Hypertension: A contemporary and comprehensive approach

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Disclosures

- Nothing
- Nada
- Niente

HypertensionDefinition

- JNC 8 – SBP > 140 or DBP > 90 on 2 separate readings 1 week or greater apart
- Prehypertension 120 – 139 systolic or 80-89 systolic
- Normotension is < 120/80

Morbidity Data

- #1 risk factor for developing CAD/CV events including Heart Attack and Stroke, more strongly correlated than any other risk factor
- Curvlinear pattern of risk – every 20 points of SBP correlates with a doubling or risk for CV events
- Most common chronic diagnosis of adults in YK delta
- Is associated with other comorbid conditions placing individuals at risk for CV events (Metabolic Syndrome)

Cardinal Symptoms

- Called the silent killer, because most frequently, there are none.

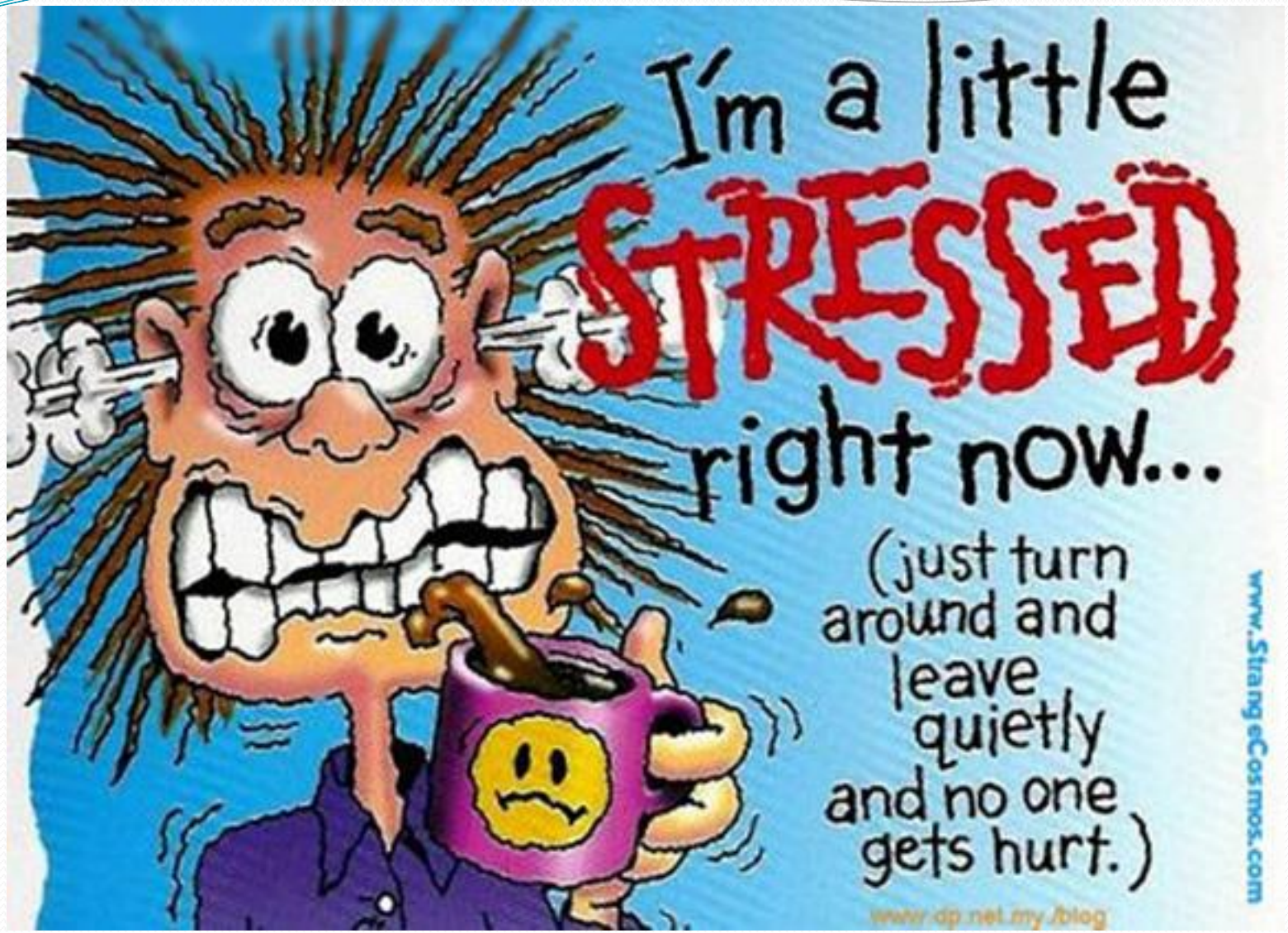
- Elevated BP in the setting of HA, vision changes or chest pressure, SOB require urgent/emergent evaluation
- Signs of end-organ damage (papilledema, EKG or troponin changes or elevated BNP, CR or new large proteinuria require emergent treatment for Hypertensive Emergency

Secondary Causes of Hypertension

- **Hyper or Hypo thyroidism**
- **Hyperparathyroidism**
- **Hyperaldosteronism, Renal disease, RAS**
- **Pheochromocytoma (MEN or sporadic) both rare**
- **Obstructive Sleep Apnea**
- **Corticosteroid Use**
- **Coarctation of the aorta (peds)**
- **Cushings disease/syndrome**
- **Drugs - NSAIDS, sympathomimetics, street drugs, estrogen**

Normotensive <120/80

PreHypertension


I'm a little
STRESSED
right now...
(just turn around and leave quietly and no one gets hurt.)
www.StrangeCosmos.com

Staging Hypertension

Pre	120 – 139 systolic, 80-89 diastolic
I	140-159 systolic, 90-99 diastolic
II	160 or greater systolic, 100 or greater diastolic

Hypertension Initial Evaluation Guidelines

- Thorough H and P, including cardiometabolic family history, CV events, genetic disorders (MEN, APCKD)
- Identify cardiac and non-cardiac disorders that might accelerate progression and treat

- BP status assessed at EACH VISIT
  - Weight BMI 25 or greater may consider weight loss
  - Blood glucose – all patients with HTN should be screened and monitored
  - Lipids – all patients with HTN should be screened and monitored

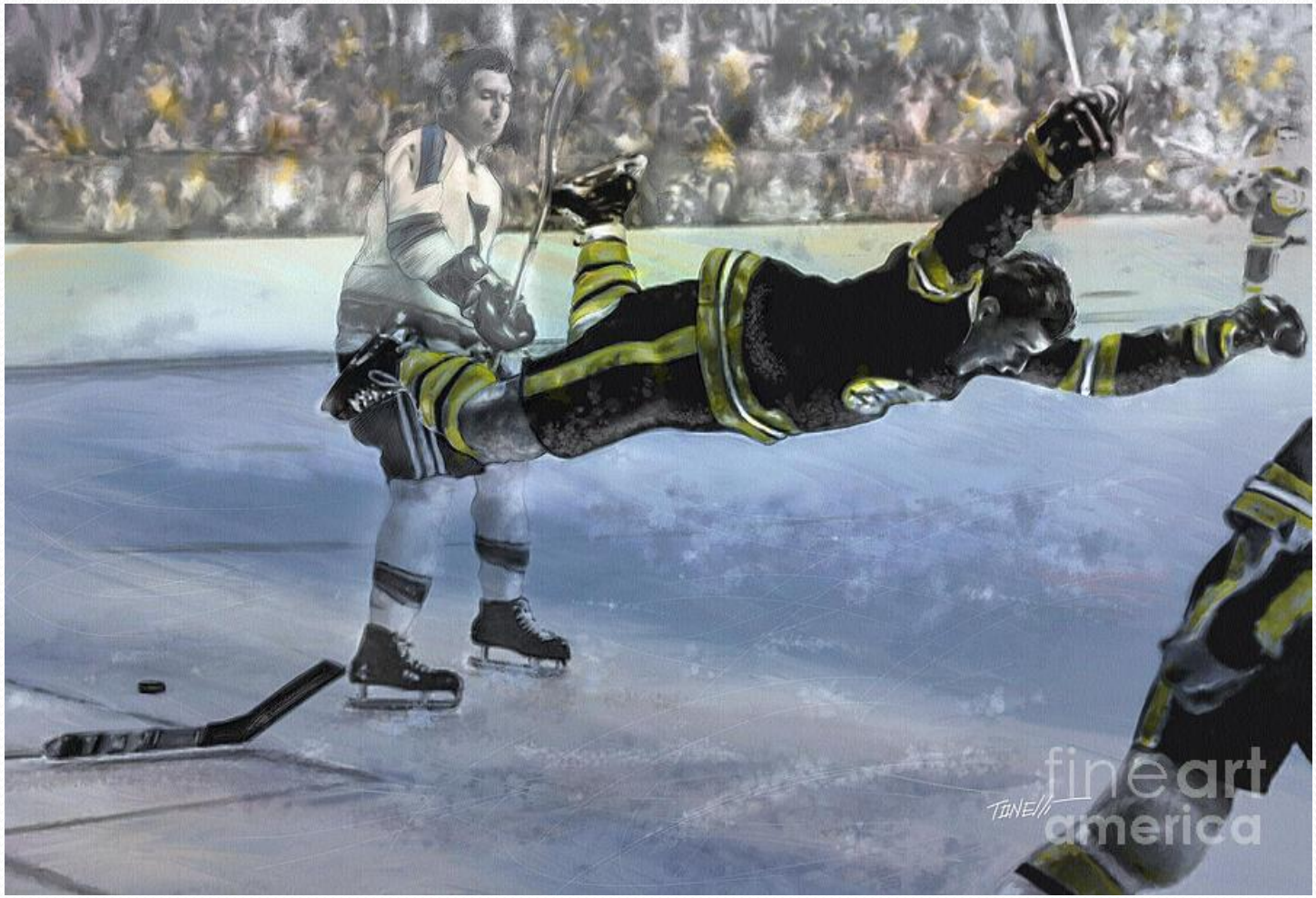
Diagnostic Tests Panel Recommendations Initial

- CBC, serum electrolytes, including Ca and Mg
- UA or protein/cr ratio
- BUN and Cr
- Glucose
- Lipid Profile
- LFT's
- TSH
- EKG

Diagnostic Testing - additional

- Diagnostic tests if indicated by other symptoms or clinical suspicion include RA, SLE, amyloidosis (fat aspirate) Sarcoidosis, pheochromocytoma – these should be reserved for patients with reasonable clinical index of suspicion
- In children consider coartaction of the aorta or thyroid or kidney disease as secondary causes
- If severe or refractory disease consider imaging the kidneys. (MR is preferred study)

THE GOAL!!!!



HTN Treatment Goals

- For most patients treatment goals are < 140/90
- For DM patients ADA states goal of <130/80 should be attempted if tolerated
- For HF and patients with CV Events/ASCVD goal of <130/80 should also be attempted if tolerated (without symptoms)

Treatment of Comorbid Conditions

- Hypertension and Lipid Disorders should be controlled in accordance with contemporary guidelines (A) evidence
- 2017 update recommends treatment goal for patients with HF as < 130/80 if tolerated.
- Other known risk factors, DM, obesity tobacco use, cardiotoxic agents such as excess alcohol should be controlled or avoided (A)
- Evaluation of obese patients with overnight oximetry screen and positives with formal sleep assessments with index of suspicion or daytime sleepiness.
- Treatment of sleep disorders is indicated to prevent CV events and HF(A)

Preventing HF and CV events by controlling Hypertension

- HTN is most common controllable risk factor for the development of either HFrEF or HFpEF,
- NNT over 2 years is 52 diuretic based therapy for HTN in primary prevention of HF
- Elderly patients age > 65 with ECG evidence of prior MI, Qwaves, LBBB, prior diagnosis of STEMI, 80 percent absolute risk reduction NNT 1.25 for incident HF with aggressive BP control (<130/80 as treatment goal)

HTN Primary Prevention CV events - continued

- Data for nondihydropyridine-CCB's and alpha blockers are unclear in their ability to prevent CV complications, do not use them unless for other indications
- Chlorthalidone and other diuretic therapies have been demonstrated to prevent HF and consistently across studies and may be used first line, Chlorthalidone shown superior 24 hr BP control compared to HCTZ (Pareet et al 2016).
- In appropriate populations ACE/ARB and diuretic therapies should be used 1st line, is indicated in patients with EKG evidence of LVH, or additional risk factors of CAD, patients who have vascular disease, ACE should be used 1st line
- ACE should be used in all renal patients where tolerated, especially proteinuria, except in renal artery stenosis
- Dihydropyridine CCB (amlodipine, felodipine) also as a consideration 1st line.

HTN Preventing CV Events considerations

- Beta Blockers – comprehensive review showed no benefit in primary prevention (atenolol was used in 75 percent of cases in the studies reviewed)
- However, Are safe to use in pregnancy
- Are helpful in migraine patients
- Are mandated in patient with prior MI and HF unless contraindicated
- Have undesired side effects of
  - Fatigue
  - Depression
  - Nightmares and sleeplessness
  - ED
  - For HF Consider carvedilol (1st) and metoprolol (2nd)which are indicated in treatment of HF when using a B-blocker (metoprolol must be titrated to high doses 200mg) (COMET trial), avoid atenolol in adult patients at risk for HF

Management of HTN, non-pharmacologic

- Patients with HTN should receive specific education for self care including weight loss if BMI 25 or greater
- Regular exercise 180 minutes per week or more
- Sodium restriction DASH diet
- Limit EtOH use to < =2/day for men, <= 1 for women
- Avoid regular use of NSAIDS wherever practical, do not use NSAIDS in patients with CKD or who have had CV events

Mangement of HTN, other medications

- May use K sparing in combination with thiazide diuretics (triamterene/HCTZ)
- Nondihydropyridine CCB's negative iontropic properties in established structure Heart Disease (low EF) **SHOULD BE AVOIDED**
- Even in patients without HF, use caution when using 2 negative ionotropic agents together. Combining Nondihydropyridine CCB's with B-blockers has been associated with symptomatic bradycardia, syncope, and even high-degree or complete heart block
- Use care when prescribing clonidine, caution when prescribing with negative ionotropics as can cause severe bradycardia or heart block
- Hydralazine may be used 10-50mg BID/TID in resistant HTN

Aldosterone Antagonists

Landmark **RALES** trial showed 30 percent risk reduction all cause mortality in HF patients HFrEF EF< 35%, NNT 3.3 . Start at 12.5 to 25mg per day and increase to 50mg daily as tolerated

- Eplerinone has a bit broader indications and wider range of patients. Starting dose 25mg per day
- Avoid NSAIDS in patients using aldosterone antagonists
- Dosage adjustments in ACE or ARB should trigger a new cycle of monitoring
- Routine triple combination **ACE/ARB/Aldosterone** antagonist **should be avoided**

Statins in HTN

- Statins should be prescribed in all patients with CV events and most patients with CKD with HTN
- Most patients with DM and HTN will also meet criteria for statin
- Rosuvastatin has most consistent data for primary prevention, especially in women
- Higher intensity statin (atorvastatin, rosuvastatin) should be used in most patients with prior vascular events, CKD, DM (See lipid guidelines and calculator)

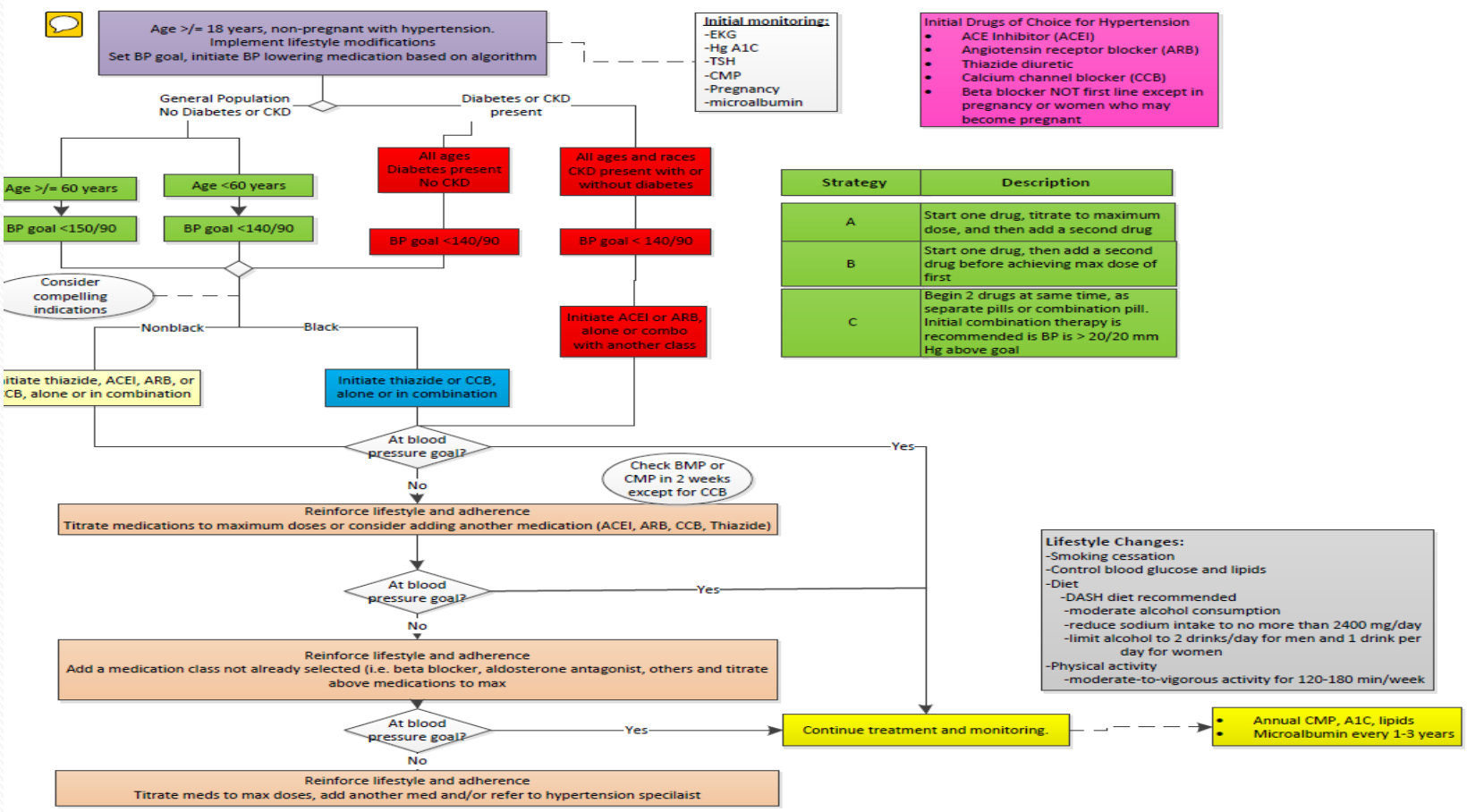
There's nothing fishy about FISH

- Omega -3 PUFA supplementation may be used as adjunctive therapy in patients with NYHA class II-IV symptoms in either HFrEF to reduce mortality and cardiovascular hospitalizations (B)
- Multiple studies in primary and secondary CAD studies show 10-20 percent ARR in fatal and non-fatal cardiovascular events (Primarily Italian studies) GISSI Prevenzione HF investigators also
- Dose 850-1g of DHA/EPA This may require more than 1 pill – count your mg of DHA/EPA.

Out of fashion Drugs in HTN

- NSAIDS – inhibit renal prostaglandins which inhibit sodium reabsorption, therefore the use of NSAIDS promotes sodium reabsorption in the thick ascending loop of Henle and collecting tubule. Several studies show increased mortality for selective and non-selective NSAIDS
- TZD's – also by dysregulation of sodium absorption in the kidney
- Alpha Blockers showed increased mortality in ALLHAT trial
- B-Blockers as first line except in select patients – comprehensive review showed no morbidity/mortality benefit (75% atenolol) DO NOT USE ATENOLOL, if must use B-Blocker use metoprolol succinate or carvedilol, bisoprolol. Carvedilol is preferred for HF and most CAD.
- Non-dihyropyridamole CCB's (nifedipine, diltiazem, verapamil) use extended release and only if patient has other indications
- Avoid CCB in patients with HF, they are contraindicated. Even amlodipine shows no survival benefit in HF
- Do NOT use Combination ACE/ARB or Direct Renin inhibitors in DM

YKHC HTN Guideline -Flowchart



HTN Summary

- ACE/ARB therapy is the drug of choice (generally ACE preferred 1st unless not tolerated or contraindicated) if patients are at risk for CV events or renal disease except renal artery stenosis
- Make sure your patient has had appropriate workup, including EKG!!
- Beta Blockers – evidence based, DO NOT USE FIRST LINE except in patients who are pregnant or may become pregnant - carvedilol, metoprolol, or bisoprolol should be used in all HF patients with CAD, NYHA class II or greater or Stage B or greater in either HFrEF or HFpEF
- Thiazide Diuretics maybe used alone or in combination with ACE or K sparing diuretic first line also.
- Chlorthalidone shown to have superior 24 hour BP control than same dose of HCTZ (2016)

HTN Summary

- Amlodipine may also be used first line – do not use older CCB to treat HTN unless they are for a specific other indication and they are CONTRAINDICATED in HF
- Do not combine ACE/ARB/Aldosterone antagonists using all 3 drugs together as risk for hyperkalemia increases substantially
- Use statin drugs where appropriate and otherwise indicated
- Use aspirin in patients age 50-59 who have HTN and hyperlipidemia, or DM
- Use aspirin otherwise in accordance with Aspirin Guidelines (USPSTF and YK guidelines)
- Avoid prolonged NSAIDS in patients with HTN or who are on aspirin therapy
- Treat HTN aggressively in patients with DM, and those at risk for HF or who have HF, goal therapy is < 130/80 (this is different than JNC HTN goals)
- Most other patients have goal of < 140/90
- Elderly, frail patient who do not tolerate lower BP may have HTN treatment goal of < 150/90 but their risk for CV events is HIGHER at these elevated goals
- Use of Omega-3 dosed at 1-2g/day of EPA/DHA may be indicated in patients with HF or CAD/history of CV events


THANK YOU!