Acute

- Primary Neurologic (check CT head, EEG, LP)
  - **Seizure: Post Ictal, Subclinical**
  - **ID: meningoencephalitis, abscess**
  - **Stroke: ischemic vs hemorrhagic**
    - **Anoxic Brain Injury (ABI)**
      - Epidemiology: 30% survive but only 15% with good independence
      - Mechanism: >5min of cerebral hypoxia
      - Imaging: no change during first few days
      - S/S: coma w/ myoclonus
      - Tx: hypothermia protocol (strict inclusionary/exclusionary criteria, complications: dysrhythmias, coagulopathy, infection, hyperglycemia, hypokalemia)
  - **Trauma: concussion**
  - **Other: hydrocephalus, migraine, vasculitis, tumor**
- Systemic (check basic vitals, labs, UTox, EtOH, UA, Cx, ABG, PT/PTT, TSH, Cortisol)
  - **CV: decompensated CHF, HTN emergency**
  - **Pulm: hypoxia/hypercarbia**
  - **GI: acute/chronic liver failure**
  - **Renal: uremia, hypo/hypernatremia, hypercalcemia**
  - **Endo: hypo/hyperglycemia, hypo/hyperthyroidism, Addison's/Cushing's**
  - **ID: sepsis, UTI (very common)**
  - **Meds: drugs, sedatives, opiates, Li**
  - **Other: hypo/hyperthermia, carbon monoxide, cyanide, methanol**
  - **Hospital: ICU sundowning in elderly**
- Tx
  - Immediate: naloxone 0.01mg/kg IV x1, thiamine 100mg IV x1, oxygen THEN glucose 50g IV x1 (NB hold flumazenil b/c if given can precipitate seizure), intubation for airway protection
  - Next: based on lab findings
  - If agitated then Tx w/ 1° quetiapine (Seroquel) 2° haloperidol (Haldol) do NOT use benzos, 1:1 sitter, family orientation, strict sleep/wake cycle, Posey vests prevent patients from leaving the bed but leave the arms and legs free, four point cloth restraints limit the movement of arms and legs

Chronic (Dementia)

- Primary
  - **Benign Forgetfulness of Elderly aka Age Related Cognitive Decline**
    - Mech: natural loss of neurons with aging
    - S/S: cognitive impairment but does not abnormally affect normal day-to-day functioning
    - NB Mild Cognitive Impairment is in between this and Alzheimer's (aka pt does not meet criteria Alzheimer's)
  - **Alzheimer's Disease (AD)** (MOST COMMON)
    - Epidemiology: 2/3 of all dementias, 4th most common cause of death, risk is 10% Q10yrs after 60yo, RFs: age, Down's Syndrome, post-menopause, 10% +FHx (amyloid precursor protein (chr 21), presenilin-1 (chr 14) and presenilin-2 (chr 19), e4 ApoE allele (chr 19))
    - Mech: very complicated but includes loss of cholinergic neurons in frontal/hippocampal cortex and deposition of beta-amyloid resulting in stimulation of excessive glutamate leading to chronic excitation and eventual neuron death
    - S/S: Cognitive Deficit (memory impairment AND abulia/aphasia/apraxia/agnosia/disturbed executive function), Impaired Day-to-Day Functioning, Normal Alertness, Onset b/t 40-90yo, DOE
    - Gross: cerebral atrophy w/ hydrocephalus ex vacuo
    - Microscopic: neuron loss, senile plaques (amyloid outside of neurons), neurofibrillary tangles (tau protein inside of neurons)
    - Dx: DOE w/ +Imaging, +MSE, -CSF
    - Prognosis: median death usually 5-10yr after onset of Sx
    - Tx
      - Increase ACh levels by avoiding anticholinergics and giving AChE Inhibitors: donepezil (Aricept), rivastigmine (Exelon), galantamine (Reminyl), all are generally equivalent in effect and SEs but overall not that effective
      - NMDA aka Glutamate inhibitors: memantine (Nemenda)
      - Other: herbals (Ginkgo biloba), vitamins (VitE)
      - Cognitive stimulation
      - Talk w/ family about advanced directives, power of attorney, etc
      - Tx psych Sx but don't use neuroleptics
      - HRT might be protective
      - Tx vascular dz as likely stimulus for Alzheimer's progression

- Systemic
  - **Hypothyroidism**
  - **B12/Folate/Thiamin Deficiency**
  - **Depression aka Psuedodementia** (generally these pts have insight while dementia pts do not)
  - **Wilson's**
  - **Alcoholism**
  - **Heavy Metal Poisoning**
- Stroke (SECOND MOST COMMON)
  - **Multi-Infarct Dementia**
    - Mech: atherosclerotic disease
    - S/S: abrupt stepwise decline
  - **Binswanger's Disease**
    - Mech: HTN disease
    - S/S: slow gradual decline
- Space Occupying Legions
  - **Normal Pressure Hydrocephalus (NPH) "Wet, Wobbly, Weird"**
    - Etiology: idiopathic, after head trauma/meningitis/SAH suggesting that the cause is obstruction at the level of arachnoid granulations thus appearing as a communicating hydrocephalus nevertheless there is nl ICP and thus no papilledema or headache
    - S/S: urinary incontinence ("unwitting wetting" where pt voids urine and doesn't know until pt feels wet) + ataxia (looks like feet are magnets and cannot be lifted off floor) + THEN dementia
    - Dx: normal CSF pressure on LP, dilated ventricles that are out of proportion to cerebral atrophy for that pt's age
    - Tx: acute LP drainage then VP shunt (ONCE dementia develops Tx is not that effective)
  - **Tumor** (refer)
  - **Chronic Subdural Hematoma** (refer)
  - **History of Traumatic Brain Injury (TBI)** eg. football concussions
- Movement Disorders
  - **Parkisonism esp Parkisonism Plus Syndromes** and specifically **Pick's Dz & Lewy Body Dz** (refer) (THIRD MOST COMMON)
  - **Huntington's** (refer)
  - **Amyotrophic Lateral Sclerosis** (refer)
- Inflammatory Demyelinating Disorders
  - **Multiple Sclerosis** (refer)
- Infections
  - **Prion Disease aka Spongiform Encephalopathies** (refer)
    - Mech: transformation of endogenous normal prion related protein (PrP^{C}) (fxn unknown, possibly metal chelator) into abnormally conformed prion related protein (PrP^{Sc}) which in turn acts as a template for misfolding of further PrP^{C} and as it accumulates in the brain it causes neuron death
    - Epidemiology: 400cases/yr in US
    - Etiology
      - Sporadic (85%) Creutzfeldt-Jakob Disease (CJD) (~60yo)
      - Inherited (10%) Gerstmann-Straussler-Scheinker Disease, Fatal Familial Insomnia
      - Acquired (5%) Kuru (cannabilism in Papua New Guinea), Mad Cow Disease (eating infected cows, epidemic in England in the 1990s), growth hormone replacement, corneal transplant, dural graft transplant, neurosurgery instruments
    - S/S: rapidly progressive (1) dementia, (2) initial startle myoclonus/cerebellar-Sx/extrapyramidal-Sx to eventual akinesis, (3) behavior/personality changes to full psychosis
    - Dx: MRI (vacuoles, hyperintense cortical gyri), EEG (periodic high voltage sharp 1cycle/sec waves), CSF (elevated 14-3-3 protein), Bx (spongiform change but very hard to do b/c difficult to sterilize equipment)
    - Tx: no Tx just supportive care
    - Prognosis: median survival from onset of Sx is 4mo
  - **HIV** (refer)
  - **Neurosyphilis** (refer)
  - **Lyme** (refer)
  - **PML** (refer)