magnesium sulfate	
MTX	methotrexate	mitoxantrone	
TAC	triamcinolone	tetracaine, ADRENALIN,cocaine	

ZnSO4	zinc sulfate	morphine sulfate	
Stemmed names			
"Nitro" drip	nitroglycerin infusion	sodium nitroprusside infusion	
"Norflox"	norfloxacin	NORFLEX	
m g	microgram	Mistaken for "mg" when handwritten.	Use "mcg."
o.d. or OD	once daily	Misinterpreted as "right eye" (OD—oculus dexter)and administration of oral medications in the eye.	Use "daily."
TIW or tiw	three times a week.	Mistaken as "three times a day."	Don't use this abbreviation.
per os	orally	The "os" can be mistaken for "left eye."	Use "PO," "by mouth," or "orally."
q.d. or QD	every day	Mistaken as q.i.d., especially if the period after the "q" or the tail of the "q" is misunderstood as an "i."	Use "daily" or "every day."
qn	nightly or at bedtime	Misinterpreted as "qh" (every hour).	Use "nightly."
qhs	nightly at bedtime	Misread as every hour.	Use "nightly."
q6PM, etc.	every evening at 6 PM	Misread as every six hours.	Use 6 PM "nightly."
q.o.d. or QOD	every other day	Misinterpreted as "q.d." (daily) or "q.i.d. (four times daily) if the "o" is poorly written.	Use "every other day."
sub q	subcutaneous	The "q" has been mistaken for "every" (e.g., one heparin dose ordered "sub q 2 hours before surgery" misunderstood as every 2 hours before surgery).	Use "subcut." or write "subcutaneous."
SC	subcutaneous	Mistaken for SL (sublingual).	Use "subcut." or write "subcutaneous."
U or u	unit	Read as a zero (0) or a four (4), causing a 10□ fold overdose or greater (4U seen as "40" or 4u seen as 44").	"Unit" has no acceptable abbreviation. Use "unit."
IU	international unit	Misread as IV (intravenous).	Use "units."
cc	cubic centimeters	Misread as "U" (units).	Use "mL."
x3d	for three days	Mistaken for "three doses."	Use "for three days."
BT	bedtime	Mistaken as "BID" (twice daily).	Use "hs."
ss	sliding scale	Mistaken for "55."	Spell out "sliding

	(insulin) or ½ (apothecary)		scale." Use "one-half" or use "½."
> and <	greater than and less than	Mistakenly used opposite of intended.	Use "greater than" or "less than."
/ (slash mark)	separates two doses or indicates "per"	Misunderstood as the number 1 ("25 unit/10 units" read as "110" units.	Do not use a slash mark to separate doses. Use "per."
Name letters and dose numbers run together (e.g., Inderal40 mg)	Inderal 40 mg	Misread as Inderal 140 mg.	Always use space between drug name, dose and unit of measure.
Zero after decimal point (1.0)	1 mg	Misread as 10 mg if the decimal point is not seen.	Do not use terminal zeros for doses expressed in whole numbers.
No zero before decimal dose (.5 mg)	0.5 mg	Misread as 5 mg.	Always use zero before a decimal when the dose is less than a whole unit.

Anesthesia Apparatus Checkout Recommendations, 1993

This checkout, or a reasonable equivalent, should be conducted before administration of anesthesia. These recommendations are only valid for an anesthesia system that conforms to current and relevant standards and includes an ascending bellows ventilator and at least the following monitors: capnograph, pulse oximeter, oxygen analyzer, respiratory volume monitor (spirometer) and breathing system pressure monitor with high and low pressure alarms. This is a guideline which users are encouraged to modify to accommodate differences in equipment design and variations in local clinical practice. Such local modifications should have appropriate peer review. Users should refer to the operator's manual for the manufacturer's specific procedures and precautions, especially the manufacturer's low pressure leak test (step #5).

Emergency Ventilation Equipment

*** 1. Verify Backup Ventilation Equipment is Available & Functioning**

High Pressure System

*** 2. Check Oxygen Cylinder Supply**
- a. Open $_{02}$ cylinder and verify at least half full (about 1000 psi).
- b. Close cylinder.

*** 3. Check Central Pipeline Supplies**
- a. Check that hoses are connected and pipeline gauges read about 50 psi.

Low Pressure System

*** 4. Check Initial Status of Low Pressure System**
- a. Close flow control valves and turn vaporizers off.
- b. Check fill level and tighten vaporizers' filler caps.

*** 5. Perform Leak Check of Machine Low Pressure System**
- a. Verify that the machine master switch and flow control valves are OFF.
- b. Attach "Suction Bulb" to common Fresh) gas outlet.
- c. Squeeze bulb repeatedly until fully collapsed.
- d. Verify bulb stays *fully* collapsed for at least 10 seconds.
- e. Open one vaporizer at a time and repeat 'c' and 'd' as above.
- f. Remove suction bulb, and reconnect fresh gas hose.

*** 6. Turn On Machine Master Switch**
and all other necessary electrical equipment.

*** 7. Test Flowmeters**
- a. Adjust flow of all gases through their full range, checking for smooth operation of floats and undamaged flowtubes.
- b. Attempt to create a hypoxic $_{02}/N_20$ mixture and verify correct changes in flow and/or alarm.

Scavenging System

*** 8. Adjust and Check Scavenging System**
- a. Ensure proper connections between the scavenging system and both APL (pop-oft) valve and ventilator relief valve.
- b. Adjust waste gas vacuum (if possible).
- c. Fury open APL valve and occlude Y-pTece.
- d. With minimum 0_2 flow, allow scavenger reservoir bag to collapse completely and verify that absorber pressure gauge reads about zero.
- e. With the 0_2 flush activated allow the scavenger reservoir bag to distend fully, and then verify that absorber pressure gauge reads < 10 cm H20.

Breathing System

*** 9. Calibrate 0_2 Monitor**
- a. Ensure monitor reads 21% in room air.
- b. Verify low 0_2 alarm is. enabled and functioning.
- c. Reinstall sensor in circuit and flush breathing system with 0_2.
- d. Verify that monitor now reads greater than 90%.

10. Check Initial Status of Breathing System
- a. Set selector switch to "Bag" mode.
- b. Check that breathing circuit is complete, undamaged and unobstructed.
- c. Verify that C_{02} absorbent is adequate.
- d. Install breathing circuit accessory equipment (e.g. humidifier, PEEP valve) to be used during the case.

11. Perform Leak Check of the Breathing System
- a. Set all gas flows to zero (or minimum).
- b. Close APL (pop-off) valve and occlude Y-piece.
- c. Pressurize breathing system to about 30 cm H_20 with 0_2 flush.
- d. Ensure that pressure remains fixed for at least 10 seconds.
- e. Open APL (Pop-off) valve and ensure that pressure decreases.

Manual and Automatic Ventilation Systems

12. Test Ventilation Systems and Unidirectional Valves
- a. Place a second breathing bag on Y-piece.
- b. Set appropriate ventilator parameters for next patient.
- c. Switch to automatic ventilation (Ventilator) mode.
- d. Fill bellows and breathing bag with 0_2 flush and then turn ventilator ON.
- e. Set 0_2 flow to minimum, other gas flows to zero.
- f. Verify that during inspiration bellows deilvers appropriate tidal volume and that during expiration bellows fills completely.
- g. Set fresh gas flow to about 5 L/min.
- h. Verify that the ventilator bellows and simulated lungs fill and empty appropriately without sustained pressure at end expiration.
- i. Check for proper action of unidirectional valves.
- j. Exercise breathing circuit accessories to ensure proper function.
- k. Turn ventilator OFF and switch to manual ventilation (Bag/APL) mode.
- I. Ventilate manually and assure inflation and deflation of artificial lungs and appropriate feel of system resistance and compliance.
- m. Remove second breathing bag from Y-piece.

Monitors

13. Check, Calibrate and/or Set Alarm Limits of all Monitors

Capnometer Pulse Oximeter
Oxygen Analyzer Respiratory Volume Monitor (Spirometer)
Pressure Monitor with High and Low Airway Alarms

Final Position

14. Check Final Status of Machine
- a. Vaporizers off
- b. AFL valve open
- c. Selector switch to "Bag"
- d. All flowmeters to zero
- e. Patient suction level adequate
- f. Breathing system ready to use

* If an anesthesia provider uses the same machine in successive cases, these steps need not be repeated or may be abbreviated after the initial checkout.

OPERATING ROOM & TABLETOP SETUP PROTOCOL
Nova Southeastern University AA Program

Anesthesia care providers must follow an OR setup protocol which is consistent for all clinical cases. Consistent setups minimize the potential for errors in practice. Every hospital follows a protocol which is unique to that institution. However, there are standards for setup which this program requires its students to uphold. The following protocol is consistent with the accepted standard of care for the majority of the hospitals that you will be rotating with. This protocol <u>WILL</u> be followed by <u>ALL</u> students at <u>ALL</u> rotations and may only be altered if the deviation is discussed with the anesthesia team members prior to actual room setup.

I. <u>Tabletop</u> - The following items should be present on the anesthesia machine tabletop for ALL cases (general anesthesia or MAC) unless specified otherwise.

A. Airway Equipment

1. an appropriately sized and functional **laryngoscope** blade and handle
2. one (1) appropriately sized **endotracheal (ETT) tube** with cuff checked for patency
   a. a **stylet** inserted into the ETT
   b. two (2) **ETTs** (one size below and one size above the chosen size) in the top drawer of the anesthesia machine (formula for pediatric OETT sizes==>[age(y) + 16]/4)
3. a **tongue depressor**
4. two (2) appropriately sized **oral airways**

B. Pharmaceuticals

1. Emergency Drugs
   a. syringe labeled ***atropine,*** <u>with drug drawn up</u>
      i. **1cc** syringe for a patient **under 1 year** of age
      ii. **3 cc** syringe for a patient **over 1 year** of age
   b. syringe labeled ***succinylcholine,*** <u>with drug drawn up</u>
      i. **1cc** syringe for a patient **under 1 year** of age
      ii. **3 cc** syringe for a patient **over 1 year** of age but **under 12 years** of age
      iii. **10 cc** syringe for a patient **over 12 years** of age
   c. one type of ***vasopressor*** <u>drawn up</u> (i.e. Phenylephrine, ephedrine)
   d. one 5cc syringe of ***2% lidocaine***

2. Induction Agents
   a. one (1) syringe of ***1% propofol*** <u>on table top</u>
      i. **one (20) cc** syringe for patients **over age 5 years**
      ii. **five (5) cc** syringe for patients **under age 5 years**

3. Maintenance Agents
    a. a vial of a ***non-depolarizing muscle relaxant*** (i.e. rocuronium, vecuronium, cis-atracurium, etc.) with labeled syringe <u>on tabletop but not drawn up</u> unless confirmed by staff
    b. a labeled syringe for ***midazolam***
    c. a labeled syringe for a ***narcotic*** (fentanyl, sufentanil, etc.)

II. <u>The Anesthesia Machine</u> - The following items on the machine should be checked prior to the first case of the day and prior to each subsequent case when appropriate.

A. The availability and integrity of patient **suction** must be verified.

B. Check **O_2 cylinder** supply.

C. Check **O_2 pipeline** supply.

D. Check **vaporizer** fill level.

E. Calibrate **O_2 monitor** sensor to room air.

F. Check **flowmeters**.

G. Install and check the integrity of an appropriately sized **breathing circuit**.

H. Place an appropriately sized **mask** on the circuit.

I. Verify that the **CO_2 absorber** (Baralime) is adequate.

J. Verify the integrity of the **APL (pop-off) valve** and the **scavenging system.**

K. Test the integrity of the **ventilator**.

L. Test the integrity of **monitors** (capnograph, pulse oximeter, ECG, temperature probe, etc.) and position probes and leads for quick placement on the patient.
    1. The use of a **precordial stethoscope** is an accepted standard of care and it should be used at all times for **intraoperative monitoring and transport to PACU** unless specifically directed otherwise by a member of the team.

III. <u>Intravenous Therapy</u> - The following items should be setup in the OR prior to the start of each case.

A. Intravenous Fluid
1. **Lactated Ringers** for most healthy patients
2. **0.9% saline** (normal saline) or **5% dextrose in water** (D5W) for renal failure patients
3. fluid choice for neonates as per attending anesthesiologist's request

B. Tubing Setup

1. **60 drop/cc** (minidrip) setup for patients **under ten** (10) years of age
2. **10 drop/cc** (maxidrip) setup for patients **over ten** (10) years of age
3. **stopcock** in-line if a moderate chance of blood transfusion exists
4. **anesthesia extension set** if using stopcock or if IV site is not easily accessible
5. the fluid should be completely **flushed** through the tubing

C. Supply Bin

1. A bin containing the following items should be stocked and in the room prior to the start of each case:
    a. at least two (2) of each appropriately sized **IV catheters**
    b. **1% lidocaine** in a one (1) or a three (3) cc syringe and a 26 g or smaller needle for local infiltration
    c. **4" x 4" gauze** sponges for clean up
    d. **tape**
    e. **alcohol** wipes
    f. **18 g needles** for skin hole
    g. **tourniquet**

The above list is considered <u>standard</u> and it should be followed exactly unless a change has been discussed with the anesthesia team members. Unauthorized deviation from this protocol will be considered <u>unacceptable</u> and will be managed accordingly.

CONSENT FOR ANESTHESIA SERVICES

I, _____ , acknowledge that my doctor has explained to me that I will have an operation, diagnostic or treatment procedure. My doctor has explained the risks of the procedure, advised me of alternative treatments and told me about the expected outcome and what could happen if my condition remains untreated. I also understand that anesthesia services are needed so that my doctor can perform the operation or procedure.

It has been explained to me that **all** forms of anesthesia involve some **risks** and no guarantees or promises can be made concerning the results of my procedure or treatment. Although rare, unexpected *severe complications* with anesthesia can occur and include the remote possibility of *infection, bleeding, drug reactions, blood clots, loss of sensation, loss of limb function, paralysis, stroke, brain damage, heart attack or death.* I understand that these risks apply to all forms of anesthesia and that additional or specific risks have been identified below as they may apply to a specific type of anesthesia. I understand that the type(s) of anesthesia service checked below will be used for my procedure and that the anesthetic technique to be used is determined by many factors including my physical condition, the type of procedure my doctor is to do, his or her preference, as well as my own desire. It has been explained to me that sometimes an anesthesia technique which involves the use of local anesthetics, with or without sedation, may not succeed completely and therefore another technique may have to be used including general anesthesia.

☐ General Anesthesia	Expected Result	Total unconscious state, possible placement of a tube into the windpipe.
	Technique	Drug injected into the bloodstream, breathed into the lungs, or by other routes.
	Risks	Mouth or throat pain, hoarseness, injury to mouth or teeth, awareness under anesthesia, injury to blood vessels, aspiration, pneumonia.
☐ Spinal or Epidural Analgesia/ Anesthesia ☐ With sedation ☐ Without sedation	Expected Result	Temporary decreased or loss of feeling and/or movement to lower part of the body.
	Technique	Drug injected through a needle/catheter placed either directly into the spinal canal or immediately outside the spinal canal.
	Risks	Headache, backache, buzzing in the ears, convulsions, infection, persistent weakness, numbness, residual pain, injury to blood vessels, "total spinal".
☐ Major / Minor Nerve Block ☐ With sedation ☐ Without sedation	Expected Result	Temporary loss of feeling and/or movement of a specific limb or area.
	Technique	Drug injected near nerves providing loss of sensation to the area of the operation.
	Risks	Infection, convulsions, weakness, persistent numbness, residual pain, injury to blood vessels.
☐ Intravenous Regional Anesthesia ☐ With sedation ☐ Without sedation	Expected Result	Temporary loss of feeling and/or movement of a limb.
	Technique	Drug injected into veins of arm or leg while using a tourniquet.
	Risks	Infection, convulsions, persistent numbness, residual pain, injury to blood vessels.
☐ Monitored Anesthesia Care (with sedation)	Expected Result	Reduced anxiety and pain, partial or total amnesia.
	Technique	Drug injected into the bloodstream, breathed into the lungs, or by other routes producing a semi-conscious state.
	Risks	An unconscious state, depressed breathing, injury to blood vessels.
☐ Monitored Anesthesia Care (without sedation)	Expected Result	Measurement of vital signs, availability of anesthesia provider for further intervention.
	Technique	None.
	Risks	Increased awareness, anxiety and/or discomfort.

I hereby consent to the anesthesia service checked above and authorize that it be administered by _____ or his/her associates, all of whom are credentialed to provide anesthesia services at this health facility. I also consent to an alternative type of anesthesia, if necessary, as deemed appropriate by them. I expressly desire the following considerations be observed (or write "none"):

_____

I certify and acknowledge that I have read this form or had it read to me, that I understand the risks, alternatives and expected results of the anesthesia service and that I had ample time to ask questions and to consider my decision.

PATIENT IDENTIFICATION

_____ _____
Patient's Signature *Date and Time*

_____ _____
Substitute's Signature *Relationship to Patient*

_____
Witness

Developed by the American Association of Nurse Anesthetists - 1991

FORM 3-1

ADVANCE HEALTH CARE DIRECTIVE

INSTRUCTIONS

Part 1 of this form lets you name another individual as agent to make health care decisions for you if you become incapable of making your own decisions, or if you want someone else to make those decisions for you now even though you are still capable. You may also name an alternate agent to act for you if your first choice is not willing, able, or reasonably available to make decisions for you.

Your agent may not be an operator or employee of a community care facility or a residential care facility where you are receiving care, or your supervising health care provider or an employee of the health care institution where you are receiving care, unless your agent is related to you or is a coworker.

Unless you state otherwise in this form, your agent will have the right to:

1. Consent or refuse consent to any care, treatment, service, or procedure to maintain, diagnose, or otherwise affect a physical or mental condition.
2. Select or discharge health care providers and institutions.
3. Approve or disapprove diagnostic tests, surgical procedures, and programs of medication.
4. Direct the provision, withholding, or withdrawal of artificial nutrition and hydration and all other forms of health care, including cardiopulmonary resuscitation.
5. Donate organs or tissues, authorize an autopsy, and direct disposition of remains.

However, your agent will not be able to commit you to a mental health facility, or consent to convulsive treatment, psychosurgery, sterilization or abortion for you.

Part 2 of this form lets you give specific instructions about any aspect of your health care, whether or not you appoint an agent. Choices are provided for you to express your wishes regarding the provision, withholding, or withdrawal of treatment to keep you alive, as well as the provision of pain relief. You also can add to the choices you have made or write down any additional wishes. If you are satisfied to allow your agent to determine what is best for you in making end-of-life decisions, you need not fill out Part 2 of this form.

Give a copy of the signed and completed form to your physician, to any other health care providers you may have, to any health care institution at which you are receiving care, and to any health care agents you have named. You should talk to the person you have named as agent to make sure that he or she understands your wishes and is willing to take the responsibility.

You have the right to revoke this advance health care directive or replace this form at any time.

PART 1 – POWER OF ATTORNEY FOR HEALTH CARE

DESIGNATION OF AGENT: I designate the following individual as my agent to make health care decisions for me:

Name of individual you choose as agent: _____

Address: _____

_____

Telephone: _____
(home phone) *(work phone)* *(cell/pager)*

OPTIONAL: If I revoke my agent's authority or if my agent is not willing, able, or reasonably available to make a health care decision for me, I designate as my first alternate agent:

Name of individual you choose as first alternate agent: _____

Address: _____

_____

Telephone: _____
(home phone) *(work phone)* *(cell/pager)*

OPTIONAL: If I revoke the authority of my agent and first alternate agent or if neither is willing, able, or reasonably available to make a health care decision for me, I designate as my second alternate agent:

Name of individual you choose as second alternate agent: _____

Address: _____

_____

Telephone: _____
(home phone) *(work phone)* *(cell/pager)*

AGENT'S AUTHORITY: My agent is authorized to make all health care decisions for me, including decisions to provide, withhold, or withdraw artificial nutrition and hydration and all other forms of health care to keep me alive, except as I state here:

_____

_____

_____

_____

(Add additional sheets if needed.)

WHEN AGENT'S AUTHORITY BECOMES EFFECTIVE: My agent's authority becomes effective when my primary physician determines that I am unable to make my own health care decisions. _____
(Initial here)

OR

My agent's authority to make health care decisions for me takes effect immediately. _____
(Initial here)

AGENT'S OBLIGATION: My agent shall make health care decisions for me in accordance with this power of attorney for health care, any instructions I give in Part 2 of this form, and my other wishes to the extent known to my agent. To the extent my wishes are unknown, my agent shall make health care decisions for me in accordance with what my agent determines to be in my best interest. In determining my best interest, my agent shall consider my personal values to the extent known to my agent.

***AGENT'S POSTDEATH AUTHORITY*:** My agent is authorized to make anatomical gifts, authorize an autopsy and direct disposition of my remains, except as I state here or in Part 3 of this form:

_____

_____

_____

(Add additional sheets if needed.)

NOMINATION OF CONSERVATOR: If a conservator of my person needs to be appointed for me by a court, I nominate the agent designated in this form. If that agent is not willing, able or reasonably available to act as conservator, I nominate the alternate agents whom I have named, in the order designated.

PART 2 – INSTRUCTIONS FOR HEALTH CARE

If you fill out this part of the form, you may strike any wording you do not want.

END-OF-LIFE DECISIONS: I direct that my health care providers and others involved in my care provide, withhold, or withdraw treatment in accordance with the choice I have marked below:

Choice *Not To* Prolong Life:

_____ *(Initial here)* I do not want my life to be prolonged if (1) I have an incurable and irreversible condition that will result in my death within a relatively short time, (2) I become unconscious and, to a reasonable degree of medical certainty, I will not regain consciousness, or (3) the likely risks and burdens of treatment would outweigh the expected benefits,

OR

Choice *To* Prolong Life:

_____ *(Initial here)* I want my life to be prolonged as long as possible within the limits of generally accepted health care standards.

RELIEF FROM PAIN: Except as I state in the following space, I direct that treatment for alleviation of pain or discomfort be provided at all times, even if it hastens my death:

_____

_____

(Add additional sheets if needed.)

OTHER WISHES: (If you do not agree with any of the optional choices above and wish to write your own, or if you wish to add to the instructions you have given above, you may do so here.) I direct that:

_____

_____

_____

_____

(Add additional sheets if needed.)

PART 3 – DONATION OF ORGANS AT DEATH (OPTIONAL)

I. Upon my death:

I give any needed organs, tissues, or parts _____
(Initial here)

OR

I give the following organs, tissues, or parts only: _____ _____
(Initial here)

II. If you wish to donate organs, tissues, or parts, you must complete II and III.

My gift is for the following purposes:

Transplant _____ Research _____
(Initial here) *(Initial here)*

Therapy _____ Education _____
(Initial here) *(Initial here)*

III. I understand that tissue banks work with both nonprofit and for-profit tissue processors and distributors. It is possible that donated skin may be used for cosmetic or reconstructive surgery purposes. It is possible that donated tissue may be used for transplants outside of the United States.

1. My donated skin may be used for cosmetic surgery purposes.

   Yes_____ No _____
   (Initial here) *(Initial here)*

2. My donated tissue may be used for applications outside of the United States.

   Yes_____ No _____
   (Initial here) *(Initial here)*

3. My donated tissue may be used by for-profit tissue processors and distributors:

Yes_____ No _____
(Initial here) *(Initial here)*

(Health and Safety Code Section 7158.3)

PART 4 – PRIMARY PHYSICIAN (OPTIONAL)

I designate the following physician as my primary physician:

Name of Physician: _____ Telephone: _____

Address: _____

_____

OPTIONAL: If the physician I have designated above is not willing, able, or reasonably available to act as my primary physician, I designate the following physician as my primary physician:

Name of Physician: _____ Telephone: _____

Address: _____

_____

PART 5 – SIGNATURE

The form must be signed by you and by two qualified witnesses, or acknowledged before a notary public.

***SIGNATURE*:** Sign and date the form here:

Date: _____

Name: _____ _____
(sign your name) *(print your name)*

Address: _____

_____

STATEMENT OF WITNESSES: I declare under penalty of perjury under the laws of California (1) that the individual who signed or acknowledged this advance health care directive is personally known to me, or that the individual's identity was proven to me by convincing evidence (2) that the individual signed or acknowledged this advance directive in my presence, 3) that the individual appears to be of sound mind and under no duress, fraud, or undue influence, (4) that I am not a person appointed as agent by this advance directive, and (5) that I am not the individual's health care provider, an employee of the individual's health care provider, the operator of a community care facility, an employee of an operator of a community care facility,

the operator of a residential care facility for the elderly, nor an employee of an operator of a residential care facility for the elderly.

FIRST WITNESS

Name: _____ Telephone: _____

Address: _____

_____

Signature of Witness: _____ Date: _____

SECOND WITNESS

Name: _____ Telephone: _____

Address: _____

_____

Signature of Witness: _____ Date: _____

ADDITIONAL STATEMENT OF WITNESSES: At least one of the above witnesses must also sign the following declaration:

I further declare under penalty of perjury under the laws of California that I am not related to the individual executing this advance health care directive by blood, marriage, or adoption, and to the best of my knowledge, I am not entitled to any part of the individual's estate upon his or her death under a will now existing or by operation of law.

Signature of Witness: _____

YOU MAY USE THIS CERTIFICATE OF ACKNOWLEDGMENT BEFORE A NOTARY PUBLIC INSTEAD OF THE STATEMENT OF WITNESSES.

State of California)
)
)

County of _____

On *(date)* _____ before me, *(here insert name and title of the officer)* _____
_____

personally appeared *(name(s) of signer(s))* _____,

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal. [Civil Code Section 1189]

Signature of Notary: _____ (Seal)

PART 6—SPECIAL WITNESS REQUIREMENT

If you are a patient in a skilled nursing facility, the patient advocate or ombudsman must sign the following statement:

STATEMENT OF PATIENT ADVOCATE OR OMBUDSMAN

I declare under penalty of perjury under the laws of California that I am a patient advocate or ombudsman as designated by the State Department of Aging and that I am serving as a witness as required by Section 4675 of the Probate Code.

Date: _____

Name: _____ _____
(sign your name) *(print your name)*

Address: _____

_____

FORM 3-1S

DIRECTIVA POR ANTICIPADO DE LA ATENCIÓN DE LA SALUD

INSTRUCCIONES

La Sección 1 de este formulario le permite nombrar a otro individuo como representante para que tome las decisiones de atención de la salud por usted en caso que llegue a ser incapaz de tomar sus propias decisiones o si usted quiere que alguien más tome esas decisiones por usted ahora aunque todavía siga siendo capaz. También puede nombrar a un representante suplente que actúe por usted si su primera elección no está dispuesta, no es capaz o no está razonablemente accesible para tomar decisiones por usted.

Su representante no puede ser un operador o empleado de un establecimiento de atención comunitaria y un establecimiento de atención residencial donde lo estén atendiendo, ni su proveedor de atención de la salud encargado de la supervisión o un empleado de la institución de atención de la salud donde usted esté recibiendo la misma, a menos que su representante esté emparentado con usted o sea compañero de trabajo.

A menos que indique lo contrario en este formulario, su representante tendrá el derecho de:

1. Prestar o negar el consentimiento a cualquier atención, tratamiento, servicio o procedimiento para mantener, diagnosticar o afectar de otro modo una enfermedad física o mental.
2. Seleccionar o rechazar proveedores e instituciones de atención de la salud.
3. Aprobar o desaprobar pruebas diagnósticas, procedimientos quirúrgicos y programas de medicamentos.
4. Dirigir el proveimiento, la negación o la retirada de nutrición e hidratación artificial y todas las demás formas de atención de la salud, incluyendo resucitación cardiopulmonar.
5. Donar órganos o tejidos, autorizar una autopsia y ordenar la disposición final de los restos.

Sin embargo, su representante no podrá internarlo en un establecimiento psiquiátrico ni dar su consentimiento para que usted sea sometido a tratamiento convulsivo, psicocirugía, esterilización o aborto.

La Sección 2 de este formulario le permite dar instrucciones específicas acerca de cualquier aspecto de su atención de la salud, ya sea que usted nombre un representante o no. Se proporcionan opciones para que usted exprese sus deseos acerca del proveimiento, la negación o la retirada del tratamiento para mantenerlo vivo, así como el proveimiento de alivio del dolor. También se proporciona espacio para que usted aumente las opciones que haya hecho o que anote cualesquier deseos adicionales. Si está conforme con dejar que su representante determine lo que sea mejor para usted al tomar decisiones relacionadas con el final de la vida, no es necesario que llene la Parte 2 de este formulario.

Entrégueles copias del formulario firmado y debidamente llenado a su médico, a cualesquier otros proveedores de atención de la salud que pueda tener, a cualquier institución de atención de la salud en la que lo estén atendiendo y a todos los representantes de atención de la salud que haya nombrado. Deberá hablar con la persona que haya nombrado como representante para asegurar que él o ella entienda sus deseos y esté dispuesta a asumir la responsabilidad.

Usted tiene derecho a revocar esta directiva por anticipado de la atención de la salud o a reemplazar este formulario en cualquier momento.

PARTE 1 – PODER NOTARIAL PARA ATENCIÓN DE LA SALUD

DESIGNACIÓN DEL REPRESENTANTE: Designo al siguiente individuo como mi representante para que tome las decisiones de atención de la salud por mí:

Nombre del individuo que usted elija como representante _____

Dirección: _____

_____

Teléfono: _____
(en casa) *(teléfono en el trabajo)* *teléfono celular / localizador*

OPCIONAL: Si revoco la autoridad de mi representante o si mi representante no está dispuesto, no es capaz o no está razonablemente accesible para tomar una decisión de atención de la salud por mí, designo como mi primer representante suplente a:

Nombre de la persona que usted elige como primera alternativa: _____

Dirección: _____

_____

Teléfono: _____
(en casa) *(teléfono en el trabajo)* *teléfono celular / localizador*

OPCIONAL: Si revoco la autoridad de mi representante y mi primer representante suplente o si ninguno de los dos está dispuesto, es capaz o está razonablemente accesible para tomar una decisión de atención de la salud por mí, designo como mi segundo representante suplente a:

Nombre del individuo que usted elija como su segundo representante suplente _____

Dirección: _____

_____

Teléfono: _____
(en casa) *(teléfono en el trabajo)* *teléfono celular / localizador*

AUTORIDAD DEL REPRESENTANTE: Mi representante está autorizado para tomar todas las decisiones de atención de la salud por mí, incluyendo las decisiones para proveer, negar o retirar la nutrición e hidratación artificial y todas las demás formas de atención de la salud para mantenerme vivo, excepto como lo consigno aquí:

_____

_____

_____

(Si es necesario, agregue hojas adicionales.)

CUÁNDO ENTRA EN VIGENCIA LA AUTORIDAD DEL REPRESENTANTE: La autoridad de mi representante entra en vigencia cuando mi médico de atención primaria determine que soy incapaz de tomar mis propias decisiones de atención de la salud. _____
(Escriba sus iniciales aquí)

La autoridad de mi representante para tomar las decisiones de atención de la salud por mí entra en vigor inmediatamente. _____
(Escriba sus iniciales aqu)

OBLIGACIÓN DEL REPRESENTANTE: Mi representante tomará decisiones de atención de la salud por mí de acuerdo con este poder notarial para atención de la salud, todas las instrucciones que yo proporcione en la Parte 2 de este formulario y mis demás deseos en la medida conocida para mi representante. En la medida que mis deseos sean desconocidos, mi representante tomará decisiones de atención de la salud por mí de acuerdo con lo que mi representante determine que es en mi mejor interés. Para determinar mi mejor interés, mi representante deberá considerar mis valores personales en la medida conocida por el mismo.

AUTORIDAD DEL REPRESENTANTE DESPUÉS DE LA MUERTE: Mi representante está autorizado para hacer donaciones anatómicas, autorizar una autopsia y ordenar la disposición final de mis restos, excepto como yo lo consigno aquí o en la Parte 3 de este formulario:

_____

_____

_____

(Si es necesario, agregue hojas adicionales.)

NOMBRAMIENTO DE CURADOR: Si algún tribunal necesita nombrar a un curador de mi persona, propongo al representante designado en este formulario. Si dicho representante no está dispuesto, no es capaz o no está razonablemente disponible para actuar como curador, propongo a los representantes suplentes que he nombrado, en el orden designado.

PARTE 2 – INSTRUCCIONES PARA LA ATENCIÓN DE LA SALUD

Si usted llena esta parte del formulario, podrá tachar cualquier texto que no quiera.

DECISIONES DEL FINAL DE LA VIDA: Ordeno que mis proveedores de atención de la salud y otros que participen en mi atención provean, nieguen o retiren el tratamiento de acuerdo con la elección que yo haya marcado abajo:

Elección de no prolongar la vida

_____ *(Inicial aquí)* No quiero que mi vida sea prolongada si (1) tengo una enfermedad incurable e irreversible que resulte en mi muerte dentro de un periodo relativamente corto, (2) pierdo el conocimiento y, con un grado razonable de certidumbre médica, no lo recuperaré o (3) los riesgos y cargas probables del tratamiento serían más mayores que los beneficios previstos,

O

Elección de prolongar la vida

_____ *(Inicial aquí)* Quiero que mi vida sea prolongada tanto como sea posible dentro de los límites de las normas de atención de la salud generalmente aceptadas.

ALIVIO DEL DOLOR: Excepto como lo consigno en el siguiente espacio, ordeno que se me proporcione en todo momento tratamiento para el alivio del dolor o las molestias, aunque acelere mi muerte:

(Si es necesario, agregue hojas adicionales).

OTROS DESEOS: (Si usted no está de acuerdo con alguna de las elecciones opcionales que aparecen arriba y desea anotar las suyas propias, o si desea aumentar las instrucciones que ha proporcionado arriba, puede hacerlo aquí). Ordeno que:

_____

_____

_____

_____

(Si es necesario, agregue hojas adicionales.)

PARTE 3 – DONACIÓN DE ÓRGANOS DESPUÉS DE LA MUERTE (OPCIONAL)

I. Después de mi muerte

Dono todos los órganos, tejidos o partes necesarios, _____
(Escriba sus iniciales aquí)

O

Dono solamente los siguientes órganos, tejidos o partes. _____
(Escriba sus iniciales aquí)

II. Si usted desea donar a órganos, tejidos o partes, usted debe completar II y III

Mi donación es para los siguientes propósitos (tache cualquiera de los siguientes que usted no desee):

Trasplante _____ *(Escriba sus iniciales aquí)*

Investigación _____ *(Escriba sus iniciales aquí)*

Terapia _____ *(Escriba sus iniciales aquí)*

Educación _____ *(Escriba sus iniciales aquí)*

III. Entiendo que los bancos de tejidos trabajan con procesadores y distribuidores de tejidos tanto con fines de lucro como sin fines de lucro. Es posible que la donación de piel se use para fines cosméticos o de cirugía reconstructiva. Es posible que la donación de tejido se use para trasplantes fuera de los Estados Unidos.

1. Mi donación de piel puede usarse con fines de cirugía cosmética.

   Sí _____ *(Inicial aquí)* No _____ *(Inicial aquí)*

2. Mi donación de tejido puede usarse para aplicaciones fuera de los Estados Unidos.

   Sí _____ *(Inicial aquí)* No _____ *(Inicial aquí)*

3. Mi donación de tejido puede ser usada por procesadores y distribuidores de tejidos con fines lucrativos:

Sí _____ *(Inicial aquí)* No _____ *(Inicial aquí)*

(Código de Salud y Seguridad, Sección 7158.3)

PARTE 4 – MEDICO DE ATENCIÓN PRIMARIA (OPCIONAL)

Designo al siguiente como mi médico de atención primaria:

Nombre del Médico: _____ Teléfono: _____

Dirección: _____

_____

OPCIONAL: Si el médico que he designado no está dispuesto, no es capaz o no está razonablemente accesible para actuar como mi médico de atención primaria, designo al siguiente para que desempeñe este papel:

Nombre del Médico: _____ Teléfono: _____

Dirección: _____

_____

PARTE 5 – FIRMA

El formulario debe ser firmado por usted y dos testigos calificados o certificado ante un notario público.

FIRMA: Firme y ponga aquí la fecha en el formulario:

Fecha: _____

Nombre: _____ _____
(ponga su firma) *(escriba su nombre con letra de molde)*

Dirección: _____

_____

DECLARACIÓN DE LOS TESTIGOS: Declaro bajo pena de perjurio conforme a las leyes de California (1) que el individuo que firmó o certificó esta directiva por anticipado de la atención de la salud es conocido personalmente para mí, o que la identidad del individuo me fue demostrada con evidencia convincente, (2) que el individuo firmó o certificó esta directiva por anticipado en mi presencia, (3) que el individuo parece encontrarse en buen estado mental y bajo ninguna presión, fraude o influencia indebida, (4) que no soy la persona designada como representante en esta directiva por anticipado y (5) que no soy el proveedor de atención de la salud del individuo,

un empleado del proveedor de atención de la salud del individuo, el operador de un establecimiento de atención comunitaria, un empleado de un operador de un establecimiento de atención comunitaria, el operador de un establecimiento de atención residencial para ancianos, ni un empleado de un operador de un establecimiento de atención residencial para personas de edad avanzada.

Nombre: _____ Teléfono: _____

Dirección: _____

_____

Firma del testigo: _____ Fecha: _____

SEGUNDO TESTIGO

Nombre: _____ Teléfono: _____

Dirección: _____

_____

Firma del testigo: _____ Fecha: _____

DECLARACIÓN ADICIONAL DE LOS TESTIGOS: Por lo menos uno de los testigos mencionados arriba también debe firmar la siguiente declaración:

Declaro además bajo pena de perjurio conforme a las leyes de California que no estoy emparentado por lazos sanguíneos, matrimonio o adopción con el individuo que formaliza esta directiva por anticipado de la atención de la salud, y que a mi leal saber y entender, no tengo derecho a parte alguna del caudal hereditario del individuo después de su muerte bajo un testamento actualmente existente o por ministerio de ley.

Firma del testigo: _____

Usted puede usar este certificado de confirmación ante notario público en vez de la declaración de testigos.

State of California)
)
)

County of _____

On *(date)* _____ before me, *(here insert name and title of the officer)* _____
_____

personally appeared *(name(s) of signer(s))* _____,

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal. [Civil Code Section 1189]

Signature of Notary: _____ (Seal)

PARTE 6 – REQUERIMIENTO DE TESTIGO ESPECIAL

Si usted es paciente en un establecimiento con servicio de enfermería especializada, el abogado o defensor cívico del paciente debe firmar la siguiente declaración:

DECLARACIÓN DEL ABOGADO O DEFENSOR CÍVICO DEL PACIENTE

Declaro bajo pena de perjurio conforme a las leyes de California que soy abogado o defensor cívico del paciente designado por el Departamento de la Senectud del Estado y que estoy sirviendo como testigo como lo estipula la Sección 4675 del Código Testamentario.

Fecha: _____

Nombre: _____ _____
(ponga su firma) *(escriba su nombre con letra de molde)*

Dirección: _____

_____

Living Will

DECLARATION

This declaration is made this _____ day of_____(month, year).

I, _____, being of sound mind, willfully and voluntarily make known my desires that my moment of death shall not be artificially postponed.

If at any time I should have an incurable and irreversible injury, disease, or illness judged to be a terminal condition by my attending physician who has personally examined me and has determined that my death is imminent except for death delaying procedures, I direct that such procedures which would only prolong the dying process be withheld or withdrawn, and that I be permitted to die naturally with only the administration of medication, sustenance, or the performance of any medical procedure deemed necessary by my attending physician to provide me with comfort care.

In the absence of my ability to give directions regarding the use of such death delaying procedures, it is my intention that this declaration shall be honored by my family and physician as the final expression of my legal right to refuse medical or surgical treatment and accept the consequences from such refusal.

Signed _____

City, County and State of Residence _____

The declarant is personally known to me and I believe him or her to be of sound mind. I saw the declarant sign the declaration in my presence (or the declarant acknowledged in my presence that he or she had signed the declaration) and I signed the declaration as a witness in the presence of the declarant. I did not sign the declarant's signature above for or at the direction of the declarant. At the date of this instrument, I am not entitled to any portion of the estate of the declarant according to the laws of intestate succession or, to the best of my knowledge and belief, under any will of declarant or other instrument taking effect at declarant's death, or directly financially responsible for declarant's medical care.

Witness _____

Witness _____

History
(Source: P.A. 85-1209.)
Annotations
Note. This section was Ill.Rev.Stat., Ch. 110 1/2, Para. 703.

Disclosure Statement for Medical Power of Attorney

Advance Directives Act (see §166.163, Health and Safety Code)

This is an important legal document.
Before signing this document, you should know these important facts:

Except to the extent you state otherwise, this document gives the person you name as your agent the authority to make any and all health care decisions for you in accordance with your wishes, including your religious and moral beliefs, when you are no longer capable of making them yourself. Because "health care" means any treatment, service or procedure to maintain, diagnose, or treat your physical or mental condition, your agent has the power to make a broad range of health care decisions for you. Your agent may consent, refuse to consent, or withdraw consent to medical treatment and may make decisions about withdrawing or withholding life-sustaining treatment. Your agent may not consent to voluntary inpatient mental health services, convulsive treatment, psychosurgery, or abortion. A physician must comply with your agent's instructions or allow you to be transferred to another physician.

Your agent's authority begins when your doctor certifies that you lack the competence to make health care decisions.

Your agent is obligated to follow your instructions when making decisions on your behalf. Unless you state otherwise, your agent has the same authority to make decisions about your health care as you would have had.

It is important that you discuss this document with your physician or other health care provider before you sign it to make sure that you understand the nature and range of decisions that may be made on your behalf. If you do not have a physician, you should talk with someone else who is knowledgeable about these issues and can answer your questions. You do not need a lawyer's assistance to complete this document, but if there is anything in this document that you do not understand, you should ask a lawyer to explain it to you.

The person you appoint as agent should be someone you know and trust. The person must be 18 years of age or older or a person under 18 years of age who has had the disabilities of minority removed. If you appoint your health or residential care provider (e.g., your physician or an employee of a home health agency, hospital, nursing home, or residential care home, other than a relative), that person has to choose between acting as your agent or as your health or residential care provider; the law does not permit a person to do both at the same time.

You should inform the person you appoint that you want the person to be your health care agent. You should discuss this document with your agent and your physician and give each a signed copy. You should indicate on the document itself the people and institutions who have signed copies. Your agent is not liable for health care decisions made in good faith on your behalf.

Even after you have signed this document, you have the right to make health care decisions for yourself as long as you are able to do so and treatment cannot be given to you or stopped over your objection. You have the right to revoke the authority granted to your agent by informing your agent or your health or residential care provider orally or in writing, by your execution of a subsequent medical power of attorney. Unless you state otherwise, your appointment of a spouse dissolves on divorce.

This document may not be changed or modified. If you want to make changes in the document, you must make an entirely new one.

You may wish to designate an alternate agent in the event that your agent is unwilling, unable, or ineligible to act as your agent. Any alternate agent you designate has the same authority to make health care decisions for you.

This Power of Attorney is not valid unless it is signed in the presence of two competent adult witnesses. The following persons may not act as ONE of the witnesses:

- the person you have designated as your agent.
- a person related to you by blood or marriage;
- a person entitled to any part of your estate after your death under a will or codicil executed by you or by operation of law;
- your attending physician;
- an employee of your attending physician;
- an employee of a health care facility in which you are a patient if the employee is providing direct patient care to you or is an officer, director, partner, or business office employee of a health care facility or of any parent organization of the health care facility; or
- a person who, at the time this power of attorney is executed, has a claim against any part of your estate after your death.

Medical Power Of Attorney

Advance Directives Act (see §166.164, Health and Safety Code)

Designation of Health Care Agent:

I, _____ (insert your name) appoint:

Name: _____

Address: _____

_____ Phone: _____

as my agent to make any and all health care decisions for me, except to the extent I state otherwise in this document. This medical power of attorney takes effect if I become unable to make my own health care decisions and this fact is certified in writing by my physician.

Limitations On The Decision Making Authority Of My Agent Are As Follows:

_____

_____

_____

_____

Designation of an Alternate Agent:

(You are not required to designate an alternate agent but you may do so. An alternate agent may make the same health care decisions as the designated agent if the designated agent is unable or unwilling to act as your agent. If the agent designated is your spouse, the designation is automatically revoked by law if your marriage is dissolved.)

If the person designated as my agent is unable or unwilling to make health care decisions for me, I designate the following person(s), to serve as my agent to make health care decisions for me as authorized by this document, who serve in the following order:

First Alternate Agent

Name: _____

Address: _____

_____ Phone: _____

Second Alternate Agent

Name: _____

Address: _____

_____ Phone: _____

The original of the document is kept at _____

_____

The following individuals or institutions have signed copies:

Name: _____

Address: _____

_____

Name: _____

Address: : _____

_____

(continued on reverse)

Duration

I understand that this power of attorney exists indefinitely from the date I execute this document unless I establish a shorter time or revoke the power of attorney. If I am unable to make health care decisions for myself when this power of attorney expires, the authority I have granted my agent continues to exist until the time I become able to make health care decisions for myself.

(If Applicable) This power of attorney ends on the following date: _____

Prior Designations Revoked

I revoke any prior medical power of attorney.

Acknowledgement of Disclosure Statement

I have been provided with a disclosure statement explaining the effect of this document. I have read and understand the information contained in this disclosure statement.

(You Must Date and Sign This Power of Attorney)

I sign my name to this medical power of attorney on _____ day of _____ (month, year) at

_____

(City and State)

_____

(Signature)

_____

(Print Name)

Statement of First Witness

I am not the person appointed as agent by this document. I am not related to the principal by blood or marriage. I would not be entitled to any portion of the principal's estate on the principal's death. I am not the attending physician of the principal or an employee of the attending physician. I have no claim against any portion of the principal's estate on the principal's death. Furthermore, if I am an employee of a health care facility in which the principal is a patient, I am not involved in providing direct patient care to the principal and am not an officer, director, partner, or business office employee of the health care facility or of any parent organization of the health care facility.

Signature: _____

Print Name: _____ Date: _____

Address: _____

_____

Signature of Second Witness

Signature: _____

Print Name: _____ Date: _____

Address: _____

_____

PCP: | **CC:**

HPI: (loc/rad, sev, char/qual, set/onst/dur, agg/allev, oth Sx, Tx, life affects, own assess)

Allergies/Anesthesia

Meds/OTC/Herbal

Problem List

DDx

PMH/FMH (Dx, how, when)

- A-Fib
- Anemia
- Arthritis
- Asthma
- Bronchitis
- CAD
- Cancer
- Cataracts
- CHF
- CNS
- COPD
- DJD
- DM I/II
- Emphysema
- Glaucoma
- Gout
- HD
- Hematologic
- Hepatitis
- HTN
- Hyperlipid
- Jaundice
- Kidney
- Leukemia
- Liver
- Melanoma
- Migraine/HA
- Seizures
- Stroke/TIA
- TB
- Ulcers
- Surgery/Hospital/Other

ROS ha fever chills

Wt gain Wt loss fatigue night sweats

Skin: rashes itching dryness

Head: bumps lesions injury

Eye: probs pain redness tearing diplopia

Ears: hearing tinnitus vetigo aches infect. dishcharge lesions

Sinus: colds rhinorhea itching bleeds loss of smell

Mouth: bleeding gums dentures sore tongue dry mouth sore throats hoarse

Neck: lumps goiter pain stiffness glands

Musc. pains stiffness backache

Resp: cough sputum hemop. wheezes pneumon. pleurisy past CXR

Cardiac: murm. CP palpit. dysp orthop noct. dysp edema past EKG

Vasc: leg cramps varicose vns lightheaded

Hemat: anemia bruising transfu rxn easy bleeding out of control bleed

GI: dysphag htburn loss of app abd pain naus/vom vom bld BMs const Diarr hemorr rect bld melena gas liver gallbld

Endo: thyr hot/cld intol sweat thirst hung

Neuro: faint blkout seiz wkness paraly numb tingl tremor

Psych: nerv anx tens modswin depr mem prob hurt slf/other

Uri: freq polyu noctu burn/pain bloodu urg decforce hesit dribbl incont infect stones

Male: hernia dischrg sores testipain masses ED STD/treat

Fx

Moth:

Fath:

Sibls:

Children:

Sx

Occupation

Enviro exposure

Travel

Caffeine

Tobacco

ETOH

Female: brst lumps pain/discom dischrg selfexam

age of men regul freq/dur

1st day of last amt bld bld b/w per

Dysmen pms age of meno

DES dischrg itch sores lumps

STD/tx #preg #birth #abort

complic birth cont pain int.

Sex: relations #part (1mo, 6, 1 yr)

Satisfy orgasm birth cont probs

Px **Inspect Palpate Percuss**

VS / / / /

Gen NAD Coop A&OX

HEENT: NCAT PERRLA EOMI

Ict hemmor nares pat. oral moist

Neck: suppl NT bruit JVD nodes

Chest: CTA

Cor: S1 S2 S3 S4 mumur:

heave thrill PMI:

Abd: NT masses BSX bruits

liver sz spleen sz AAA

Ext: PPP Edema (pt/npt) + color capr

Neuro: C2-C12 tch sns vib sens DTRs

babin cerebellar gait ROM strength

Other:

Folstein MMS

date day month season year	5
hospital floor city county state	5
apple charity tunnel **#trials___**	3
serial 7's X 5 or spell world backwards	5
recall 3 objects from above	3
name two objects (pen/watch)	2
Repeat "No ifs, ands, or buts"	1
3 stage command (right hand, fold, floor)	2
Con't on other side	3

>24 nl 15-24 mild-mod <15 impaired

Medicine History & Physical

Developed by S.A. Irwin, Ph.D., 2001

Fold

THE JOHNS HOPKINS HOSPITAL
PRE-OPERATIVE EVALUATION CENTER
Adult Screening Tool and History Form

addressograph plate

2-Hole 1/4 2 3/4 - 3-Hole 1/4 4 1/4

Admission Information

PATIENT INSTRUCTIONS:

This form helps the doctors and nurses plan your care. Please answer all the questions using a PEN. Indicate with a check mark or write your answer in the space provided. Bring the form with you and/or complete on the day of your admission. The staff will complete shaded areas, after you are admitted.

Will you or the patient need help with either of the following:

☐ Foreign Language: Specify _____ ☐ Hearing Impaired

Date: _____ **Patient Name:** _____

Planned operation or procedure _____

Data Source: (name of person completing form) _____

Where will you be staying the night before your operation/procedure?

Name/location: _____ Phone/Cell Phone: _____

Have you had an unplanned stay in the hospital or been seen in the Emergency Department more than once in the last six months? No ☐ Yes ☐ (describe when and why) _____

Occupation: (if applicable) _____

Primary MD: Name _____ **Phone:** _____

Contact Info/ Advance Directive

Planned operation or procedure: _____

Contact person in case of an emergency: Name _____ Phone: _____

Who would you like to designate as your spokesperson? Name _____

Do you have an Advance Directive? No ☐ Yes ☐ (Provide or bring a copy with you)

(for example: Durable Power of Attorney for Health Care or Living Will)

Allergies

Are you allergic to any medicines? No ☐ Yes ☐ What drugs? _____

What kind of reaction? _____

Are you allergic to any foods? No ☐ Yes ☐ What foods? _____

What kind of reaction? _____

Are you allergic to latex or rubber products *(for example: balloons, condoms, paint)* **or foods linked to latex allergies** *(for example: kiwi, bananas, passion fruit, or avocados)***?**

No ☐ Yes ☐ Describe _____

Are you allergic to dyes used for x-rays? No ☐ Yes ☐ **or Iodine or Seafood?** No ☐ Yes ☐

Describe _____

Any other allergies? No ☐ Yes ☐ Describe _____

Pain

Do you have any ongoing pain problems? No ☐ Yes ☐ If yes, specify _____

If you have ongoing pain problems, how would you rate your average pain on a typical day using a scale of 0 to 10 (0 is no pain, 10 is the worst possible pain)? _____

Using the scale of 0 to 10 what do you expect your pain level to be after your operation? _____

Please continue to the next page.

Patient Name: _____ **History Number:** _____

Medication

Please list all medications you are currently taking ***(include any vitamins, herbs, or other supplements)***

Medication	How Much	How Often	Medication	How Much	How Often

Medications brought to hospital: No ☐ Yes: ☐ Sent home ☐ Secured on unit: _____

Wants to continue supplements during hospitalization? No ☐ Yes ☐ (Notify MD)

Violence/ Substance Use

We routinely screen all patients for abuse or violence in their lives.

Is this a problem for you? No ☐ Yes ☐ Would you like help with this today? No ☐ Yes: ☐

Do you use any drugs not listed above? No ☐ Yes: ☐ **What drugs?** _____

Do you smoke?No ☐ Have you smoked in the past? **No ☐ Yes:** ☐ Year you quit?

Yes: ☐ What do you smoke and how much? _____

Do you drink alcohol? No ☐ Yes ☐ What kind and how much each day?

Adaptive Devices

Do you wear or use any of the following: ☐ No ☐ Yes

☐ Removable Dentures ☐ Full ☐ Partial ☐ Upper ☐ Lower

☐ Hearing Aid ☐ Right ☐ Left ☐ Both

☐ Glasses ☐ Contact Lenses

☐ False Eye ☐ Right ☐ Left

☐ Prosthesis or adaptive equipment? What type _____

Check all that remain with patient

☐

☐

☐

☐

☐

Please continue to the next page

For Hospital Staff Only:

For validation by the Inpatient/ICU RN. If information is added to this form after the initial completion, initial the entry and indicate signature, title, and the date and time of the entry in the signature box below.

Initials	Signature/Title	Date/Time	Initials	Signature/Title	Date/Time

Patient Name: _____ **History Number:** _____

2-Hole 1/4 2 3/4 - 3-Hole 1/4 4 1/4

Medical History

PATIENTS PLEASE CONTINUE: Check all that apply to you now, or have applied to you in the past.

Describe your exercise tolerance

☐ Bedridden ☐ Able to walk with assistance ☐ Active (over 2 flights of steps or comparable with ease)
☐ Limited (less than 1 flight of steps)
☐ Moderate (1 - 2 flights of steps or comparable) ☐ Regular exercise

Heart Disease

☐ High Blood Pressure------ ☐ On medication for high blood pressure
☐ Chest Pain---------- ☐ With activity---------- ☐ At rest
☐ Chest Pain combined with: ☐ difficulty breathing ☐ sweatiness ☐ nauseated feeling
☐ Heart attack Date: _____ Give name of hospital where treated: _____
☐ History of heart attacks in your immediate family (parents, brothers, or sisters)
☐ Heart surgery or angioplasty
Date: _____ Give name of hospital where treated: _____
☐ Heart rhythm problem or palpitations ☐ Pacemaker Last Checked: _____
☐ Heart valve problem or congenital abnormality. Describe: _____

Special Heart Testing: (Please bring all NON-JOHNS HOPKINS medical reports with you.)

☐ Exercise stress test Date: _____ Hospital/Dr: _____
☐ Echocardiogram Date: _____ Hospital/Dr: _____
☐ Thallium Date: _____ Hospital/Dr: _____
☐ Cardiac catheterization Date: _____ Hospital/Dr: _____
☐ Electrocardiogram (EKG) Date: _____ Hospital/Dr: _____

Lung Disease

☐ Asthma/Wheezing ☐ Bronchitis ☐ Emphysema ☐ Cystic Fibrosis ☐ Sleep Apnea
☐ Lung Cancer ☐ Tuberculosis ☐ Other: _____

For the above lung problems, have you ----------(Check all that apply)

☐ been on steroids (prednisone, medrol, or cortisone) within past 2 years? When? _____
☐ been admitted to the hospital within past 2 years? When? _____
☐ been seen in an Emergency Room within past 2 years? When? _____
☐ been on antibiotics within past 6 months? When? _____
☐ had a chest x-ray within the last 6 months? **(Bring all NON-JOHNS HOPKINS reports with you)**
Where? _____ When? _____
☐ undergone breathing tests? **(Bring all NON-JOHNS HOPKINS reports with you)**
Where? _____ When? _____

Other Medical Conditions

☐ Kidney disease
☐ Dialysis ☐ Transplant
☐ Bladder/Urinary disorder (infections)
☐ Adrenal disease
☐ Stomach ulcers
☐ Diabetes
☐ Insulin ☐ Pills ☐ Diet Controlled
☐ Thyroid ☐ on Thyroid medication
☐ Fainting spells
☐ Neurologic disease
☐ Parkinson's Disease
☐ Seizures ☐ on medication for seizures
☐ StrokeWhen? _____
☐ Hiatal Hernia
☐ Unable to lie flat without heartburn

(Please continue to the next page)

Patient Name: _____ **History Number:** _____

Medical History (continued)

Other Medical Conditions (continued from previous page)

- ☐ Sickle Cell
- ☐ Excessive Bleeding (dental work, easy bruising)
  - Describe: _____
- ☐ Family History of Excessive Bleeding
- ☐ Blood Clots (Legs or Lungs) when: _____
- ☐ Blood Transfusion within last 3 months
- ☐ Neuromuscular Disease
  - Describe: _____
- ☐ Arthritis: ☐ Jaw ☐ Neck ☐ Other joints
- ☐ Liver disease
  - ☐ Hepatitis (yellow jaundice) When? _____
  - ☐ Other liver disease? _____
- ☐ Back Problems
  - ☐ Neck ☐ Thoracic ☐ Low back
  - ☐ Previous back injury
  - ☐ Previous back surgery
- ☐ Now taking blood thinners (coumadin, heparin)
- ☐ Taken aspirin or aspirin containing medications within the last week
- ☐ Taken anti-inflammatory medicines in the past 4 days (Motrin-like products)
- ☐ + HIV
- ☐ Cancer (type): _____
- ☐ Recent cold or flu (within 4 weeks)
- ☐ Any other illness (specify): _____

Anesthesia / Surgical History

Do you refuse blood transfusions? ☐ No ☐ Yes

Have you donated your own blood for THIS operation? ☐ No ☐ Yes
Date of Last Menstrual Period: _____ (date) ☐ Not Applicable

Have you ever had general anesthesia (put to sleep) for an operation before? ☐ No ☐ Yes

Have you ever had a spinal or epidural before? ☐ No ☐ Yes

Were there any problems with either of the above procedures? (Include drug reactions) ☐ No ☐ Yes

If yes, describe: _____

Please list all past operations or hospital stays.

Reason	Year	Check here if you were admitted to Intensive Care
		☐
		☐
		☐
		☐
		☐
		☐
		☐
		☐

Completed by: _____ **Date/Time:** _____
☐ Patient ☐ Other _____ (Relationship to Patient)

For Pre-Operative Evaluation Center Staff Only

_____ *Reviewer Signature/Title*

_____ *Date*

2-Hole 1/4 2 3/4 - 3-Hole 1/4 4 1/4

The Johns Hopkins Hospital

"HOME*" MEDICATION RECONCILIATION
(Reconciliation of Admission Orders)

Page ____ of ___

Addressograph Plate

Directions: List medications used by the patient prior to admission. * - "Home" means the location of the patient just prior to admission. Patients may complete the gray area, which will be reviewed on admission.

Allergies:

"HOME" MEDICATION LIST (CURRENT MEDS USED PRIOR TO ADMISSION)
(prescriptions, over-the-counter medications, herbals, vitamins, inhalers, eye drops, creams, ointments, parenteral nutrition etc.)

MEDICATION NAME	DOSE	ROUTE (e.g., by mouth or injection)	FREQUENCY (how often is it taken)

USE ADDITIONAL FORM(S) AS NEEDED TO LIST ALL "HOME" MEDICATIONS.

Source of Medication History (check all that apply)

- ☐ Direct observation of patient's medications
- ☐ Clinic note: date:_____
- ☐ Obtaining history was not feasible (e.g., patient not conscious)
- ☐ Patient provided list
- ☐ Family provided list
- ☐ Patient verbal recall
- ☐ Family verbal recall
- ☐ Pharmacy (name/phone number) _____
- ☐ Primary physician (name/phone number)_____
- ☐ Previous discharge paperwork (date: _____)
- ☐ Other _____

Signature of person reviewing above medication list:

Date: | Time:

"Home" medication list reconciled with admission orders.

(Authorized prescriber signature)

ID #: | Date: | Time:

RECORD "HOME" MEDICATION INFORMATION OBTAINED AFTER INITIAL RECONCILIATION ON REVERSE SIDE.

PLACE AS THE FIRST SHEET BEHIND THE "MEDICATION" MEDICAL RECORD TAB
DO NOT THIN FROM CHART

Form Number: 11/05

MODIFICATIONS TO INITIAL "HOME" MEDICATION LIST

DIRECTIONS: Record additional "home" medication information obtained after initial reconciliation has occurred and notify prescriber. Include over-the-counter (OTC) and herbal medications.

Source of Additional Medication History (check all that apply)		
☐ Directly observed patient medications ☐ Clinic note (date:_____)	☐ Patient provided list ☐ Family provided list ☐ Patient verbal recall ☐ Family verbal recall	☐ Pharmacy (name/phone number) _____ ☐ Primary physician (name/phone number)_____ ☐ Previous discharge paperwork (date: _____) ☐ Other _____

MEDICATION NAME	DOSE (do not use volume, e.g., mL)	ROUTE	FREQUENCY	Prescriber notified (check)	Recorder (date/time, initials)
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	
				☐	

Name of recorder	Initials	Name of recorder	Initials	Name of recorder	Initials

NSU ANESTHESIA RECORD

Procedure(s)

Date	OR #	Page of	Surgeon(s)

	START	STOP
Anesthesia		
Procedure		

Room Time IN: OUT:

PRE-PROCEDURE

Pt Identified: ☐ID Band ☐ Questioned ☐Guardian
☐ Chart reviewed ☐ Permit signed
☐ NPO since _____ ☐ Full stomach
☐ Patient reassessed prior to anesthesia & surgery; surgical site verified - Ready to proceed
☐ Peri-operative pain management discussed with patient / guardian, plan of care completed
Pre-Anesthetic state:
☐ Awake ☐ Anxious ☐ Uncooperative
☐ Calm ☐ Sedated ☐ Reduced LOC

PATIENT SAFETY

☐ Anesthesia machine # _____ checked
☐ Critical clinical alarms checked & activated
☐ Secured with safety belt ☐ Axillary roll
☐ Arm(s) secured on armboards: L R
☐ Arm(s) tucked: L R ☐ Arms < 90°
☐ Pressure points checked, padded, monitored
☐ Eye Care: ☐ Taped closed ☐ Ointment ☐ By surgeon ☐ Saline ☐ Goggles
☐ Prone - no pressure on orbits/nose/ears/genitals

MONITORS AND EQUIPMENT

Steth: ☐ Esophageal ☐Precordial ☐ Suprasternal
☐Non-Invasive B/P ☐ V lead ECG
☐Continuous ECG ☐ ST / Dysrhy. analysis
☐Pulse oximeter ☐ Nerve stimulator: ☐ Ulnar ☐ Tibial ☐ Facial ☐ _____
☐End tidal $C0_2$
☐Oxygen / $Fi0_2$ monitor
☐ET agent analyzer ☐ Fluid / Blood warmer
☐Temp:_____ ☐ Processed EEG
☐Body warmer ☐ Cell saver ☐ ICP
☐Airway humidifier: ☐ CPB ☐ TEE
☐ Evoked potential:
☐NG / OG tube _____
Foley: ☐ OR ☐ Ward ☐ Doppler: _____
☐Arterial line _____
☐C-line/CVP _____
☐PA line _____
☐IV(s) _____

ANESTHETIC TECHNIQUE

GA Induction: ☐Intravenous ☐ Pre-0_2 ☐ RSI
☐Cricoid pressure ☐Inhalation ☐ IM ☐ PR
GA Maintenance: ☐Inhalation ☐Inhalation / IV
☐GA / Regional combination ☐TIVA
☐Sedation & Analgesia / Monitored Anesthesia Care
Regional: Epidural - ☐ Thoracic ☐Lumbar ☐Caudal
☐SAB ☐Ankle ☐Femoral ☐Axillary ☐ Interscalene
☐CSE ☐ Bier ☐Continuous Spinal ☐ Cervical Plexus
☐Other:
Regional Technique: ☐ Position _____
☐See remarks ☐ Prep _____
☐Local _____ ☐ Site _____
☐Needle _____ ☐ Introducer
☐LA _____
☐Narcotic _____
☐Additive _____
☐Test dose Rx _____
☐Attempts x _____ Level _____
☐Catheter: ☐Test dose response: + −
L.O.R. _____ cm Skin _____ cm ☐Secured

	LOR	Heme	CSF	Pares
A	+	+	+	+
S	−	−	−	−

AIRWAY MANAGEMENT

☐Oral ETT ☐ RAE ☐L.T.A. ☐ Magill forceps
☐Nasal ETT ☐ LMA # _____
☐Stylet ☐ Classic/Unique ☐ Fastrach ☐ ProSeal
☐DL ☐ Flexible ☐ Other: _____
☐Tube size: _____ ☐ FOI ☐Awake
☐Blade: _____ ☐ Laser ETT ☐LIS
☐Attempts x _____ ☐ EMG ETT ☐Bougie
☐Grade: I II III IV blind ☐ Armored ETT ☐TTJV
☐Atraumatic intubation/LMA ☐ DLT _____
☐Secured at _____ cm ☐ Bronchial blocker system
☐ET $C0_2$ present _____
☐Breath sounds = bilateral ☐ Rigid FO laryngoscope
☐Cuffed - min occ pressure _____
☐Uncuffed ETT - leaks at _____ cm H20 ☐ Nerve blocks / Topical / Nebulizer - See Remarks
☐Oral airway ☐ Nasal airway ☐ Bite block Two
Mask vent: ☐ Easy ☐ Head-tilt ☐ Max jaw-thrust ☐ handed / person
Circuit: ☐ Circle system ☐ NRB ☐ Bain
☐Mask case ☐ Via tracheotomy / stoma
☐Nasal cannula ☐ Simple 0_2 mask ☐ _____

TIME:

AGENTS

☐ Des ☐ Iso ☐ Sev ☐ Hal (ET%)	
☐ N_20 ☐ Air (L/min)	
Oxygen (L/min)	
( )	
( )	
( )	
( )	
( )	
( )	
( )	
( )	
( )	

FLUIDS

OUTPUT

Urine (ml)	
EBL (ml)	
Gastric (ml)	

MONITORS

ECG	
% Oxygen Inspired ($Fi0_2$)	
0_2 Saturation ($Sa0_2$)	
End Tidal $C0_2$	
Temp: ☐C ☐F	

TOTALS

SYMBOLS

- ∨ / ∧ B/P CUFF PRESSURE
- ⊥ / T ARTERIAL LINE
- X MEAN ARTERIAL PRESSURE
- ● PULSE
- VENTILATION
- O / SV SPONTANEOUS
- Ø / AV ASSISTED
- ⊠ / CV CONTROLLED

PERI-OP MEDS | **TIME**

***Pre-procedure* Vital Signs**

Pulse	Resp
BP	
Temp	$Sa0_2$

200 180 160 140 120 100 80 60 40 20

180 150 120 100 80 50

100

TOURNIQUET
LOCATION:
mmHg:

VENT

Tidal Volume (ml)	
Respiratory Rate (bpm)	
Peak Pressure (cm H_20)	
☐PEEP ☐CPAP (cm H_20)	
Symbols for Remarks	
Position	

UP:
DOWN:
TOTAL TIME:

PROVIDER(S)

Remarks:

Patient Identification (*Addressograph Card*)

HISTORY

Chief Complaint: In patient's own words, the patients' main complaint or why they are having surgery.

- Indicate patient's understanding of medical condition and potential outcomes from surgery
- Question: *What brought you to the hospital today?*

History of Illness: Brief description of the course of the medical pathology for which the patient is presenting to the operating room

- Pertinent related history
    - Timing and duration of illness
    - Signs and symptoms
    - Severity
    - Associated and modifying factors
    - Course of disease
    - Treatments protocols thus far
- Question: *What are you having surgery for?*

Adult Illnesses: Concurrent medical illnesses that may or may not be related to the indication for surgery

- Examples:
    - Hypertension and CAD
    - Diabetes mellitus (DM)
    - Hepatitis or cirrhosis
    - Asthma or recent URI
    - Communicable diseases
    - Renal or thyroid disease
    - Pregnancy
- Question: *What major medical problems do you have?*

Surgical History: Indicates patient's tolerance of anesthesia and associated risks of surgery. This also gives the anesthetist an indication a base level of patient knowledge of what to except during the operative course, and the patient's understanding of what will be occurring in the operative suite

- Important component of surgical history:
    - Year
    - Surgical procedure
    - Type of anesthesia and any problems with anesthesia
        - Post-op sore throat or hoarseness
        - Post-op hemoptysis or hematemesis
        - PONV

        - Difficult or prolonged intubation
        - Unexpected intensive care admissions
        - Adverse reactions to anesthesia drugs
    - Complications from surgery

* Question: *Have you ever been put off to sleep for surgery before?*

Family History: Indicates any potential underlying (or 'silent') hereditary complications that may preexist in the surgical patient

- Important points to note:
    - Parents or young siblings who have died prematurely of CAD
    - FHx of trouble with anesthesia
        - Particularly a history of pseudocholinesterase deficiency or malignant hyperthermia
- Question: *Has anyone in your family ever had any problems with anesthesia?*

Drug Allergies: It is critical to decipher from the patient history whether the patient has a true allergy to a given agent, or merely an adverse side effect

- Important aspects to note:
    - Specific drug or food that caused reaction
    - Type of reaction
    - Severity of reaction
    - Known alternatives to agent
- Of particular interest are patients that report an allergy to adhesive tape or latex
- Question: *Are you allergic to any medications that you know of?*

Social History: Indicates daily activity, stress level, religious preferences, exposure to toxic agents, or language barriers to communication

- Important aspects to note:
    - Occupation, are there any toxic exposures
    - Smoking history
        - Note daily consumption and duration of exposure
        - 'Pack year': # of packs/day x # of years smoking
            - Ex: 1 PPD x 20 years = 20 pack years
        - Question: *Do you smoke? How much?*
    - Alcohol consumption
        - Note daily consumption and duration of exposure
        - Question: *Do you drink? How much?*
    - Illicit drug use
        - Note exact type, frequency of use, and last intake
        - Admission by patient may require explanation of risks of anesthesia with unknown drug use

        - Question: *Do you use any [illegal] drugs?*
    - Physical activity level
        - Question: *Are you able to walk up a flight of stairs or a block down the street without getting short of breath?*

Current Medications: Medication list gives a generalized indication of concurrent pathologies and treatment modalities. This should include all physician-prescribed medications, OTC drugs, vitamins, and/or herbal remedies

- Important aspects to note:
    - Names of drug
    - Indication for prescription
    - Frequency and dose
- Question: *Do you take any medicines or drugs on a regular basis?*

REVIEW OF SYSTEMS:

The initial review of symptoms should begin with observation of the patient. By simply looking at and interacting with the patient, several important characteristics vital to your assessment will become realized:

- General appearance
- Weight
- Age
- Relative socioeconomic status
- Sex
- Race
- Education level
- Level of consciousness

HEENT:

Head:	H/O headaches, dizziness, lightheadedness
Eyes:	Corrective lenses (glasses or contacts)
Ears:	Difficulty hearing, hearing aids
Nose:	Nosebleeds, sinus trouble, previous surgery or trauma
Dentition:	General dental problems o Poor dentition or use of prostheses
Throat:	Sore throats, history of hoarseness or change in voice quality, snoring, difficulty swallowing, any prior treatment for TMJ problems

Neck:

- History of any surgeries or trauma to head, neck, mouth, throat,
    - Note any stabilization methods in place (ie: collar, traction, halo, or c-spine radiology)
- History of tracheostomy

- History of laryngectomy
- Neck stiffness or pain
- Goiter
- Radiation to the neck
- Any pathology related to decreased cervical ROM

Respiratory:

- History of asthma or other breathing problems
    - Age of onset
    - Medications (esp. steroid administration)
    - Hospitalization or intubations in past
    - Time since last exacerbation and ER visits
- Emphysema, chronic bronchitis
    - Including medications and disease progression
- Recent pneumonia, acute bronchitis, or URI
- Tuberculosis (TB)
- Cough (acute, or chronic and if so, any changes)
- Sputum production (color, quantity, and any recent changes)

Cardiovascular:

- Chest pain, palpitations, shortness of breath, exercise tolerance, irregular heart arrhythmias, or valvular disorders
- Orthopnea, paroxysmal nocturnal dyspnea
- Edema, leg pain with walking
- Hypertension
    - Including medications and any changes in past 6 months
- History of Rheumatic fever or heart murmurs
- Myocardial Infarction (when, treatments, outcomes)
- History of cardiac surgery (ie: CABG, valve replacements, etc.)
- Last ECG
    - Patients over 50 years old should get an ECG prior to any anesthetic, and the ECG should be less than 30 days old

Gastrointestinal:

- History of gastroesophogeal reflux (GERD)
    - Including severity, medications daily and prn, current interval between episodes
    - Regurgiation after meals upon recumbency, what position do you sleep in or number of pillows used
- History of hiatal hernia
- Abdominal pain in relation to ingestion of fatty foods
- Liver disease
    - Jaundice
    - Any recent travel to endemic areas
    - Occupational exposure to toxins

    - History of hepatitis exposures and hospitalizations
- Abdominal surgeries such as gastric bypass
- Nausea, vomiting, diarrhea

Urinary:

- Kidney disease and/or dialysis
    - Last dialysis treatment
    - Note location of any AV fistulas or shunts, medications, daily urine production
- Possibility of UTI
    - Frequency, pain or burning with urination, urgency
- Kidney stones, incontinence

Female GU:

- Last menstrual period
- Possibility of being pregnant
    - A serum β-human chorionic gonadatropin (HCG) level should be obtained on any female of child-bearing age prior to receiving anesthesia

Hematologic:

- Bleeding problems (ie: hemophilia, von Willebrand's disease)
- Anemias (type or cause)
- Sickle cell anemia (disease or trait)
- History of blood transfusions, reactions to transfusions

Musculoskeletal:

- Muscular dystrophies or myotonic muscular disease
- Arthritis, rheumatoid and osteoarthritis
    - Think of both neck and other joints for positioning issues
- Other neuromuscular diseases (ie. myasthenia gravis)

Neurologic:

- Seizures, paralysis, numbness or loss of sensation
    - With seizure disorder, note last episode and any inciting agents
- Tremors or other involuntary movements
- Stroke, TIA
    - When, treatment or meds, timing of event

Endocrine:

- Thyroid disease
    - Hyper- or hypothyroid
    - Medications
    - Goiter

    - Treatment with radiation therapy
- Diabetes mellitus
    - Oral medications
    - Insulin use
    - Obtain preoperative blood sugar
    - Note medication regimen

Psychiatric:

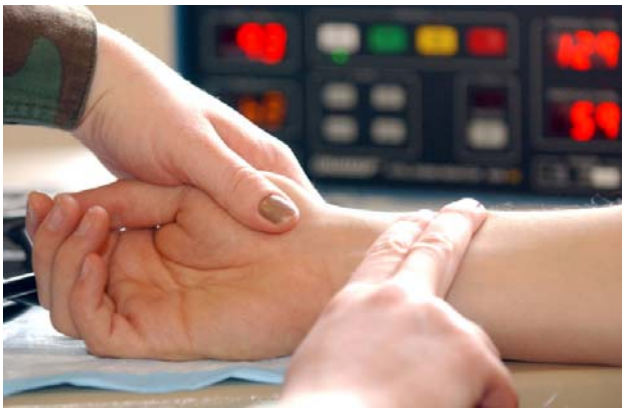
- Medications, tension, stress, mood, memory

PHYSICAL EXAM

General Survey: Emotional status (confusion, depression, anxiety, lability)
Posture, involuntary movements, immobility or paralysis
Peripheral cyanosis, audible wheeze, pallor
Accessory muscle use, general respiratory pattern, stridor
Diaphoresis, jaundice, signs of distress, clubbing
Voice quality

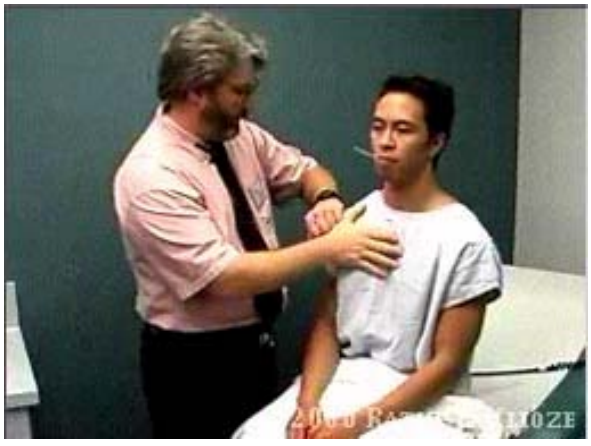
Vital Signs: Pulse, rate and rhythm

- Normal: 60-100 bpm
- Bradycardia: <60 bpm
- Tachycardia: >100 bpm



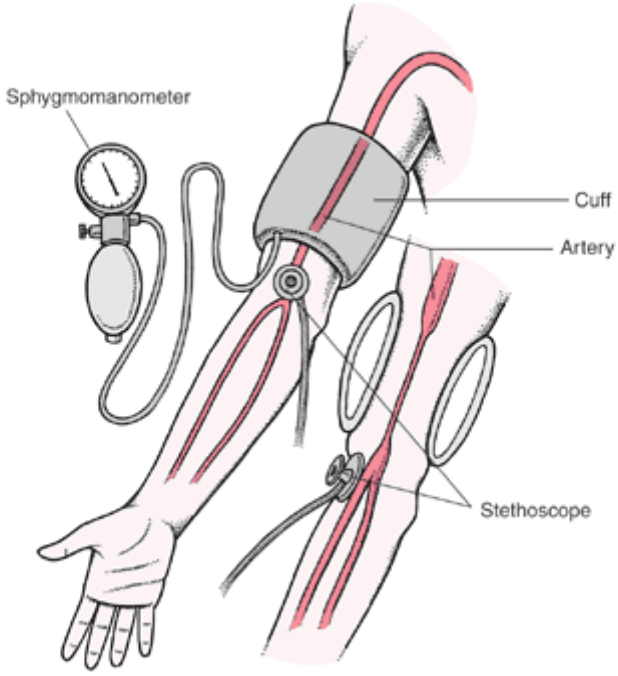
Respirations, rate and character

- Normal: 14-20 bpm
- Hyperpnea: deep breathing
- Bradypnea: <14 bpm
- Tachypnea: >20 bpm
- Apnea: lack of respirations



Blood pressure

- Normal: < 130/85 mmHg
- High normal: 130/85 – 139/89 mmHg
- Mild hypertension: 140/90 – 159/99 mmHg
- Moderate hypertension: 160/100 – 179/109 mmHg
- Severe hypertension: 180/110 – 209/119 mmHg
- Critical hypertension: >210/120 mmHg

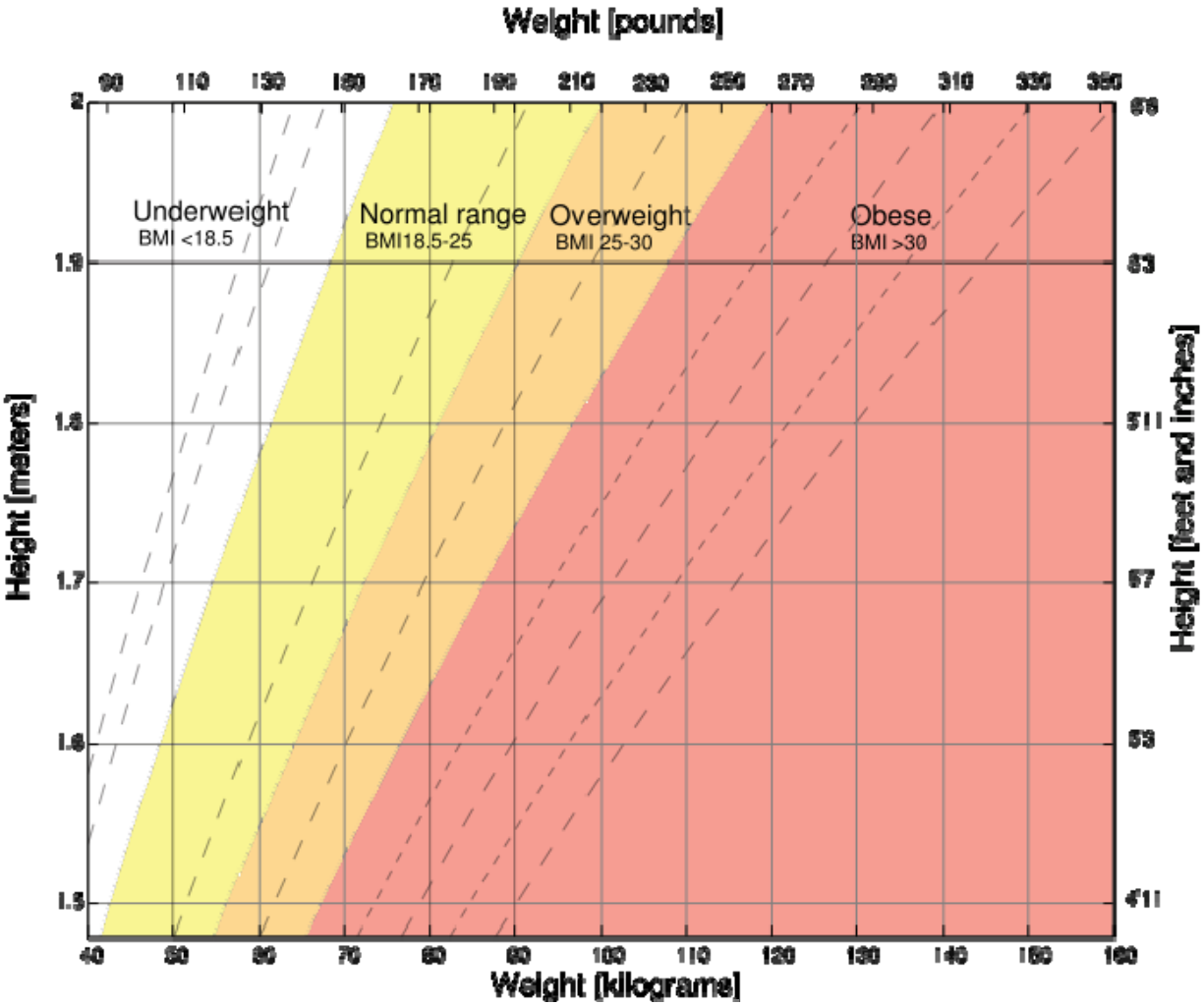


Height and weight

- Weight and height conversions
  - Kilograms (kg) = lbs. / 2.2 kg/lbs.
  - Centimeters (cm) = height (inches) x 2.5 cm/in.
- Ideal body weight

Men	Ideal BMI = 0.5 * kg/m^2 + 11.5
Women	Ideal BMI = 0.4 * kg/m^2 + 0.03*Age + 11

- Body Mass Index (BMI)
  - BMI = kg / m^2



Temperature

- Conversion of farenheit (°F) to celsius (°C)
    - °C = 9/5 (C°) + 32

C	F C	F	C	F C	F
-40	-40	-40	15.6	60	140
-23.3	-10	14	18.3	65	149
20.6	-5	23	21.1	70	158
-17.8	0	32	23.9	75	167
-15	5	41	26.7	80	176
-12.2	10	50	29.4	85	185
-9.4	15	59	32.2	90	194
-6.7	20	68	35	95	203
-3.9	25	77	37	98.6	209.5
-1.1	30	86	37.2	99	210.2
1.7	35	95	37.8	100	212
4.4	40	104	38.3	101	213.8
7.2	45	113	38.9	102	215.6
10	50	122	39.4	103	217.4
12.8	55	131	40	104	219.2

www.temperatureWorld.com

Skin:

Inspect: Color, petechiae, ecchymosis

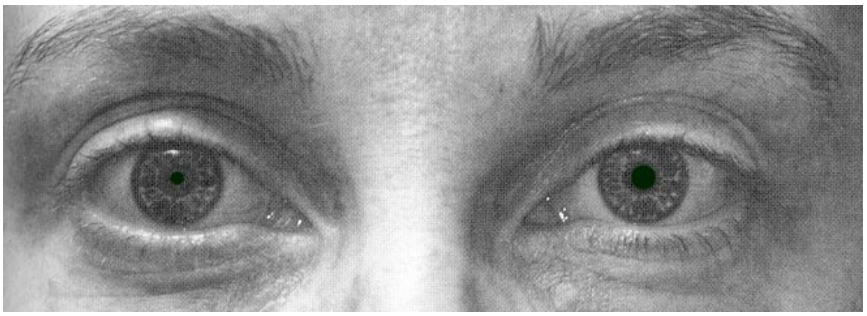
Head:

Inspect: Frontal and profile view to assess mandibular and maxillary size

Palpate: Maxillary and frontal sinuses for tenderness

Eyes:

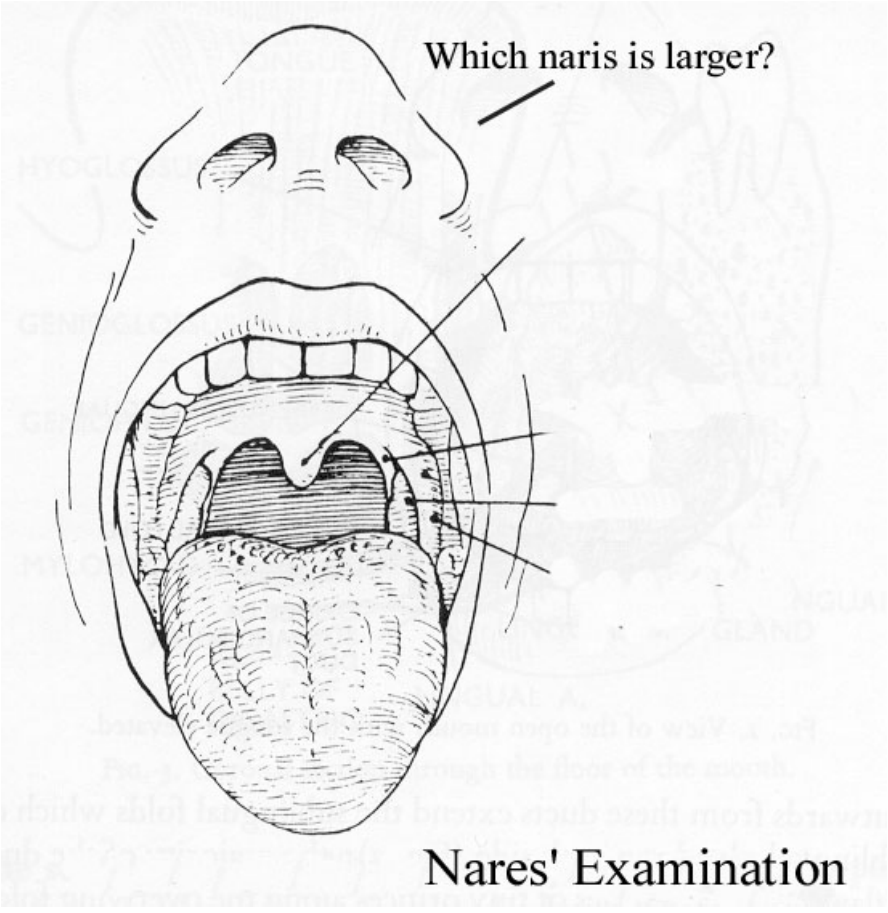
Inspect: Look for scleral icterus
Pupils for size, if they are equal and react to light
P.E.R.R.L.A.
* Pupils Equal, Round and Reactive to Light & Accommodation



Nose:

Inspect: External profile for symmetry and deformities
Nares for size and location
Evidence of epistaxis

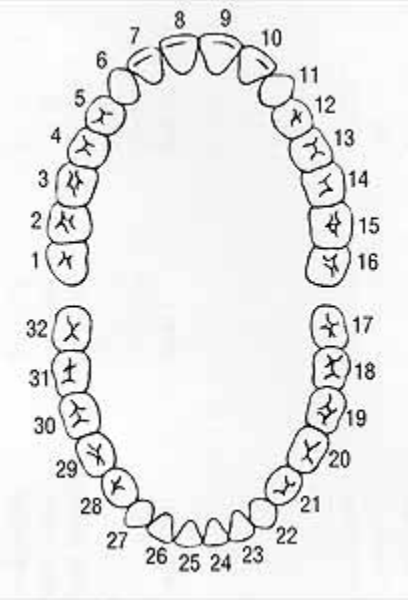
Palpate: Patency of nares



Mouth:

Inspect: Dentition:

- Oversized teeth, prostheses, poor dentition (ie. carious, cracked, broken, or missing teeth, especially #'s 7, 8, 9, 10, 23, 24, 25, 26)

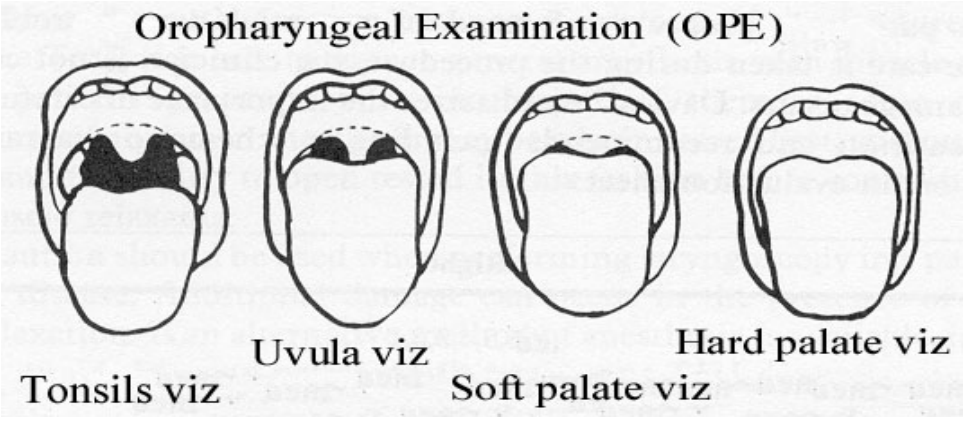


Tongue:

- Size, location, disease, midline with protrusion

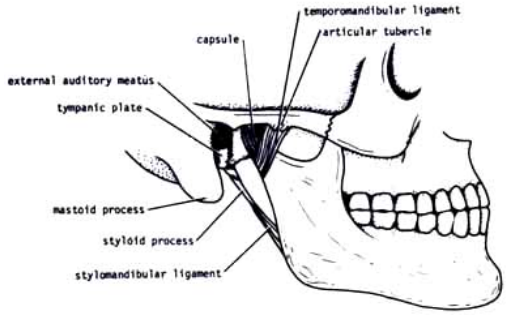
Soft palate

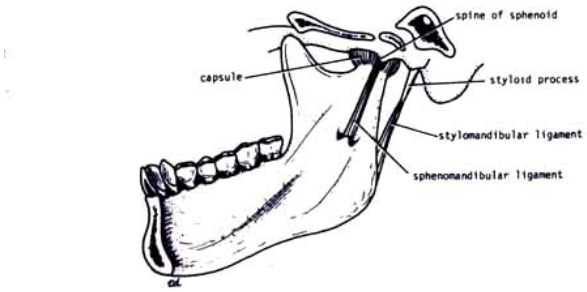
- Uvula, faucial pillars, palatine tonsils
- First attempt with patient actively opening mouth, then saying "Ahhh," then use tongue depressor and light
- Mallampati Classification system

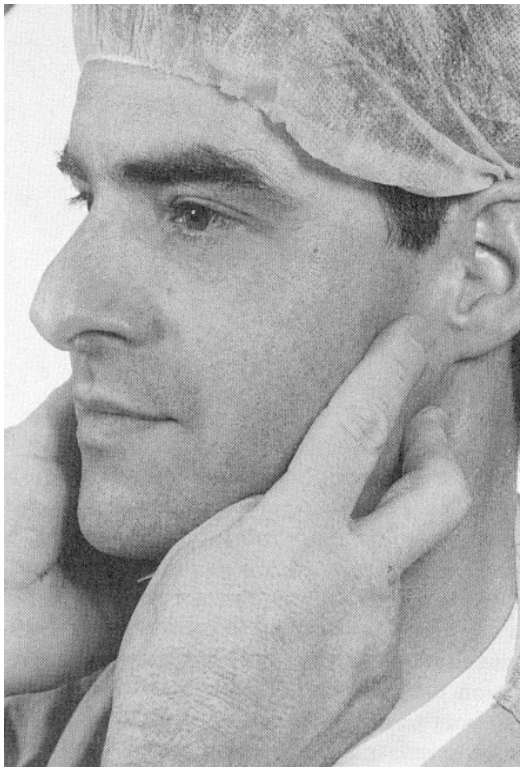


Joint mobility

- TMJ – joint movement and mobility (ie. rotation, sliding, other)

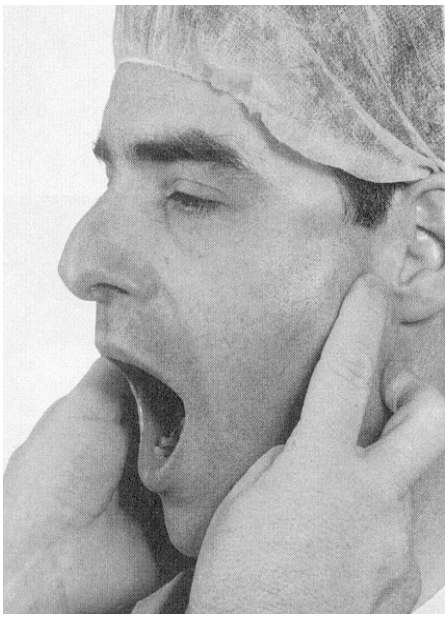






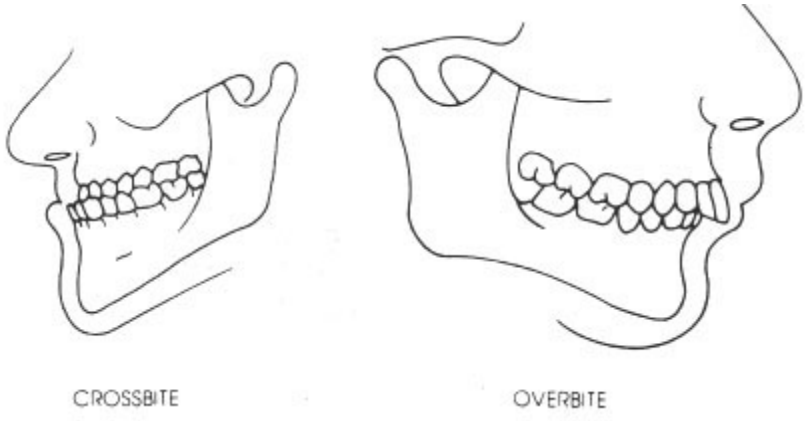
Mouth opening

- Estimate number of cm.



Maxilla/Mandible

- Over-jet, overbite, prognathism, retrognathism

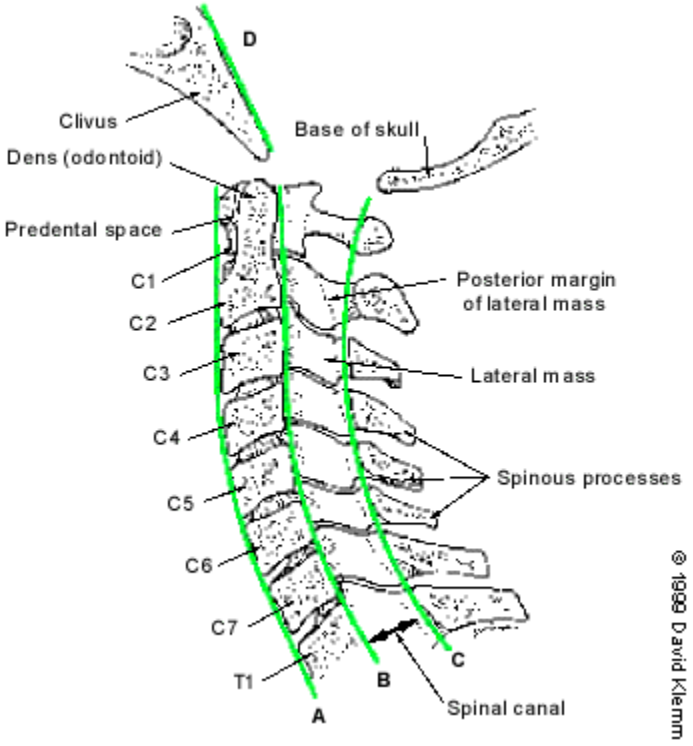


Palpate: * TMJ movement for cracking or crepitus,
* Establish if decreased range of motion is from pain or mechanical etiology

Neck:

Inspect: Cervical spine mobility and alignment

- Symmetry of cervical spine
- ROM – flexion, extension, rotation right and left, side-to-side right and left, any pain, parasthesias, motor weakness, mechanical limitation, no movement
- Atlanto-occipital joint – (patient sits straight and extends head while keeping cervical spine in neutral position)

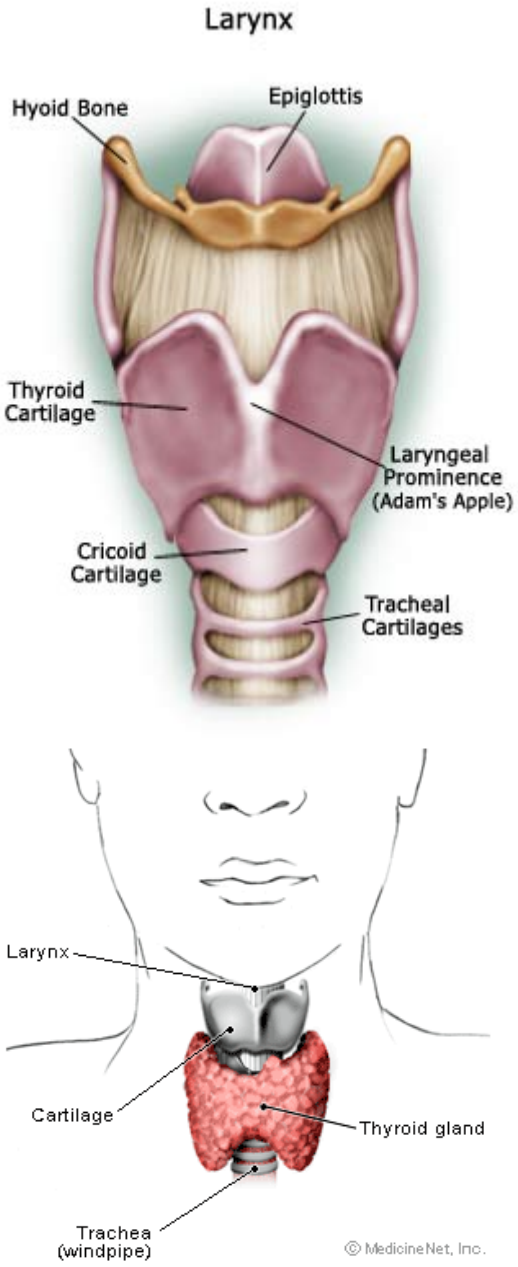


- Thyromental distance – (head fully extended and measure between bony point of mentum of the mandible and the thyroid notch)

- Position of trachea and larynx, scars from previous tracheostomy, deformities, erythema, edema, or induration
- JVD, visualize jugular venous pulsation

Palpate: Trachea and larynx

- Fixed with swallowing
- Hyoid bone including greater horns
- Thyroid notch and thyroid for consistency, size, masses, nodules, tenderness, manual movement of thyroid
- Crycothyroid membrane
- Cricoid cartilage



Respiratory:

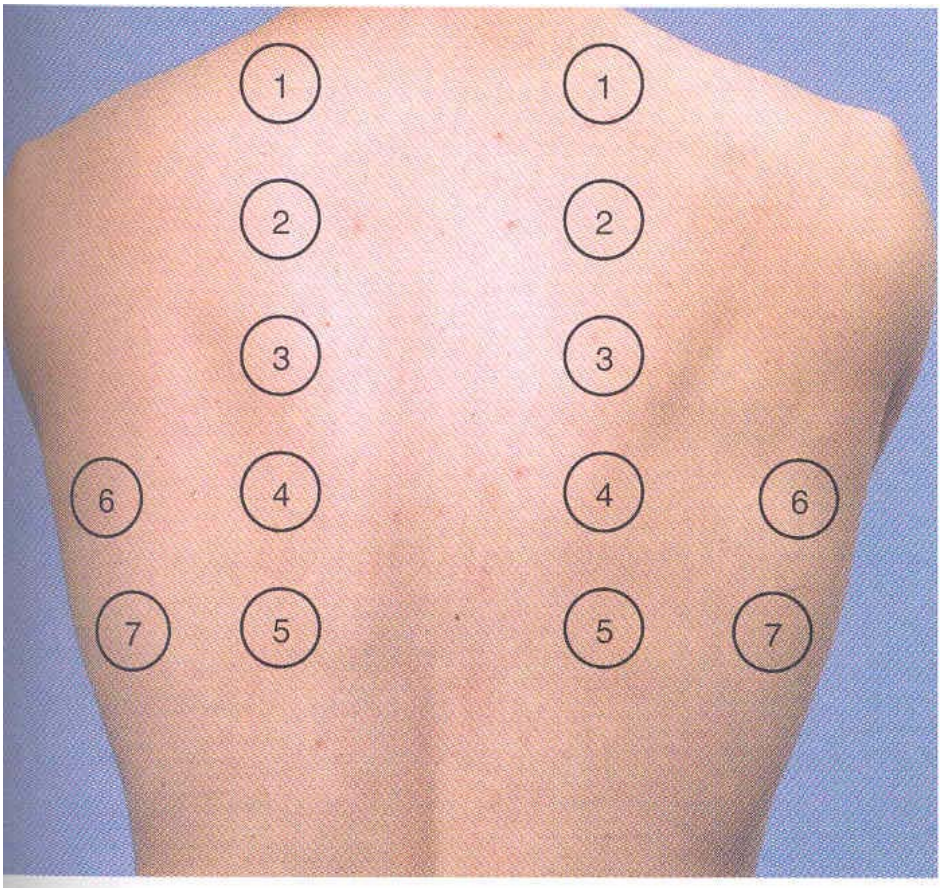
Inspect: Thorax, neck, and abdomen

- Position, pattern, symmetry, synchrony of patient's breathing
- Look for – barrel-shaped thorax, kyphoscoliosis, obesity, pectus excavation, pervious mastectomy, burn scars, scars from previous chest tube placement or thoracotomy
- Ability of patient to take deep breath and cough vigorously
- Suprasternal or intercostal retractions

Palpate: Tactile fremitus
Symmetry of chest excursion

Percuss: Diaphragmatic excursion

Auscultate: Lung fields, both anterior and posterior

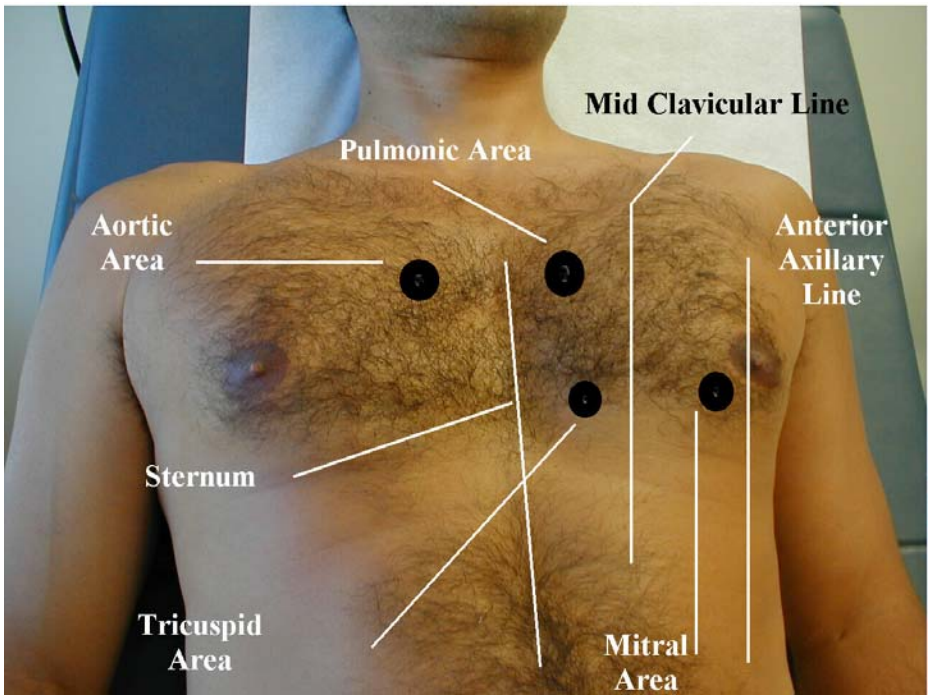


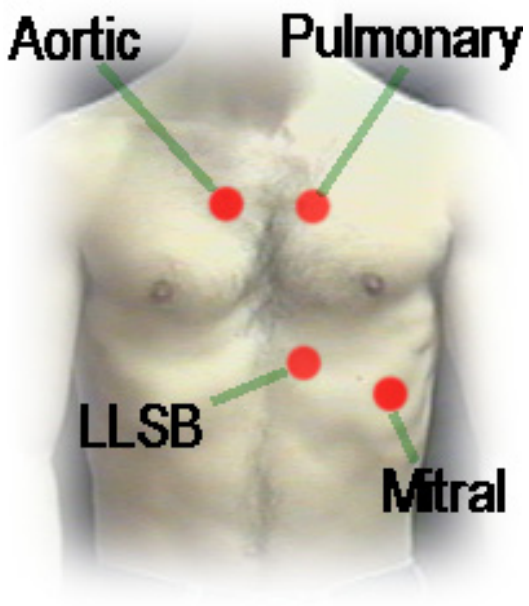
Cardiovascular:

Inspect: Anterior chest for lifts, heaves, PMI

Palpate: Precordium for thrill at sternal borders (first with fingertips and then with ball of hand)

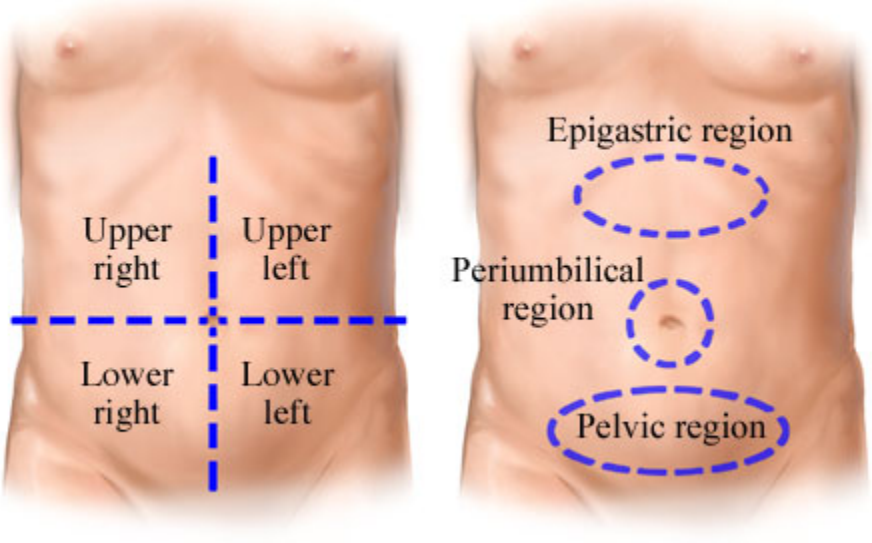
Auscultate: With both bell and diaphram in supine position
With diaphram sitting up and leaning forward and patient holding breath





Abdominal:

Inspect:	Surface for condition of skin, visible masses, scars Contour and fullness Aortic pulsation
Auscultate:	Bruits over aorta, renal arteries, iliac arteries Femoral pulse
Percuss:	Lightly over 4 quadrants (looking for distention) Over 11-12 interspaces in LMAL for spenomegaly



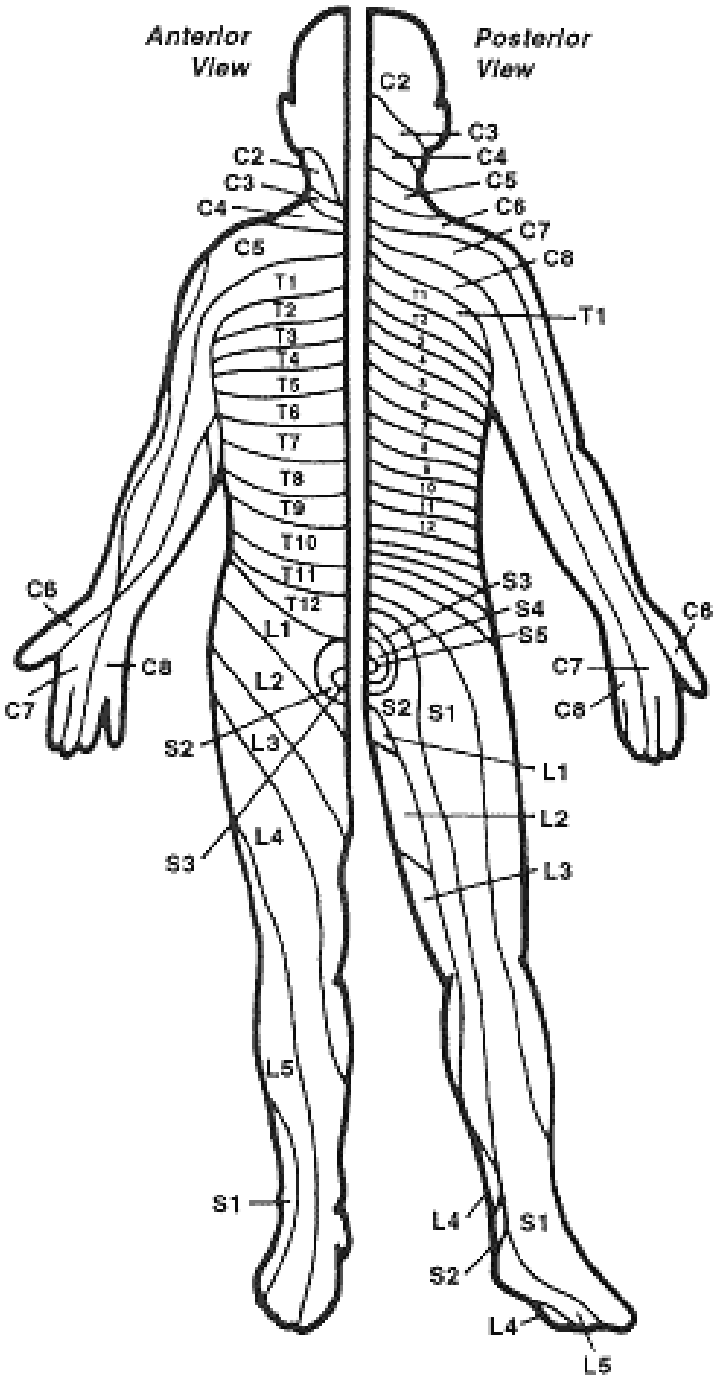
Palpate:	For liver edge, texture, tenderness For spleen (along left costal margin) Abdominal aorta, estimate size Flank or suprapubic tenderness Kidneys bilaterally Femoral pulses (after auscultation)

Musculoskeletal:

Inspect:	Extremity alignment, joint deformity, atrophy
Palpate:	Strength testing

Neurologic:

Mental status
Discrimination (ie. pinprick or temperature)
Lower and upper extremity weakness or sensory deficit
Sensory by dermatomes



Common Laboratory Values

CBC

Test	Normal value	Function	Significance
Hemoglobin	12-18 g/100 mL	Measures oxygen carrying capacity of blood	Low: hemorrhage, anemia High: polycythemia
Hematocrit	35%-50%	Measures relative volume of cells and plasma in blood	Low: hemorrhage, anemia High: polycythemia, dehydration
Red blood cell	4-6 million/mm^3	Measures oxygen-carrying capacity of blood	Low: hemorrhage, anemia High: polycythemia, heart disease, pulmonary disease
White blood cell Infant 4-7 y 8-18 y	 8,000-15,000/mm^3 6,000-15,000/mm^3 4,500-13,500/mm^3	Measures host defense against inflammatory agents	Low: aplastic anemia, drug toxicity, specific infections High: inflammation, trauma, toxicity, leukemia

Differential Count

Test	Normal value	Significance
Neutrophils	54%-62%	Increase in bacterial infections, hemorrhage, diabetic acidosis
Lymphocytes	25%-30%	Viral and bacterial infection, acute and chronic lymphocytic leukemia, antigen reaction
Eosinophils	1%-3%	Increase in parasitic and allergic conditions, blood dyscrasias, pernicious anemia
Basophils	1%	Increase in types of blood dyscrasias
Monocytes	0%-9%	Hodgkin's disease, lipid storage disease, recovery from severe infections, monocytic leukemia

Absolute Neutrophil Count (ANC)

Calculation	Normal value	Significance
$\frac{(\%\ \text{Polymorphonuclear Leukocytes} + \%\ \text{Bands}) \times \text{Total White Cell Count}}{100}$	>1500	<1000 Patient at increased risk for infection; defer elective dental care

Bleeding Screen

Test	Normal value	Function	Significance
Prothrombin time	1-18 sec	Measures extrinsic clotting factors	Prolonged in liver disease, impaired Vitamin K production, surgical trauma with blood loss
Partial thromboplastin time	By laboratory control	Measures intrinsic clotting of blood, congenital clotting disorders	Prolonged in hemophilia A,B, and C and Von Willebrand's disease
Platelets	140,000-340,000/mL	Measures clotting potential	Increased in polycythemia, leukemia, severe hemorrhage; decreased in thrombocytopenia purpura
Bleeding time	1-6 min	Measures quality of platelets	Prolonged in thrombocytopenia
International Normalized Ratio (INR)	Without anticoagulant therapy: 1 Anticoagulant therapy target range: 2-3	Measures extrinsic clotting function	Increased with anticoagulant therapy

Urinalysis

Test	Normal value	Function	Significance
Volume	1,000-2,000 mL/d		Increase in diabetes mellitus, chronic nephritis
Specific gravity	1.015-1.025	Measures the degree of tubular reabsorption and dehydration	Increase in diabetes mellitus; decrease in acute nephritis, diabetes insipidus, aldosteronism
pH	6-8	Reflects acidosis and alkalosis	Acidic: diabetes, acidosis, prolonged fever Alkaline: urinary tract infection, alkalosis
Casts	1-2 per high power field		Renal tubule degeneration occuring in cardiac failure, pregnancy, and hemoglobinuric-nephrosis

Electrolytes

Test	Normal value	Function	Significance
Sodium (Na)	135-147 mEq	Reflects acid-base balance	Increase in Cushing's syndrome
Potassium (K)	3.5-5 mEq		Increase in tissue breakdown
Bicarbonate (HCO_3)	24-30 mEq		
Chloride (Cl)	100-106 mEq		Increase in renal disease and hypertension

Introduction to Clinical Anesthesia

Normal Lab Values

* Reference values only; normal ranges will vary between labs and facilities *

Hematology

Hgb ♂ 13.5-17.5 ♀ 12.0-16.0 g/dl

Hct ♂ 39-49% ♀ 35-45%

RBC's ♂ 4.3-5.7 ♀ 3.8-5.1 $\cdot 10^8/\mu$ l

Plt 150-450$\cdot 10^3$ /μ l

WBC 4.5-11.0 $\cdot 10^3$ /μ l

- Neutrophils 57-67%
  Segs 54-62%
  Bands 3-5%
- Lymphocytes 23-33%
- Monocytes 3-7%
- Eosinophils 1-3%
- Basophils 0-1%

ESR ♂ < 15 ♀ < 20 mm/hr

Fe ♂ 65-175 ♀ 50-170 μ g/dl

Fe Sat ♂ 20-50 ♀ 15-50%

FDP <10 μ g/ml

Ferritin ♂ 20-250 ♀ 10-120 ng/ml

Fibrinogen 150-350 mg/dl

Haptoglobin 26-185 mg/dl

Hgb A_{1C} 5.0-7.5%

MCH 26-34 pg

MCHC 33-37%

MCV 80-100 fl

PT 10-14 sec

aPTT 20-40 sec

INR 0.9-1.2 sec

ACT 80-120 sec

Retics 0.5-1.5%

TIBC 250-400 μ g/dl

Transferrin 200-400 mg/dl

TT 13-20 sec

Chemistries

Na+ 135-145 mEq/l

K+ 3.5-5.3 mEq/l

Cl- 95-105 mEq/l

HCO3- 22-29 mEq/l

BUN 10-26 mg/dl

Creat 0.6-1.3 mg/dl

Glucose 70-115 mg/dl

Anion Gap 7-16 mEq/l

Osmolality 275-300 mOsm/kg

Ca++ total: 8.5-10.5 mg/dl

Ionized: 4.65-5.28 mg/dl

Mg+ 1.3-2.4 mEq/l

Phosphate 2.5-4.5 mg/dl

α FP <10 ng/mol

Albumin 3.5-5.5 g/dl

Immunoglobin: IgA 70-312 mg/dl
IgG 640-1350 mg/dl

IgM 56-350 mg/dl

Lactate 0.5-1.3 mEq/l

Protein (total) 6.0-8.0 g/dl

Uric Acid ♂ 3.0 - 7.4 ♀ 2.1 - 6.3 mg/dl

Zn 55-135 μ g/dl

Liver/Pancreas

ALT 0-40 IU/l

Alk Phos ♂ 38-126 ♀ 70-230 U/l

Ammonia 10-50 μ mol/l

AST 7-40 IU/l

Bilirubin(total) 0.2 – 1.0 mg/dl

Bilirubin(conj) 0 – 0.2 mg/dl

GGT 0-50 U/l

LDH 90-190 U/l

Amylase 25-125 U/l

C peptide 0.70 – 1.89 ng/ml

- Lipase 10-140

>60yo 18-180

Lipids

Tot. Cholest. <200 mg/dl

LDL <130 mg/dl

HDL ♂ >29 ♀ > 35 mg/dl

Triglyc. ♂ 40-160 ♀ 35-135 mg/dl

Other

CPK ♂ 38-174 ♀ 26-140 U/l

CPK MB <5%

Acid Phosphatase <0.8 IU/ml

B_{12} 100-700 pg/ml

CA-125 <35 U/ml

Cu^{+} ♂ 70-140 ♀ 80-155 μ g/dl

Folate 3-15 ng/ml

Pb <10 μ g/dl

PSA <4.0 ng/ml

Zn^{++} 70-150 μ g/dl

Blood Gasses

	Arterial	Venous
PH	**7.35-7.45**	**7.32-7.42**
pCO_2	**35-45**	**41-51**
pO_2	**80-100**	**25-40**
HCO_3	**21-27 mEq/l**	**24-28mEq/l**
O_2 sat	**95-99%**	**-**

Urine

Min Vol. 0.5-1.0 ml/kg/hr

Spec Gravity 1.015-1.030

Osmol. 600-1400 mOsm/kg

Creatinine ♂ 14-26 ♀ 11-20 mg/kg/day

- Cr Clearance ♂ 100-150 ♀ 90-140 ml/min

* rough estimate only, varies with BMI

Urea Nitrogen 12-20 g/day

Ca++ 100-300 mg/day

K+ 25-125 mEq/day

Na+ 40-220 mEz/day

PO4- 0.4-1.3 g/day

Uric acid 250-750 mg/day

Albumin 10-100 mg/day

Amylase 1-17 U/hr

Glucose <0.5 g/day

Protein 10-100 mg/day

CSF

- Pressure 60-180 mmH2O

WBC 0-5 /μ l

Protein 15-45 mg/dl

Glucose 40-80 mg/dl

Alkaline Phosphatase – ALP

Norms: Adult – 30-85 ImU/ml or 42-128 U/L (SI units)
2 years – 85-235 ImU/ml
2-8 yrs – 65-210 ImU/ml
9-15 yrs – 60-300 ImU/ml
16-21 yrs – 30-200 ImU/ml
Elderly – slightly higher than adult

ALP is used to detect and monitor disease of the liver or bone.

Explanation:

While ALP is an enzyme found in many tissues, the highest concentrations are found in the liver, biliary tract epithelium, and bone. Normally ALP is excreted in the bile. Enzyme levels of ALP are greatly increased with extrahepatic and intrahepatic obstructive biliary disease and cirrhosis. Lower levels of elevation are seen in hepatic tumors, hepatoxic drugs, and hepatitis.

There are a couple of ways to distinguish whether the elevation of the total ALP is from bone or liver disease. The first is to look at isoenzymes. ALP1 would be high when the source of the elevated ALP is from the liver. ALP2 would be higher if bone was the source of total ALP elevation. Another way would be to simultaneously test for 5'-nucleotidase. If total ALP and 5'nucleotidase are both elevated, the disease is in the liver. If 5'-nucleotidase is normal, the disease is in the bone.

Clinical Significance: (Liver causes)

Increased levels
- Primary cirrhosis
- Intrahepatic or extrahepatic biliary obstruction
- Primary or metastatic liver tumor
- Intestinal ischemia or infarction

Decreased levels
- Hypophosphatemia
- Malnutrition
- Pernicious anemia
- Scurvy (Vit C deficiency)

Amylase

Norms: Adult – 56-190 IU/L, 80-150 Somogyi units/dl, or 25-125 U/L (SI units)
Newborn – 6-65 U/L
Values me be slightly increased during normal pregnancy and in elderly

This test is used to detect and monitor the clinical course of pancreatitis.

Explanation:

Amylase is normally secreted by acinar cells in the pancreas and then moves through the pancreatic duct and into the duodenum. Amylase aids in the catabolism of carbohydrates to their component simple sugars. If there is damage to the acinar cells or obstruction of pancreatic duct flow, amylase is poured into the intrapancreatic lymph system and into the free peritoneum. There, amylase is picked up by the blood vessels draining the free peritoneum and lymph system. Amylase is rapidly cleared by the kidney and serum levels can return to normal in 48 to 72 hours if the insult does not persist.

Amylase is not specific for the pancreas. Other reasons amylase may be elevated include bowel perforation, penetrating peptic ulcer into the pancreas, duodenal obstruction, ectopic pregnancy, diabetic ketoacidosis and parotiditis (mumps) because of amylase in the salivary glands.

Patients with chronic pancreatic disorders that have resulted in destruction of pancreatic cells may not have elevated amylase because it is not being secreted as it normally would.

Clinical Significance:

Increased levels
- Acute pancreatitis
- Chronic relapsing pancreatitis
- Penetrating peptic ulcer into the pancreas
- GI disease
- Acute cholecystitis

Aspartate Aminotransferase – AST (formerly SGOT)
Alanine Aminotransferase – ALT (formerly SGPT)

AST Norms: 0-5 days – 35-140
< 3 yrs – 15-60
3-6 yrs – 15-50
6-12 yrs – 10-50
12-18 yrs – 10-40
Adult – 5-40 IU/L
Adult – 8-20 U/L (SI units)
Females – slightly higher than males
Elderly – slightly higher than adults

ALT Norms: Adult/Child – 5-35 IU/L or 8-20 U/L (SI units)
Values may be higher in men and in African Americans.
Elderly – slightly higher than adult
Infant – may be twice as high as adult

Explanation:

Both are enzymes found in many tissues of the body such as heart, liver, and skeletal muscle. Increases in these enzymes indicate cellular injury because as cells are injured these enzymes are released into the bloodstream. AST levels can rise to 10 or 20 times the normal level in extrahepatic obstruction (e.g., gallstones) or acute hepatitis, respectively. In cirrhotic patients the level of AST elevation will depend on the amount of active inflammation. Most ALT elevations are due to hepatocellular dysfuntion. The AST/ALT ratio is usually greater than 1 in patients with alcoholic cirrhosis, liver congestion, and metastatic tumor of the liver. Ratios of less than 1 may be seen in acute hepatitis, viral hepatitis, or infectious mononucleosis. Ratio is less accurate if AST exceeds 10 times normal.

Clinical Significance: *(these are just liver considerations – there are others)*

Increased AST when evaluating for liver disease
- Hepatitis
- Hepatic cirrhosis
- Drug-induced liver injury
- Hepatic mets
- Hepatic necrosis
- Hepatic surgery
- Infectious mononucleosis with hepatitis
- Hepatic infiltrative process

Increase ALT – Significant increase
- Hepatitis
- Hepatic necrosis

- Hepatic ischemia

Increased ALT – Moderate increase

- Cirrhosis
- Cholestasis
- Hepatic tumor
- Hepatotoxic drugs
- Obstructive jaundice

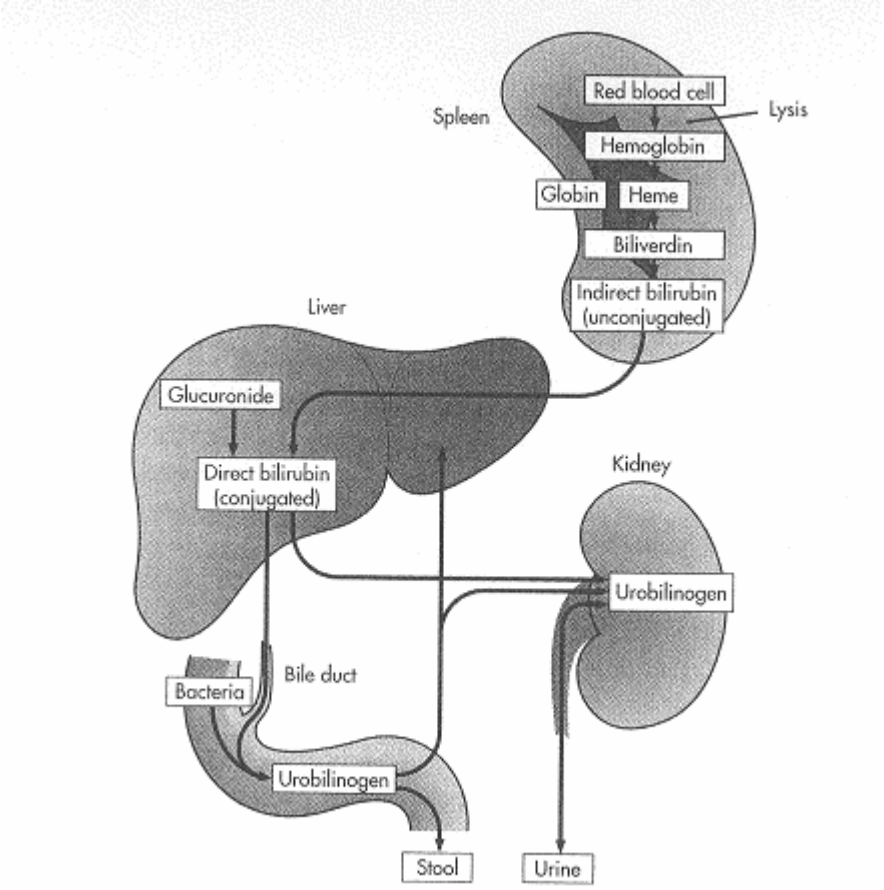
Increase ALT – Mild increase

- Pancreatitis
- Infectious mononucleosis

Bilirubin

Norms: Total Bilirubin 0.1-1.0 mg/dl or 5.1-17.0 mmol/L (SI units)
Indirect – 0.2-0.8 mg/dl or 3.4-12.0 mmol/L (SI units)
Direct – 0.1-0.3 mg/dl or 1.7-5.1 mmol/L (SI units)
Newborn total bilirubin – 1-12 mg/dl or 17.1-20.5 mmol/L (SI units)

This test evaluates liver function.



Explanation:

Bilirubin metabolism begins when RBCs are broken down, mostly in the spleen. Hemoglobin is broken down to heme and globin. The heme is then catabolized into bilverdin. This is then transformed into unconjugated bilirubin. The unconjugated bilirubin then goes to the liver and is conjugated with glucuronide to form conjugated bilirubin. The conjugated bilirubin is excreted from the liver cells and eventually through the common bile duct into the bowel. Some conjugated bilirubin in also excreted through the kidneys, in the urine.

Jaundice is the yellowish skin color change that accompanies abnormally high levels of serum bilirubin. It results from a dysfunction in either the metabolism or excretion of

bilirubin. If you know whether it is the unconjugated or conjugated bilirubin that is elevated, you can begin to clue in on the cause. Elevated unconjugated or indirect bilirubin generally indicates hepatocellular dysfunction. Elevated conjugated or direct bilirubin indicates something extrahepatic such as gallstones or tumors obstructing the bile ducts.

Clinical Significance:

Increased Conjugated Bilirubin
- Gallstones
- Extrahepatic duct obstruction
- Extensive liver mets
- Cholestasis
- Dubin-Johnson syndrome
- Roto's syndrome

Increased Unconjugated Bilirubin
- Transfusion reaction
- Sickle cell anemia
- Hemolytic anemia
- Pernicious anemia
- Hepatitis
- Cirrhosis
- Sepsis
- Neonatal hyperbilirubinemia

Blood Alcohol Levels

Norms: None

Critical Values: >300 mg/dl

This test measures alcohol levels in the blood. It is used to detect alcohol intoxication and overdose.

Explanation:

Blood alcohol levels of 50 to 100 mg/dl, or 0.05% to 0.10% weight/volume, may cause flushing, slowing of reflexes, and impaired visual activity. People with levels lower than 0.05% are not considered under the influence of alcohol. Levels over 0.10% are considered over the legal limit in most states and evidence of intoxication. Depression of the CNS occurs with levels over 100 mf/dl, or 0.10%, and fatalities can occur with levels over 400 mg/dl, or 0.40%.

Alcohol is rapidly absorbed from the stomach in about 1 hour. If the stomach is empty, absorption is faster. Alcohol is metabolized in the liver. A 70-kg person with normal liver function can metabolize about 15 mg of alcohol per hour.

Blood Urea Nitrogen – BUN

Norms: Adult – 10-20 mg/dl or 3.6-7.1 mmol/L (SI units)
Elderly – may be slightly higher than adult
Child – 5-18 mg/dl
Infant – 5-18 mg/dl
Newborn – 3-12 mg/dl
Cord – 21-40 mg/dl

Critical Values: >100 mg/dl (indicates serious impairment of renal function)

BUN serves as an index of the function of the liver, where urea is formed, and the kidneys, where the urea is excreted.

Explanation:

BUN measures the amount of urea nitrogen there is in the blood. Urea is formed in the liver as an end product of protein metabolism. It is then deposited into the bloodstream and excreted through the kidneys. If normal liver function exists, BUN is a measure of renal function and glomerular filtration rate.

BUN may not become elevated if renal disease is unilateral because the unaffected kidney can compensate for the diseased kidney. There are other causes of BUN elevation other than primary renal disease. Some of these include shock, dehydration, CHF, and excessive protein catabolism.

BUN is interpreted in conjunction with the creatinine test. Creatinine is actually a better indicator of renal disease.

Clinical Significance:

Increased levels
- Prerenal causes
  - Hypovolemia
  - Shock
  - Burns
  - Dehydration
  - CHF
  - MI
  - GI bleeding
  - Excessive protein catabolism
  - Starvation
  - Sepsis
- Renal causes
  - Renal disease

- Renal failure
- Nephrotoxic drugs

Postrenal causes

- Ureteral obstruction from stones, tumor, or congenital anomalies
- Bladder outlet obstruction from prostatic hypertrophy or cancer or bladder/urethral anomalies

Calcium (Total/Ionized Calcium)

Norms:

Age	mg/dl	mmol/L (SI Units)
	TOTAL CALCIUM	
<10 days	7.6-10.4	1.9-2.6
Umbilical	9.0-11.5	2.25-2.88
10 days-2 yrs	9.0-10.6	2.3-2.65
Child	8.8-10.8	2.2-2.7
Adult	9.0-10.5	2.25-2.75
	IONIZED CALCIUM	
Newborn	4.2-5.58	1.05-1.37
2 mons-18 yrs	4.80-5.52	1.20-1.38
Adult	4.5-5.6	1.05-1.30

Critical Values: Total Calcium - <6.0 or >13 mg/dl; or <1.5 or >3.25 mmol/L
Ionized Calcium - <2.2 or >7.0 mg/dl; or <0.78 or >1.58 mmol/L

Serum calcium levels are used to evaluate parathyroid function and calcium metabolism by directly measuring the total amount of calcium in the blood. They are also used to monitor patients with renal failure, renal trasplantation, hyperparathyroidism, and various malignancies. Serum calcium testing is also used to monitor calcium levels during and after large-volume blood transfusions.

Explanation:

Serum calcium is vital for muscle contractility, cardiac function, neural transmission, and blood clotting. When calcium blood levels decrease, parathyroid hormone (PTH) release is stimulated. This hormone acts on the reservoirs of calcium, bones and teeth, to release calcium into the blood. About half of the serum calcium exists in the blood in its free (ionized) form and then about half exists in its protein-bound form (mostly with albumin). The serum calcium level measures both. Therefore, as albumin levels decrease, so will be the serum calcium level and vice versa. Generally it is remembered that the total serum calcium level decreases by approximately 0.8 mg for every 1-g decrease in the serum albumin level.

For the diagnosis of hypercalcemia, the patient must have elevated serum calcium levels at least three times. Symptoms of hypercalcemia include anorexia, nausea, vomiting, somnolence, and coma. Hyperparathyroidism is the number one cause of hypercalcemia. Parathyroid hormone acts to increase serum calcium by increasing GI absorption, decreasing urinary excretion, and increasing bone resorption. Malignancy is the second most common cause of hypercalcemia. Tumor metastasis to the bone causes break down and calcium is pushed into the blood stream. Some cancers can produce PTH-like substances that drive the serum calcium up.

Normal serum calcium could still mean the patient is hypercalcemic if the albumin level is low. A similar situation exists in patients with chronic renal failure.

Hypocalcemia occurs with hypoalbuminemia. The most common causes are malnutrition, as in alcoholics, and large-volume IV infusions.

Clinical Significance:

Increased levels

- Hyperparathyroidism
- Nonparathyroid PTH-producing tumor (e.g., lung or renal carcinoma)
- Metastatic tumor to bone
- Paget's disease of bone
- Prolonged immobilization
- Mild-alkali syndrome
- Vit D intoxication
- Lymphoma
- Granulomatous infections such as sarcoidosis and tuberculosis
- Addison's disease
- Acromegaly
- Hyperthyroidism

Decreased levels

- Hypoparathyroidism
- Renal failure
- Hyperphosphatemia
- Rickets, Osteomalacia
- Vit D deficiency
- Malabsorption
- Pancreatitis
- Fat embolism
- Alkalosis

Chloride

Norms: Adult/Elderly – 90-110 mEq/L or 98-106 mmol/L (SI Units)
Child – 90-110 mEq/L
Newborn – 96-106 mEq/L
Premature infant – 95-110 mEq/L

Critical Values: < 80 or > 115 mEq/L

This is part of electrolyte testing. Chloride is interpreted with the other electrolytes to investigate acid-base balance and hydrational status.

Explanation:

Chloride is the major extracellular anion. It maintains electrical neutrality, mostly as a salt with sodium. As sodium moves, chloride follows. Because water moves with sodium and chloride, chloride also affects water balance. Chloride also serves as a buffer to assist in acid-base balance.

Hypochloremia and hyperchloremia rarely occur alone and usually are part of parallel shifts in sodium or bicarbonate levels. Signs and symptoms of hypochloremia include hyperexcitability of the nervous system and muscles, shallow breathing, hypotension, and tetany. Signs and symptoms of hyperchloremia include lethargy, weakness, and deep breathing.

Clinical Significance:

Increased levels
- Dehydration
- Excessive infusion of normal saline solution
- Metabolic acidosis
- Renal tubular acidosis
- Cushing's syndrome
- Kidney dysfunction
- Hyperparathyroidism
- Eclampsia
- Respiratory alkalosis

Decreased levels
- Overhydration
- Syndrome of inappropriate secretion of antidiuretic hormone
- CHF
- Vomiting or prolonged gastric suction
- Chronic diarrhea or high-output GI fistula
- Chronic respiratory acidosis
- Metabolic alkalosis

Salt-losing nephritis
Addison’s disease
Diuretic therapy
Hypokalemia
Aldosteronism
Burns

Creatinine Clearance

Norms: Adult (<20 yrs)
Male – 90-139 ml/ min or 0.87-1.34 ml/sec/m2
Female – 80-125 ml/min or 0.77-1.2 ml/sec/m2
Values decrease 6.5 ml/min/decade of life after age 20 with decline in glomerular filtration rate (GFR)
Newborn – 40-65 ml/min

This test is used to measure the GFR of the kidney.

Explanation:

Creatinine is a catabolic product of creatine phosphate which is used in skeletal muscle contractions. Production of creatine and subsequently, creatinine, depends on muscle mass. Creatinine is excreted exclusively by the kidneys. Creatinine clearance is a calculation made by knowing the urine and serum creatinine level and measures the GFR.

The amount of filtrate made in the kidney depends on the amount of blood to be filtered and the ability of the glomeruli to filter. As with the BUN, if kidney disease is unilateral, there may not be a decrease in creatinine clearance.

Clinical Significance:

Increased levels
- Exercise
- Pregnancy
- High cardiac output syndromes

Decreased levels
- Impaired kidney function
- Conditions causing decreased GFR such as CHF cirrhosis with ascities, shock, and dehydration

Creatinine, Serum

Norms: Elderly – Decrease in muscle mass may cause decreased values
Adult
Male – 0.6-1.2 mg/dl
Female – 0.5-1.1 mg/dl or 44-97 mmol/L (SI units)
Adolescent – 0.5-1.0 mg/dl
Child – 0.3-0.7 mg/dl
Infant – 0.2-0.4 mg/dl
Newborn – 0.3-1.2 mg/dl

Critical Values: >4 mg/dl (indicates serious impairment in renal function)

Creatinine is used to diagnose impaired renal function.

Explanation:

This test measures the amount of creatinine in the blood. Creatinine is a catabolic product of creatinine phosphate, which is used in skeletal muscle contraction. The daily production of creatinine is fairly constant because it is dependant upon muscle mass, which does not fluctuate very much on a day-to-day basis. Creatinine is excreted entirely by the kidneys and is therefore directly proportional to renal excretory function. The only occasion for creatinine to increase would be in the presence of renal disorders such as glomerulonephritis, pyelonephritis, acute tubular necrosis, and urinary obstruction.

Creatinine levels are used in conjunction with BUN levels to diagnose renal impairment. But unlike BUN, creatinine is not affected by hepatic function. Creatinine levels tend to rise later than BUN levels. Therefore, creatinine is indicative of a more chronic disease process. In general, a doubling of creatinine suggests a 50% reduction in the glomerular filtration rate.

Clinical Significance:

Increased levels
- Diseases affecting renal function, such as glomerulonephritis, pyelonephritis, acute tubular necrosis, urinary tract obstruction, reduced renal blood flow, diabetic nephropathy, nephritis
- Rhabdomyolysis
- Acromegaly
- Gigantism

Decreased levels
- Debilitation
- Decreased muscle mass – ie, muscular dystrophy, myasthenia gravis

Blood Glucose or Fasting Blood Sugar

Norms: Cord – 45-96 mg/dl or 2.5-5.3 mmol/L (SI units)
Premature infant – 20-60 mg/dl or 1.1-3.3 mmol/L
Neonate – 30-60 mg/dl or 1.7-3.3 mmol/L
Infant – 40-90 mg/dl or 2.2-5.0 mmol/L
Child <2 yrs – 60-100 mg/dl or 3.3-5.5 mmol/L
Child >2 to adult – 70-105 mg/dl or 3.9-5.8 mmol/l
Elderly – increase in normal range after age 50 yrs

Critical Values: Adult male - <50 and >400 mg/dl
Adult female - <40 and >400 mg/dl
Infant - <40 mg/dl
Newborn - <30 and >300 mg/dl

This test directly measures fasting blood glucose levels and is used to evaluate diabetic patients.

Explanation:

Glucose is controlled through a feedback system involving glucagons and insulin. When glucose levels are low in the fasting state, glucagons is secreted from the pancreas. Glucagon breaks down glycogen down to glucose in the liver and glucose levels rise. When glucose levels are higher after eating insulin is secreted from the pancreas. Insulin attaches to insulin receptors in muscle, liver, and fatty cells where it drives glucose into the cell to be metabolized to glycogen, amino acid, and fatty acids. Then blood glucose levels decrease.

True glucose elevations indicate diabetes mellitus. There are many other reasons why glucose levels may increase such as hormone levels, stress, and recently eating. Hypoglycemia also has many causes such as drugs and insulin overdose.

Clinical Significance:

Increased levels
- Diabetes mellitus
- Acute stress response
- Cushing's syndrome
- Pheochromocytoma
- Chronic renal failure
- Glucagonoma
- Acute pancreatitis
- Diuretic therapy
- Corticosteroid therapy
- Acromegaly

Decreased levels
- Insulinoma
- Hypothyroidism
- Hypopituitarism
- Addison’s disease
- Extensive liver disease
- Insulin overdose
- Starvation

Thyroxine, Free – T_4

Norms:	Age	ng/dl
	0-4 days	2-6
	2 wks-20 yrs	0.8-2
	Adult	0.8-2.7

Free thyroxine is used to evaluate thyroid function in patients who may have protein abnormalities that could affect total T_4 levels. This test is used to diagnose thyroid function and to monitor replacement and suppressive therapy.

Explanation:

Thyroid hormone is made up of thyroxine (T_4) and triiodothyronine (T_3). The largest portion is T_4 and the majority of that, as much as 99%, is bound to proteins such as thyroxine-binding globulin (TBG) and albumin. Only 1% to 5% of total T_4 is unbound or "free." This free portion is the metabolically active thyroid hormone. Total T_4 is a measure of bound and free amounts of the hormone. Therefore, abnormalities in protein levels can significantly affect the results. Free T_4 is not affected by these abnormalities and is therefore a more accurate assessment of thyroid function than total T_4. Overall, greater than normal levels indicates hyperthyroid states and lower than normal levels indicates hypothyroid states.

Clinical Significance:

Increased levels
- Primary hyperthyroid states
- Acute thyroiditis
- Struma ovarii

Decreased levels
- Hypothyroid states
- Pituitary insufficiency
- Hypothalamic failure
- Iodine insufficiency
- Nonthyroid illnesses

Glycosylated Hemoglobin (GHb) or Hemoglobin A1C (HbA1c)

Norms: Adult/Elderly – 4%-8%
Child – 1.8%-4%
Good diabetic control – 7% or less
Fair diabetic control – 10%
Poor diabetic control – 13-20%

This test measures the amount of HbA1c in the blood. It provides an accurate long-term index of the patient's average blood glucose and therefore is used to monitor diabetes treatment.

Explanation:

In adults about 98% of the hemoglobin in the RBC is hemoglobin A. HbA1c is the component of hemoglobin A that most strongly combines with glucose in the process of glycosylation. As the RBC circulates, it combines its HbA1 with some of the glucose in the bloodstream to form glycohemoglobin (GHb). The amount of GHb depends on the amount of glucose the RBC comes in contact with over its 120-day life span, therefore reflecting the average blood sugar level for the 100- to 120-day period before the test. The more glucose the RBC is exposed to, the greater the GHb percentage. This test is not influenced by short-term variations such as food intake, exercise, or stress. The elevation in GHb occurs about 3 weeks after the sustained elevation in blood glucose. It takes at least 4 weeks for the GHb to decrease after a sustained reduction in blood glucose.

Clinical Significance:

Increased levels
- Newly diagnose diabetic patient
- Poorly controlled diabetic patient
- Nondiabetic hyperglycemia such as acute stress response, Cushing's syndrome
- Splenectomized patients
- Pregnancy

Decreased levels
- Hemolytic anemia
- Chronic blood loss
- Chronic renal failure

Lactic Dehydrogenase – LDH or Isoenzyme LDH 5 specific for the liver

Norms: Adult/Elderly – 45-90 U/L (30 degree C),
115-225 IU/L or 0.4-1.7 mmol/L (SI units)
Isoenzyme LDH 5 – 0%-5%
Child – 60-170 U/L (30 degree C)
Infant – 100-250 U/L
Newborn – 160-450 U/L

LDH is an intracellular enzyme used to support the diagnosis of injury or disease of the heart, liver, RBCs, kidneys, skeletal muscle, brain, and lungs.

Explanation:

LDH 5 is the isoenzyme that indicates hepatocellular injury or disease. The heart, RBCs, skeletal muscle, lung, kidney, and pancreas all are followed by looking at other isoenzymes. The mechanism works much the same as the other enzymes. When there is injury to the cells containing LDH, it is spilled out into the bloodstream and the labs show elevated levels.

Clinical Significance: (for GI purposes)

Increased level
- Hepatic disease
- Intestinal ischemia and infarction
- Advanced solid tumor malignancies
- Pancreatitis (LDH 4)

Lipase

Norms: 0-110 U/L or 0-417 U/L (SI units)

Lipase is used to evalute for pancreatic disease.

Explanation:

Lipase is secreted by the pancreas into the duodenum to break down triglycerides into fatty acids. Like amylase, lipase is secreted into the bloodstream when there is damage to or disease affecting the pancreatic acinar cells.

The most common cause of elevated lipase levels is acute pancreatitis where levels can rise to 5-10 time normal values. Lipase levels usually rise a little later than amylase and remain elevated for 5-7 days. This makes lipase a more useful tool in late diagnosis of acute pancreatitis. Lipase is not as useful in chronic pancreatitis or pancreatic carcinoma.

Other conditions can be associated with elevated levels of lipase. Since lipase is secreted through the kidneys, elevated levels can be seen in renal failure. Elevated lipase levels can also be associated with intestinal infarction or obstruction. However, in nonpancreatic diseases, lipase levels are usually only 3 times the upper limit of normal.

Clinical Significance:

Increased levels

- Pancreatic disease
- Biliary disease
- Renal failure
- Intestinal disease
- Peptic ulcer disease
- Salivary gland inflammation or tumor

Postprandial Glucose

Norms: 2-hour PPG
0-50 yrs - <140 mg/dl or 7.8 mmol/L (SI units)
50-60 yrs - <150 mg/dl
60 yrs and older - <160 mg/dl
1-hour glucose screen for gestational diabetes - <140 mg/dl

The 2-hour PPG test is used to test for diabetes mellitus by measuring the amount of glucose in the patient's blood 2 hours after a meal.

Explanation:

In a healthy patient, insulin is secreted immediately after a meal is eaten and glucose levels will have retuned to normal within 2 hours. In this test, a meal is used as a glucose challenge to see if glucose levels return to normal 2 hours after eating a meal. In patients with diabetes, the glucose level is still elevated at 2 hours after eating the meal.

If the results are >140 and <200, further studies such as a glucose tolerance test should be completed. If the 2-hour PPS is >200, the diagnosis of diabetes mellitus can be made.

Clinical Significance:

Increased levels
- Diabetes mellitus
- Gestational diabetes mellitus
- Malnutrition
- Hyperthyroidism
- Acute stress response
- Cushing's syndrome
- Pheochromocytoma
- Chronic renal failure
- Glucagonoma
- Diuretic therapy
- Corticosteroid therapy
- Acromegaly
- Extensive liver disease

Decreased levels
- Insulinoma
- Hypothyroidism
- Hypopituitarism
- Addison's disease
- Insulin overdose
- Malabsorption or maldigestion

Potassium (K)

Norms: Adult/Elderly – 3.5-5.0 mEq/L or 3.5-5.0 mmol/L (SI Units)
Child – 3.4-4.7 mEq/L
Infant – 4.1-5.3 mEq/L
Newborn – 3.9-5.9 mEq/L

Critical Values: Adult - <2.5 or >6.5 mEq/L
Newborn - <2.5 or >8.0 mEq/L

This electrolyte is important to the cardiac function. It is tested as part of complete routine evaluations, especially in patients who take diuretics or heart medications.

Explanation:

K is the major cation within the cell. The difference in concentrations between intracellular concentration and the serum concentration maintains membrane electrical potential, especially in neuromuscular tissue. Because the serum concentration is so small compared to the intracellular concentration, small changes can have significant affects.

K is excreted by the kidneys. There is no reabsorption of K from the kidneys. Therefore, if K is not adequately supplied in the diet, serum K levels can drop rapidly.

K contributes to the metabolic portion of acid-base balance in that the kidneys can shift K^+ for H^+ ions to maintain physiologic pH.

Serum potassium concentration depends on many factors, including:

1. Aldosterone (and to a lesser extent, glucocorticosteroids) – tends to increase renal losses of K
2. Sodium reabsorption – as sodium is reabsorbed, potassium is lost
3. Acid-base balance – alkalotic states tend to lower serum K by shifting it into the cell while acidotic states tend to raise serum K levels by reversing that shift

Symptoms of hyperkalemia include irritability, nausea, vomiting, intestinal colic, and diarrhea. EKG changes include peaked T waves, a widened QRS complex, and depressed ST segment. Signs of hypokalemia are related to a decrease in contractility of smooth, skeletal, and cardiac muscles, which results in weakness, paralysis, hyporeflexia, ileus, increased cardiac sensitivity to digoxin, cardiac arrythmias, flattened T waves, and prominent U waves. K must be monitored in patients taking digitalis-like drugs because cardiac arrhythmias may be induced by hypokalemia and digoxin.

Clinical Significance:

Increased levels (hyperkalemia)
Excessive dietary intake

- Excessive IV intake
- Acute or chronic renal failure
- Addison's disease
- Hypoaldosteronism
- Aldosterone-inhibiting diuretics
- Crush injury to tissues
- Hemolysis
- Transfusion of hemolyzed blood
- Infection
- Acidosis
- Dehydration

Decreased levels (hypokalemia)

- Deficient dietary intake
- Deficient IV intake
- Burns
- GI disorders
- Diuretics
- Hyperaldosteronism
- Cushing's syndrome
- Renal tubular acidosis
- Alkalosis
- Licorice ingestion
- Insulin administration
- Glucose administration
- Ascites
- Renal artery stenosis
- Cystic fibrosis
- Trauma/surgery/burns

Prothrombin Time – PT

Norms: 11.0-12.5 seconds; 85%-100%
Full anticoagulant therapy - >1.5-2.0 times control value; 20%-30%

This is generally a test used to evaluate the adequacy of extrinsic system and common pathway in the clotting mechanism. It can also be used to evaluate liver function.

Explanation:

PT measures the clotting ability of factors I, II, V, VII, and X which are involved in the extrinsic system and common pathway. Factors I, II, V, VII, IX, and X are all produced in the liver. Therefore, if there is hepatocellular injury or disease and the production of these factors is decreased, there will be a prolongation of the PT.

Obstructive biliary disease can also affect PT because the necessary bile for fat absorption is not able to enter the gut. Vitamins A, D, E, and K are fat soluble and not absorbed. Vitamin K is needed for the synthesis of factors II, VII, IX, and X. Therefore, with a decrease in Vitamin K, serum concentrations of these factors will fall. In order to differentiate between Vitamin K deficiency and hepatocellular disease, parenteral Vitamin K is administered. If PT returns to normal after 1-3 days of Vitamin K administration, it is probably obstructive biliary disease. If not, it is assumed that hepatocellular disease exists.

Clinical Significance:

Increased levels or prolongation of PT
- Liver disease such as cirrhosis or hepatitis
- Hereditary factor deficiency
- Vitamin K deficiency
- Bile duct obstruction
- Coumarin ingestion such as Coumadin or Panwarfin
- Disseminated intravascular coagulation
- Massive blood transfusion
- Salicylate intoxication

Sodium (Na)

Norms: Adult/Elderly – 136-145 mEq/L or 136-145 mmol/L
Child – 136-145 mEq/L
Infant – 134-150 mEq/L
Newborn – 134-144 mEq/L

Critical Values: <120 or >160 mEq/L

This is part of the electrolytes testing. It is used to monitor and evaluate fluid and electrolyte balance and therapy.

Explanation:

Sodium is the major cation in the extracellular space. Therefore, sodium salts are the major determinants of extracellular osmolality. Blood sodium content is a result of a balance between dietary sodium intake and renal excretion.

Some factors that regulate sodium balance are:

1. Aldosterone – causes conservation of sodium by stimulating the kidneys to reabsorb sodium and decreasing renal losses
2. Natriuretic hormone – decreases renal absorption and increases renal losses of sodium
3. Antidiuretic hormone (ADH) – controls reabsorption of water at the distal tubules of the kidney, affecting the sodium serum levels by dilution and concentration

Physiologically, water and sodium are closely interrelated. Aldosterone, ADH, and natriuretic hormone assist in the compensatory actions of the kidney to maintain appropriate levels of free water. As free water increases or decreases, sodium concentration decreases and increases, respectively. The kidneys actions to regulate free water help maintain proper levels of sodium.

Symptoms of hyponatremia include confusion and lethargy and may progress to stupor and coma if levels continue to decline. Symptoms of hypernatremia include dry mucous membranes, thirst, agitation, restlessness, hyperreflexia, mania, and convulsions.

Clinical Significance:

Increased levels (hypernatremia)
- Increased sodium intake
  - Increased dietary intake
  - Excessive sodium in IV fluids
- Decreased sodium loss
  - Cushing's syndrome
  - Hyperaldosteronism
- Excessive free body water loss

- GI loss (without rehydration)
- Excessive sweating
- Extensive thermal burns
- Diabetes insipidus
- Osmotic diuresis

Decreased levels (hyponatremia)
- Decreased sodium intake
  - Deficient dietary intake
  - Deficient sodium in IV fluids
- Increased sodium loss
  - Addison’s disease
  - Diarrhea, vomiting, or nasogastric aspiration
  - Intraluminal bowel loss as in an ileus or mechanical obstruction
  - Diuretic administration
  - Chronic renal insufficiency
  - Chronic renal insufficiency
  - Large-volume aspiration of pleural or peritoneal fluid
- Increased free body water
  - Excessive oral water intake
  - Hyperglycemia
  - Excessive IV water intake
  - CHF
  - Ascites
  - Peripheral edema
  - Syndrome of inappropriate or ectopic secretion of ADH

Triiodothyronine – T_3

Norms:	Age	ng/dl
	1-3 days	100-740
	1-11 mons	105-245
	1-5 yrs	105-270
	6-10 yrs	95-240
	11-15 yrs	80-215
	16-20 yrs	80-210
	20-50 yrs	70-205
	>50 yrs	40-180

Triiodothyronine is used to evaluate thyroid function, primarily diagnose hyperthyroidism. It is also used to monitor thyroid replacement and suppressive therapy.

Explanation:

A large portion of T_3 is formed in the liver by conversion of T_4 to T_3. T_3 is less stable than T_4 because it is not bound as tightly to the serum proteins as T_4. Still, almost 70% of T_3 is bound while only minute quantities are "free" and metabolically active. Also, T_3 levels are not affected by alterations in serum proteins as the measurement of T_4 can be.

Nonthyroid diseases can decrease the levels of T_3 by diminishing the conversion of T_4 to T_3 in the liver. This makes T_3 less helpful in diagnosis of hypothyroid states. Because of this, T_3 levels are used primarily to assist in the diagnosis of hyperthyroid states. An elevated T_3 indicates hyperthyroidism, especially when T_4 is elevated as well. There is a rare form of hyperthyroidism called "T_3 toxicosis" where T_4 is normal and T_3 is elevated.

Clinical Significance:

Increased levels
- Primary hyperthyroid states
- Acute thyroiditis
- TBG increase

Decreased levels
- Hypothyroid states
- Pituitary insufficiency
- Hypothalamic failure
- Protein malnutrition and other protein-depleted states
- Nonthyroid illnesses
- Iodine insufficiency
- Hepatic disease

Thyroxine – T_4

Norms:

Age	*u*g/dl
1-3 days	11-22
1-2 weeks	10-16
1-4 mons	8-16
1-5 yrs	7-15
5-10 yrs	6-13
10-15 yrs	5-12
Adult male	4-12
Adult female	5-12
Adult >60	5-11

Critical Values: Adult - <2.0 mg/dl if myxedema coma possible; >20 mg/dl if thryroid storm possible
Newborn - <7.0 mg/dl

Thyroxine is used to diagnose thyroid function and to monitor replacement and suppressive therapy.

Explanation:

Serum T_4 is a direct measurement of the total amount of T_4, bound and free, in the patient's blood. Levels that are greater than normal indicate hyperthyroid states and levels lower than normal indicates hypothyroid states.

T_4 makes up nearly all of what we call thyroid hormone. T_3 makes up less than 10% of thyroid hormone. Nearly all of both hormones are bound to proteins. Most of it is bound to thyroxine-binding globulin (TBG) and some to albumin and prealbumin. It is the unbound or "free" hormone that is metabolically active and working on the cells of the body. Therefore the test reliability can be affected by the amount of TBG in the body. These proteins can increase in pregnancy and patients taking oral contraceptives. To correct for this the levels of these carrier proteins are concomitantly measured.

Clinical Significance:

Increased levels
- Primary hyperthyroid states such as Graves' disease, Plummer's disease, toxic thyroid adenoma
- Acute thyroiditis
- Familial dysabluminemic hyperthyroxinemia
- TBG increase as in pregnancy, hepatitis, congenital hyperproteinemia

Decreased levels
- Hypothyroid states such as cretinism, surgical ablation, myxedema
- Pituitary insufficiency

Hypothalamic failure
Protein malnutrition and other protein-depleted states
Iodine insufficiency
Nonthyroid illnesses such as renal failure, Cushing's disease, cirrhosis, surgery, advanced cancer

Thyroid-Stimulating Hormone - TSH

Norms: Adult - 2-10 mU/ml or 2-10 mU/L (SI units)
Newborn - 3-18 mU/L
Cord - 3-12 mU/ml

TSH is used to diagnose primary hypothyroidism and to differentiate it from secondary (pituitary) and tertiary (hypothalamus) hypothyroidism. This test is also used to monitor the effectiveness of thyroid medications and screen newborns.

Explanation:

TSH is secreted from the pituitary gland in response to stimulation from thyrotropin-releasing hormone (TRH) from the hypothalamus. Lower than normal levels of T_3 and T_4 stimulate TRH and TSH. Therefore a compensatory increase of TRH and TSH occurs in patients with primary hypothyroid states.

In secondary or tertiary hypothyroidism there is dysfunction in the pituitary gland or the hypothalamus gland. TRH and TSH cannot be secreted. Even with stimulation of low levels of T_3 and T_4, there are almost zero levels of TRH and TSH.

When exogenous thyroid medication is used, the goal is either thyroid replacement for a non-functioning thyroid or suppression of the thyroid. In both cases, you are attempting to keep TSH secretion at a minimum. Therefore, you monitor the effectiveness of the medication by testing the TSH.

Clinical Significance:

Increased levels
- Primary hypothyroidism
- Thyroiditis
- Thyroid agenesis
- Congenital cretinism or congenital hypothyroidism
- Large doses of iodine
- Radioactive iodine injection
- Surgical ablation of thyroid
- Severe and chronic illnesses

Decreased levels
- Secondary hypothyroidism (pituitary or hypthalamus dysfunction)
- Hyperthyroidism
- Suppressive doses of thyroid medications

White Blood Cell Count and Differential – (WBC with diff)

Norms: Total WBCs – Adult/Child >2yrs – 5000-10,000/mm^3
or 5-10.0 X 10^9/L (SI Units)
Child <2yrs – 6200-17,000/mm^3
Newborn – 9000-30,000/mm^3

Differential Count

Cell Type	(%)	Absolute (per mm^3)
Neutrophils	55-70	2500-8000
Lymphocytes	20-40	1000-4000
Monocytes	2-8	100-700
Eosinophils	1-4	50-500
Basophils	0.5-1.0	25-100

Critical Values: WBCs <2500 or >30,000/mm^3

White blood cell count and differential is helpful in the evaluation of the patient with infection, neoplasm, allergy, or immunosuppression.

Explanation:

There are two parts to this test. The total number of white blood cells and then the differential which measures the percentage of each type of leukocyte, the neutrophils, lymphocytes, monocytes, eosinophils, and basophils. An increased total count usually means there is infection, inflammation, tissue necrosis, or leukemic neoplasia in the body. Sometimes trauma or stress, either emotional or physical, may cause an increase in WBC. A decrease in WBC occurs when there is bone marrow failure as in antineoplastic chemotherapy or radiation therapy, marrow infiltration diseases, overwhelming infection, dietary deficiencies, and autoimmune diseases. The major function of leukocytes is to fight infection and react against foreign bodies or tissues.

The primary role for neutrophils is phagocytosis or killing and digestion of bacterial microorganisms. When the production of neutrophils increases quickly, early immature forms called “band” or “stab” cells are in circulation. This is what is known as a “left shift” in WBC production and is indicative of a bacterial infection.

Basophils are also called mast cells. Basophils and eosinophils are involved in allergic reactions. They carry out phagocytosis of antigen-antibody complexes. They do not respond to bacterial or viral infections.

There are two types of lymphocytes. T cells are involved in cellular-type immune reactions and B cell are involved in humoral immunity or antibody productions. The primary function of lymphocytes is to fight chronic bacterial infection and acute viral infections.

Monocytes fight bacterial infection much like neutrophils in that they are phagocytic. They can be produced more rapidly and spend a longer time in circulation than the neutrophils.

Clinical Significance:

Increased levels (Leukocytosis)

- Infection
- Leukemic neoplasia or other myeloproliferative disorders
- Other malignancy
- Trauma, stress, or hemorrhage
- Tissue necrosis
- Inflammation
- Dehydration
- Thyroid storm
- Steroid use

Decreased levels (Leukopenia)

- Drug toxicity
- Bone marrow failure
- Overwhelming infections
- Dietary deficiency such as Vit B12 or iron deficiency
- Congenital marrow aplasia
- Bone marrow infiltration
- Autoimmune disease
- Hypersplenism

*See pg 460 table 2-37 for specifics on the types of leukocytes.

Carbon Dioxide Content (CO_2 Content, Bicarbonate [HCO_3^-])

Norms: Adult/Elderly – 23-30 mEq/L or 23-30 mmol/L (SI Units)
Child – 20-28 mEq/L
Infant – 20-28 mEq/
Newborn – 13-22 mEq/L

Critical Values: < 6 mEq/L

This is an actual test of CO_2 in the blood. This is used to assist in evaluating the pH status of the patient and to assist in evaluation of electrolytes.

Explanation:

The CO_2 content measures H_2CO_3, dissolved CO_2 and the bicarbonate ion (HCO_3^-) that exist is the serum. Because the amounts of H_2CO_3 and dissolved CO_2 are so small in the serum, CO_2 content is an indirect measure of the HCO_3^- anion. This anion plays a major role in acid-base balance. It is second in importance to the chloride ion is electrical neutrality.

Levels of HCO_3^- are regulated by the kidneys. Levels increase with alkalosis and levels decrease with acidosis. Air affects the specimen when tested with other serum electrolytes. Therefore, venous blood specimens are not highly accurate for measuring true CO_2 content or HCO_3^-. It is used primarily as a rough guide as to acid-base balance.

Clinical Significance:

Increased levels
- Severe vomiting
- High-volume gastric suction
- Aldosteronism
- Use of mercurial diuretics
- COPD
- Metabolic alkalosis

Decreased levels
- Chronic diarrhea
- Chronic use of loop diuretics
- Renal failure
- Diabetic ketoacidosis
- Starvation
- Metabolic acidosis
- Shock