**JNC8 Rules Document**

**V9- version with updates after KY Offline testing 07.21.15**

**General rules**

Updates highlighted in green

1. **Eligibility criteria**
   1. Presence of hypertension
   2. Age >17
   3. Egfr >30
   4. Absence of renovascular disease
   5. Absence of secondary hypertension
   6. Absence of spinal cord injury
   7. Absence of idiopathic hypertropic subaortic stenosis
   8. Absence of narcolepsy
   9. Absence of ascites
   10. Absence of organ transplant
   11. Absence of hemodialysis (CPT code)
   12. Absence of active prescription for minoxidil
   13. Absence of active prescription for cyclosporine
   14. ~~Absence of active prescription for spironolactone~~
   15. Absence of active prescription for tacrolimus
2. **Intensification criteria** – CDS will generate options to increase dose and add drugs (these are options for user to follow and not a recommendation to order all of our drug recommendations) . If patient not at target and drug doses of active preferred antihypertensives (ACEI, ARB, CCB or Thiazides) are below high dose range (< lower limit upper\_range) then we increase dose of drugs where relevant and add another preferred drug until on 4 preferred antihypertensives drugs.
3. **Substitutions:** Not recommending substitutions.

**6 scenarios, first 5 generate only a message and no drug recommendations:**

1. **>=4 active anti-hypertensive meds (broad) AND (NOT (SBP>=220 OR DBP>=110)) AND (NOT( IHD AND DBP<60))**

‘Patient on 4 or more antihypertensive drugs. Refer to hypertension specialist.’

1. **SBP>=220 OR DBP >=110**

‘SBP>=220 or DBP>=110 so treatment recommendations are beyond the scope of this program. If MARKED BP ELEVATION is confirmed, then the patient needs further TREATMENT and EARLY FOLLOW-UP to MONITOR THERAPEUTIC EFFICACY.’

1. **IHD and DBP<60**

**Not at target:** Patient has a diagnosis of ischemic heart disease and the most recent DBP<60mmHg. Patient at high risk for cardiovascular events**.**

**At target:** Most recent DBP < 60. If confirmed with repeat BPs, evaluate benefit:risk of continuing present doses.

1. **Above Dashboard Target below JNC8 Target**

Although patient not at target for Dashboard, blood pressure is within JNC 8 target (Age>=60 yrs, BP <150/90).

1. **BP below Dashboard and JNC8 target**

Maintain current drug choices and continue to encourage patient adherence to his/her current regimen.

1. **BP above target 🡺 Evaluate for drug recommendations**

**ACE Inhibitor JNC 8**

* **Compelling indications** 
  + HTN + non black + not on one of the 4-preferred drugs andNOT angioedema to ARB
  + HTN + 1 anti-htn med andNOT angioedema to ARB
  + HF andNOT angioedema to ARB
  + CKD andNOT angioedema to ARB
    - CM: ACE + CKD + Age>70🡺lack of evidence for ACEi in this group
  + DM (defined by ICD9 or hypoglycemic drugs) andNOT angioedema to ARB
* **Relative indication**
  + HTN + non black + not on one of the 4-preferred drugs and angioedema to ARB
  + HTN + 1 anti-htn med and angioedema to ARB
  + HF and angioedema to ARB
  + CKD and angioedema to ARB
    - CM: ACE + CKD + Age>70🡺lack of evidence for ACEi in this group
  + DM (defined by ICD9 or hypoglycemic drugs) and angioedema to ARB
* **Absolute contraindications**
  + ~~Pregnancy~~
  + K>5.5 in past 29d
  + angioedema to ACEI
  + renovascular disease
* **Relative contraindications**
  + 5<=K<5.5
  + K sparing diuretics
* **Blocked recommendation (do not start and do not stop)**
  + K>5.5 and not on ACE
  + Absence of SBP in past month
    - CM: If most recent K >5.5, need to order K before prescribing ACE
  + K >1 month
* **Drug partners to avoid**
  + ARB
  + ~~K sparing diuretic~~

**ARB JNC 8**

* **Compelling indications** 
  + HTN + non black + not on one of the 4-preferred drugs +NOT angioedema to ACEI +ADR ACE Inhibitor
  + HTN + 1 anti-htn med andNOT angioedema to ACEI +ADR ACE Inhibitor
  + HF andNOT angioedema to ACEI +ADR ACE Inhibitor
  + CKD andNOT angioedema to ACEI +ADR ACE Inhibitor
    - CM: ACE + CKD + Age>75🡺lack of evidence for ACEi in this group
  + DM (defined by ICD9 or hypoglycemic drugs) andNOT angioedema to ACEI +ADR ACE Inhibitor
* **Relative indication**
  + HTN + non black + not on one of the 4-preferred drugs and angioedema to ACEI
  + HTN + 1 anti-htn med and angioedema to ACEI
  + HF and angioedema to ACEI
  + CKD and angioedema to ACEI
    - CM: ACE + CKD + Age>70🡺lack of evidence for ACEi in this group
  + DM (defined by ICD9 or hypoglycemic drugs) and angioedema to ACEI
* **Absolute contraindications**
  + Pregnancy
  + K>5.5 in past 29d
  + angioedema to ARB
  + renovascular disease
* **Relative contraindications**
  + 5<=K<5.5
  + K sparing diuretics
  + ~~K>5.5 and absence of ARB~~
* **Blocked recommendation (do not start and do not stop)**
  + If most recent K >5.5 and NOT on ACE
    - CM: If most recent K >5.5, need to order K before prescribing ARB
  + Most recent K >1 month
  + Absence of SBP in past month
* **Drug partners to avoid**
  + ACEI

**Thiazides**

* **Compelling indications**
  + HTN and not already taking one of the 4 preferred drugs
* **Relative indication**
  + HTN (taking >=1 preferred drug)
  + Osteoporosis
* **Absolute contraindications**
  + Na<=130 most recent
  + Gout complicated
  + K<=3 and on thiazide
  + K<3.5 not on thiazide
  + Lithium
* **Relative contraindications**
  + gout
  + N<135 most recent
  + K<3.5 ever in past
  + Uric acid > 6.8 most recent
  + ~~BPH and alpha blocker monotherapy~~
  + 3<K<3.5 and on thiazide (issue message)
  + Allergy to sulfa ever – MA- we have allergy to sulfonamide see appendix for drugs
* **Drug partners to avoid**
* furosemide
* **Blocked recommendation (do not start and do not stop)**

Absence SBP

**CCB DHP**

* **Compelling indications**
  + HTN and not already taking one of the 4 preferred drugs
* **Relative indication**
  + HTN (taking >=1 preferred drug)
  + Angina
  + Migraine
  + Raynaud’s syndrome
  + DM
* **Absolute contraindications**
* **Relative contraindications**
* **Drug partners to avoid**
  + **NDHP CCB**

**CCB NDHP**

* **Compelling indications**
  + HTN and not already taking one of the 4 preferred drugs
* **Relative indication**
  + HTN (taking >=1 preferred drug)
  + Atrial fibrillation
  + Atrial tachycardia
  + MI
  + Angina
  + CKD
  + Raynaud’s syndrome
* **Absolute contraindications**
  + HB 2nd degree and no pacemaker
  + HB 3rd degree and no pacemaker
  + Unspecified HB
  + HB 1st degree and no pacemaker
* **Relative contraindications**
  + HF (as defined for HTN)
  + On amiodarone
  + Sinoatrial node dysfunction and no pacemaker
* **Drug partners to avoid**
  + Beta blocker
  + DHP CCB

**Appendix A: Eligibility definitions**

**Absence of active prescription for:**

* Cyclosporine
* Spironolactone
* Minoxidil
* Tacrolimus

**Absence of CPT codes:**

|  |  |  |
| --- | --- | --- |
| CPTCode | CPTName | KBName |
| 4052F | HEMODIALYSIS VIA AV FISTULA | Hemodialysis |
| 4053F | HEMODIALYSIS VIA AV GRAFT | Hemodialysis |
| 4054F | HEMODIALYSIS VIA CATHETER | Hemodialysis |
| 90935 | HEMODIALYSIS ONE EVALUATION | Hemodialysis |
| 90939 | HEMODIALYSIS STUDY, TRANSCUT | Hemodialysis |
| 90988 | HOSPITAL HEMODIALYSIS CARE | Hemodialysis |
| 90990 | HEMODIALYSIS, TRAIN/COUNSEL | Hemodialysis |
| 90991 | HOME HEMODIALYSIS CARE | Hemodialysis |
| 99512 | HOME VISIT FOR HEMODIALYSIS | Hemodialysis |
| G8714 | HEMODIALYSIS 3 TIMES WEEK | Hemodialysis |
| G8715 | HEMODIALYSIS NOT 3 TIMES WK | Hemodialysis |
| M0928 | HEMODIALYSIS, MAINTENANCE, F | Hemodialysis |
| M0944 | HEMODIALYSIS TREATMENTS, STA | Hemodialysis |
| S9335 | HT HEMODIALYSIS DIEM | Hemodialysis |

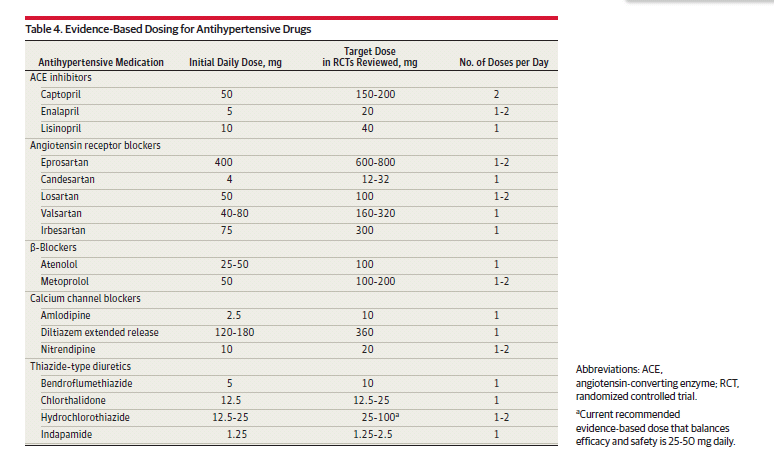
**Presence of diagnosis**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | icd | KBName | icddescription | | 401.0 | Hypertension | MALIGNANT ESSENTIAL HYPERTENSION | | 401.1 | Hypertension | BENIGN ESSENTIAL HYPERTENSION | | 401.9 | Hypertension | UNSPECIFIED ESSENTIAL HYPERTENSION | |  |  |

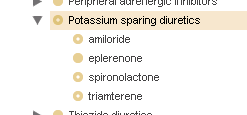
**Absence of diagnosis**

|  |  |  |
| --- | --- | --- |
| icd | KBName | icddescription |
| 789.51 | Ascites | malignant ascites |
| 789.59 | Ascites | other ascites |
| 746.81 | Idiopathic Hypertrophic Subaortic Stenosis | subaortic stenosis, congenital |
| 347 | Narcolepsy | cataplexy and narcolepsy |
| 347 | Narcolepsy | narcolepsy, without cataplexy |
| 347.01 | Narcolepsy | narcolepsy, with cataplexy |
| 347.1 | Narcolepsy | narcolepsy in conditions classified elsewhere, without cataplexy |
| 347.11 | Narcolepsy | narcolepsy in conditions classified elsewhere, with cataplexy |
| 199.2 | OrganTransplant | malignant neoplasm associated with transplant organ |
| 238.77 | OrganTransplant | post-transplant lymphoproliferative disorder (ptld) |
| 996.8 | OrganTransplant | complications of transplanted organ |
| 996.8 | OrganTransplant | complication of transplanted organ, unspecified |
| 996.81 | OrganTransplant | complications of transplanted kidney |
| 996.82 | OrganTransplant | complications of transplanted liver |
| 996.83 | OrganTransplant | complications of transplanted heart |
| 996.84 | OrganTransplant | complications of transplanted lung |
| 996.85 | OrganTransplant | complications of bone marrow transplant |
| 996.86 | OrganTransplant | complications of transplanted pancreas |
| 996.87 | OrganTransplant | complications of transplanted organ,intestine |
| 996.88 | OrganTransplant | null |
| 996.89 | OrganTransplant | complications of other specified transplanted organ |
| E878.0 | OrganTransplant | surgical operation with transplant of whole organ causing abnormal patient reaction, or later complication, without |
| V42.0 | OrganTransplant | kidney replaced by transplant |
| V42.1 | OrganTransplant | heart replaced by transplant |
| V42.2 | OrganTransplant | heart valve replaced by transplant |
| V42.3 | OrganTransplant | skin replaced by transplant |
| V42.4 | OrganTransplant | bone replaced by transplant |
| V42.5 | OrganTransplant | cornea replaced by transplant |
| V42.6 | OrganTransplant | lung replaced by transplant |
| V42.7 | OrganTransplant | liver replaced by transplant |
| V42.8 | OrganTransplant | other specified organ or tissue replaced by transplant |
| V42.81 | OrganTransplant | organ or tissue replaced by transplant, bone marrow |
| V42.82 | OrganTransplant | organ or tissue replaced by transplant, peripheral stem cells |
| V42.83 | OrganTransplant | organ or tissue replaced by transplant, pancreas |
| V42.84 | OrganTransplant | organ or tissue replaced by transplant, intestines |
| V42.89 | OrganTransplant | other organ or tissue replaced by transplant |
| V42.9 | OrganTransplant | unspecified organ or tissue replaced by transplant |
| V45.87 | OrganTransplant | transplanted organ removal status |
| V49.83 | OrganTransplant | awaiting organ transplant status |
| V50.0 | OrganTransplant | elective hair transplant for purposes other than remedying health states |
| V58.44 | OrganTransplant | aftercare following organ transplant |
| 403.01 | Renovascular\_Disease | hypertensive chronic kidney disease, malignant, with chronic kidney disease stage v or end stage renal disease |
| 403.1 | Renovascular\_Disease | benign hypertensive renal disease |
| 403.11 | Renovascular\_Disease | hypertensive chronic kidney disease, benign, with chronic kidney disease stage v or end stage renal disease |
| 403.9 | Renovascular\_Disease | unspecified hypertensive renal disease |
| 403.91 | Renovascular\_Disease | hypertensive chronic kidney disease, unspecified, with chronic kidney disease stage v or end stage renal disease |
| 404.02 | Renovascular\_Disease | hypertensive heart and chronic kidney disease, malignant, without heart failure and with chronic kidney disease stage v or end stage renal disease |
| 404.1 | Renovascular\_Disease | benign hypertensive heart and renal disease |
| 404.12 | Renovascular\_Disease | hypertensive heart and chronic kidney disease, benign, without heart failure and with chronic kidney disease stage v or end stage renal disease |
| 404.9 | Renovascular\_Disease | unspecified hypertensive heart and renal disease |
| 255 | Secondary\_Hypertension | cushing's syndrome |
| 255.1 | Secondary\_Hypertension | hyperaldosteronism |
| 255.11 | Secondary\_Hypertension | glucocorticoid-remediable aldosteronism |
| 255.14 | Secondary\_Hypertension | other secondary aldosteronism |
| 255.6 | Secondary\_Hypertension | medulloadrenal hyperfunction |
| 405.01 | Secondary\_Hypertension | malignant renovascular hypertension |
| 405.09 | Secondary\_Hypertension | other malignant secondary hypertension |
| 405.11 | Secondary\_Hypertension | benign renovascular hypertension |
| 405.19 | Secondary\_Hypertension | other benign secondary hypertension |
| 405.91 | Secondary\_Hypertension | unspecified renovascular hypertension |
| 405.99 | Secondary\_Hypertension | other unspecified secondary hypertension |
| 747.1 | Secondary\_Hypertension | coarctation of aorta (preductal) (postductal) |
| 747.11 | Secondary\_Hypertension | interruption of aortic arch |
| 747.22 | Secondary\_Hypertension | congenital atresia and stenosis of aorta |
| 13.4 | Spinal\_Cord\_Injury | tuberculoma of spinal cord, unspecified examination |
| 13.41 | Spinal\_Cord\_Injury | tuberculoma of spinal cord, bacteriological or histological examination not done |
| 13.42 | Spinal\_Cord\_Injury | tuberculoma of spinal cord, bacteriological or histological examination results unknown (at present) |
| 13.43 | Spinal\_Cord\_Injury | tuberculoma of spinal cord, tubercle bacilli found (in sputum) by microscopy |
| 13.44 | Spinal\_Cord\_Injury | tuberculoma of spinal cord, tubercle bacilli not found (in sputum) by microscopy, but found by bacterial culture |
| 13.45 | Spinal\_Cord\_Injury | tuberculoma of spinal cord, tubercle bacilli not found by bacteriological examination, but tuberculosis confirmed |
| 13.46 | Spinal\_Cord\_Injury | tuberculoma of spinal cord, tubercle bacilli not found by bacteriological or histological examination, but tuberculosis |
| 13.5 | Spinal\_Cord\_Injury | tuberculous abscess of spinal cord, unspecified examination |
| 13.51 | Spinal\_Cord\_Injury | tuberculous abscess of spinal cord, bacteriological or histological examination not done |
| 13.52 | Spinal\_Cord\_Injury | tuberculous abscess of spinal cord, bacteriological or histological examination results unknown (at present) |
| 13.53 | Spinal\_Cord\_Injury | tuberculous abscess of spinal cord, tubercle bacilli found (in sputum) by microscopy |
| 13.54 | Spinal\_Cord\_Injury | tuberculous abscess of spinal cord, tubercle bacilli not found (in sputum) by microscopy, but found by bacterial culture |
| 13.55 | Spinal\_Cord\_Injury | tuberculous abscess of spinal cord, tubercle bacilli not found by bacteriological examination, but tuberculosis confirmed |
| 13.56 | Spinal\_Cord\_Injury | tuberculous abscess of spinal cord, tubercle bacilli not found by bacteriological or histological examination, but tubercu- |
| 192.2 | Spinal\_Cord\_Injury | malignant neoplasm of spinal cord |
| 198.3 | Spinal\_Cord\_Injury | secondary malignant neoplasm of brain and spinal cord |
| 225.3 | Spinal\_Cord\_Injury | benign neoplasm of spinal cord |
| 237.5 | Spinal\_Cord\_Injury | neoplasm of uncertain behavior of brain and spinal cord |
| 336 | Spinal\_Cord\_Injury | syringomyelia and syringobulbia |
| 336.2 | Spinal\_Cord\_Injury | subacute combined degeneration of spinal cord in diseases classified elsewhere |
| 336.9 | Spinal\_Cord\_Injury | unspecified disease of spinal cord |
| 742.51 | Spinal\_Cord\_Injury | diastematomyelia |
| 742.53 | Spinal\_Cord\_Injury | hydromyelia |
| 742.59 | Spinal\_Cord\_Injury | other specified congenital anomalies of spinal cord |
| 742.9 | Spinal\_Cord\_Injury | unspecified congenital anomaly of brain, spinal cord, and nervous system |
| 767.4 | Spinal\_Cord\_Injury | injury to spine and spinal cord due to birth trauma |
| 805 | Spinal\_Cord\_Injury | closed fracture of cervical vertebra, unspecified level |
| 805.01 | Spinal\_Cord\_Injury | closed fracture of first cervical vertebra |
| 805.02 | Spinal\_Cord\_Injury | closed fracture of second cervical vertebra |
| 805.03 | Spinal\_Cord\_Injury | closed fracture of third cervical vertebra |
| 805.04 | Spinal\_Cord\_Injury | closed fracture of fourth cervical vertebra |
| 805.05 | Spinal\_Cord\_Injury | closed fracture of fifth cervical vertebra |
| 805.06 | Spinal\_Cord\_Injury | closed fracture of sixth cervical vertebra |
| 805.07 | Spinal\_Cord\_Injury | closed fracture of seventh cervical vertebra |
| 805.08 | Spinal\_Cord\_Injury | closed fracture of multiple cervical vertebrae |
| 805.1 | Spinal\_Cord\_Injury | open fracture of cervical vertebra, unspecified level |
| 805.11 | Spinal\_Cord\_Injury | open fracture of first cervical vertebra |
| 805.12 | Spinal\_Cord\_Injury | open fracture of second cervical vertebra |
| 805.13 | Spinal\_Cord\_Injury | open fracture of third cervical vertebra |
| 805.14 | Spinal\_Cord\_Injury | open fracture of fourth cervical vertebra |
| 805.15 | Spinal\_Cord\_Injury | open fracture of fifth cervical vertebra |
| 805.16 | Spinal\_Cord\_Injury | open fracture of sixth cervical vertebra |
| 805.17 | Spinal\_Cord\_Injury | open fracture of seventh cervical vertebra |
| 805.18 | Spinal\_Cord\_Injury | open fracture of multiple cervical vertebrae |
| 805.2 | Spinal\_Cord\_Injury | closed fracture of dorsal (thoracic) vertebra without mention of spinal cord injury |
| 805.3 | Spinal\_Cord\_Injury | open fracture of dorsal (thoracic) vertebra without mention of spinal cord injury |
| 805.4 | Spinal\_Cord\_Injury | closed fracture of lumbar vertebra without mention of spinal cord injury |
| 805.5 | Spinal\_Cord\_Injury | open fracture of lumbar vertebra without mention of spinal cord injury |
| 805.6 | Spinal\_Cord\_Injury | closed fracture of sacrum and coccyx without mention of spinal cord injury |
| 805.7 | Spinal\_Cord\_Injury | open fracture of sacrum and coccyx without mention of spinal cord injury |
| 805.8 | Spinal\_Cord\_Injury | closed fracture of unspecified part of vertebral column without mention of spinal cord injury |
| 805.9 | Spinal\_Cord\_Injury | open fracture of unspecified part of vertebral column without mention of spinal cord injury |
| 806 | Spinal\_Cord\_Injury | closed fracture of c1-c4 level with unspecified spinal cord injury |
| 806.04 | Spinal\_Cord\_Injury | closed fracture of c1-c4 level with other specified spinal cord injury |
| 806.05 | Spinal\_Cord\_Injury | closed fracture of c5-c7 level with unspecified spinal cord injury |
| 806.09 | Spinal\_Cord\_Injury | closed fracture of c5-c7 level with other specified spinal cord injury |
| 806.1 | Spinal\_Cord\_Injury | open fracture of c1-c4 level with unspecified spinal cord injury |
| 806.14 | Spinal\_Cord\_Injury | open fracture of c1-c4 level with other specified spinal cord injury |
| 806.15 | Spinal\_Cord\_Injury | open fracture of c5-c7 level with unspecified spinal cord injury |
| 806.19 | Spinal\_Cord\_Injury | open fracture of c5-c7 level with other specified spinal cord injury |
| 806.2 | Spinal\_Cord\_Injury | closed fracture of t1-t6 level with unspecified spinal cord injury |
| 806.24 | Spinal\_Cord\_Injury | closed fracture of t1-t6 level with other specified spinal cord injury |
| 806.25 | Spinal\_Cord\_Injury | closed fracture of t7-t12 level with unspecified spinal cord injury |
| 806.29 | Spinal\_Cord\_Injury | closed fracture of t7-t12 level with other specified spinal cord injury |
| 806.3 | Spinal\_Cord\_Injury | open fracture of t1-t6 level with unspecified spinal cord injury |
| 806.34 | Spinal\_Cord\_Injury | open fracture of t1-t6 level with other specified spinal cord injury |
| 806.35 | Spinal\_Cord\_Injury | open fracture of t7-t12 level with unspecified spinal cord injury |
| 806.39 | Spinal\_Cord\_Injury | open fracture of t7-t12 level with other specified spinal cord injury |
| 806.4 | Spinal\_Cord\_Injury | closed fracture of lumbar spine with spinal cord injury |
| 806.5 | Spinal\_Cord\_Injury | open fracture of lumbar spine with spinal cord injury |
| 806.6 | Spinal\_Cord\_Injury | closed fracture of sacrum and coccyx with unspecified spinal cord injury |
| 806.69 | Spinal\_Cord\_Injury | closed fracture of sacrum and coccyx with other spinal cord injury |
| 806.7 | Spinal\_Cord\_Injury | open fracture of sacrum and coccyx with unspecified spinal cord injury |
| 806.79 | Spinal\_Cord\_Injury | open fracture of sacrum and coccyx with other spinal cord injury |
| 806.8 | Spinal\_Cord\_Injury | closed fracture of unspecified vertebra with spinal cord injury |
| 806.9 | Spinal\_Cord\_Injury | open fracture of unspecified vertebra with spinal cord injury |
| 905.1 | Spinal\_Cord\_Injury | late effect of fracture of spine and trunk without mention of spinal cord lesion |
| 907.2 | Spinal\_Cord\_Injury | late effect of spinal cord injury |
| 952 | Spinal\_Cord\_Injury | c1-c4 level spinal cord injury, unspecified |
| 952.01 | Spinal\_Cord\_Injury | c1-c4 level with complete lesion of spinal cord |
| 952.04 | Spinal\_Cord\_Injury | c1-c4 level with other specified spinal cord injury |
| 952.05 | Spinal\_Cord\_Injury | c5-c7 level spinal cord injury, unspecified |
| 952.06 | Spinal\_Cord\_Injury | c5-c7 level with complete lesion of spinal cord |
| 952.09 | Spinal\_Cord\_Injury | c5-c7 level with other specified spinal cord injury |
| 952.11 | Spinal\_Cord\_Injury | t1-t6 level with complete lesion of spinal cord |
| 952.14 | Spinal\_Cord\_Injury | t1-t6 level with other specified spinal cord injury |
| 952.15 | Spinal\_Cord\_Injury | t7-t12 level spinal cord injury, unspecified |
| 952.16 | Spinal\_Cord\_Injury | t7-t12 level with complete lesion of spinal cord |
| 952.19 | Spinal\_Cord\_Injury | t7-t12 level with other specified spinal cord injury |
| 952.2 | Spinal\_Cord\_Injury | lumbar spinal cord injury without spinal bone injury |
| 952.4 | Spinal\_Cord\_Injury | cauda equina spinal cord injury without spinal bone injury |
| 952.8 | Spinal\_Cord\_Injury | multiple sites of spinal cord injury without spinal bone injury |
| 952.9 | Spinal\_Cord\_Injury | unspecified site of spinal cord injury without spinal bone injury |
| V53.02 | Spinal\_Cord\_Injury | fitting and adjustment of neuropacemaker (brain) (peripheral nerve) (spinal cord) |

**Appendix B: Antihypertensive drug doses from JNC8 (pg 514)**



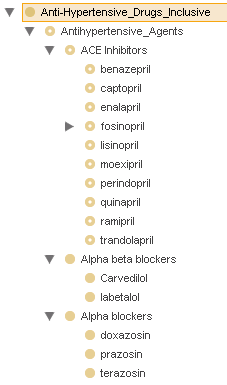
**Appendix C: list of K sparing diuretics**

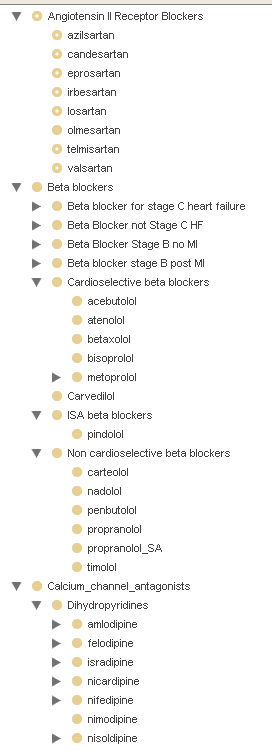


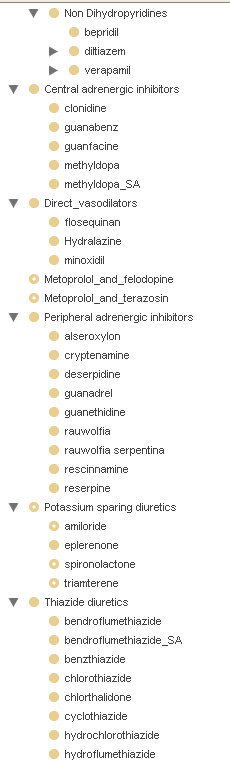
**Appendix D: drugs coded as sulfonamide (**

|  |  |
| --- | --- |
| Reactant | KBName |
| ACETAZOLAMIDE | Sulfa\_drugs\_noSU |
| ACETAZOLAMIDE SODIUM | Sulfa\_drugs\_noSU |
| ALISKIREN | Sulfa\_drugs\_noSU |
| ALISKIREN HEMIFUMARATE | Sulfa\_drugs\_noSU |
| BUMETANIDE | Sulfa\_drugs\_noSU |
| CELECOXIB | Sulfa\_drugs\_noSU |
| CHLORTHALIDONE | Sulfa\_drugs\_noSU |
| FUROSEMIDE | Sulfa\_drugs\_noSU |
| HYDROCHLOROTHIAZIDE | Sulfa\_drugs\_noSU |
| METHAZOLAMIDE | Sulfa\_drugs\_noSU |
| SILVER SULFADIAZINE | Sulfa\_drugs\_noSU |
| SULFACETAMIDE | Sulfa\_drugs\_noSU |
| SULFACETAMIDE SODIUM | Sulfa\_drugs\_noSU |
| SULFADIAZINE | Sulfa\_drugs\_noSU |
| SULFAMETHOXAZOLE | Sulfa\_drugs\_noSU |

**Appendix E: Anti-hypertensive drugs**









**Wishlist April 2015:**

**Implement: Y/N**

**Categories of complexity to encode: 1 -easy, 2-moderate, 3-hard, 4-ask ST**

**Priority: 1(high)->4 (very low)**

**ACE Inhibitor**

Absolute contraindication

New: most recent K>5.5 and <30days old (valid for on ACE or not on ACE) – absolute contraindication

Add message: If K>=30 days old issue message to repeat K and drop absolute contraindication.

Blocked recommendation

K>5.5 and absence of ACE – update to add temporal constraint of >=30days old

* + - CM: If most recent K >5.5, need to order K before prescribing ACE

**ARB**

Absolute contraindication

New: most recent K>5.5 and <30days old (valid for on ARB or not on ARB) – absolute contraindication

Add message: If K>=30 days old issue message to repeat K and drop absolute contraindication.

Blocked recommendation

K>5.5 and absence of ARB – update to add temporal constraint of >=30days old

* + - CM: If most recent K >5.5, need to order K before prescribing ARB
* *Intensification criteria (4/24/15)- if on:*

1 preferred drug: can increase dose or add a 2nd drug (encoded currently)

2 preferred drugs: just intensify if not on high\_dose range. If both drugs on high\_dose range then add 3rd drug (not encoded currently – that if 2 drugs are in medium dose range we would not add drugs))

3 preferred drugs: intensify dose. If all drugs in high\_dose range then issue message ‘Please choose another class of antihypertensive drug to add or refer to a specialist’. (not encoded currently)

* If patient is above upper limit of high\_dose range – would like to issue a message warning provider about this.
* *We have updated the dose ranges to be in line with JNC8 as best we could:*

Lisinopril no changes

Enalapril no changes

Captopril - changed

Eprosartan- – in kb but not in guideline drug - wishlist

Candesartan- – in kb but not in guideline drug - wishlist

Valsartan – no changes

Irbesartan- no changes

Amlodipine – was not in guideline drugs, added amlodipine and amlodipine\_besylate – dose ranges did not change

Diltiazem SR/SA – no changes

Nitrendipine- not in kb, will not add for now. On wishlist Only used in Europe

Bendroflumethiazide – in kb but not in guideline drug – wishlist Only used in Europe?

chlorthalidone– in kb but not in guideline drug on wish list

HCTZ – recommended target dose range is now 25-50. Adjusted so dose increase not recommended if >=40

Indapamide- – in kb but not in guideline drug - wishlist

* Add link to table 4 JNC8 to add drug and intensify drug recs. (emailed Dan and ST 4/24/15)

From ST:

I don’t think at this time we have ad hoc way of adding html link next to each ‘add’ recommendation. Links can be added as part of a message text. For example, in the Lipid guideline, Connie has encoded an On\_Screen\_Message

([Lipid\_dashboard\_Class100015] of  On\_Screen\_Message

(label "Refusal or intolerance to statin")

(message "If patient refuses statins or cannot tolerate statins, consider <a href=\"[http://@AUTOPMWEBSERVER@/Lipid/Non\_statin\_drugs.pdf\](http://@AUTOPMWEBSERVER@/Lipid/Non_statin_drugs.pdf/)">  non-statin drugs </a>.") (message\_type Recommendation))

At runtime, Dan’s code replaces "@AUTOPMWEBSERVER@“ with the appropriate root path to the file. The message can be a part of a drug usage’s collateral action.

SM- will leave on wishlist. We would need to add collateral messages to all add recs. Ideally would like to link

**icd KBName icddescription**

401.0 Hypertension MALIGNANT ESSENTIAL HYPERTENSION 🡺 leave in as eligibility criteria and if BP is elevated pt will go into high BP scenario and no recs will be given. No need to issue messages in current kb since we can’t differentiate whether dx is active or inactive.

* If active on problem list CDS should issue a primary message stating pt has active dx of malignant hypertension and recommendations are beyond the scope of this program. If dx is no longer active please updated the PL accordingly.

**Mike:**

Not available at VA: mention to acknowlegde their existence

Bendoflumethazide

Isradipine

Bepridil

Nitrendipine

Eprosartan

VA available but non-formulary: probably need to encode, but could be wish list?

Nicardipine

Candesartan

VA meds: need to encode, what are the chances?

Chlorlthalidone \*\*\*\*\*\*

Indapamide \*\*\*\*\*\*

Nimidipine \*\*\*\*\*

Nifedipine SA only

Felodipine SA only

Will look at thiazides next.  
The only thiazide meds available from the VA are: (all are on the formulary)

Chlorthalidone \*\*\*\*\*\*

HCTZ

Indapamide \*\*\*\*\*

Metolazone \*\*\*\*\*

TO check: issue about sulfa allergy relevant hctz and sulfonylureas, which drugs have the chemical component and should be in the mapping table

**Wishlist per Kaeli’s work:**

**From 7/27/2015 email from Susana:**

1. If no eGFR use creatinine- need to decide on values – 2.3 women and 2.5 men? As used before.
2. If no eGFR nor creatinine, issue message to order lab rather than exclude
3. If patient is excluded and yet is failing the measure we should state that patient is excluded from recs based on eligibility criteria and issue a rec to refer because of exclusion criteria or to order labs if labs are missing
4. Add creatinine to eGFR eligibility criteria and rule in/out criteria throughout. In real world this would not be an issue.
5. When eGFR criteria evaluates to unknown it has different behavior in eligibility criteria and as a rulein condition for an action choice (BP above target/CKD)
6. If BP is over a year old should issue a message?
7. New item 9/8/2015 from meeting: add to longterm wish list: if eGFR/creatinine are missing, work out how to give a message to obtain an eGFR/creatinine. Will need to work this out within each scenario, determining whether to issue the message and go ahead and process the rest of the scenario or to halt until a creatinine is available

DEBUGGING:

Inreviewing case 504018, DBP = 113. When case is run in EON, it correctly classifies into the scenario of very HI BP; however, it does not issue the message. Requires debugging. Note that the BP is more than one year old; however, the KB is not check8ing for how old the BP is (it just accepts the most recent BP) so it should have issued the message.

**Other:**

* ATHENA fails to recommend increase dose for losartan because definition of "low dose" is missing in KB (1) - 500858
* Put "Tamsulosin" in the alpha-blocker subclass of anti-hypertensives (so ATHENA will recognize it as an anti-HTN med in the HTN KB)? Need to discuss w/ Mary and Mike
* MI older than 6 months should NOT be used to define IHD. But w/in 6mo, "Acute MI" ICD9 code means IHD (patient 500489).
* KY thought "OTHER LEFT BUNDLE BRANCH BLOCK" was a type of heart block that would be an absolute contraindication to CCB NDHP, but it is not (1) - need to discuss whether this is a wishlist item to fix or not

**Updates to Rules per Kaeli’s work:**

NOTE: these fixes are to align the rules doc with what is encoded as of 7/30/2015. Wishlist items are not included in rules doc fixes to make. If a wishlist item is added to the KB, the rules doc should be updated accordingly

* Need to explain the part of the algorithm that patients traverse if they have CKD - this is currently not mentioned in the rules doc

* Need explain that there are different JNC8 targets (e.g. 140/90 instead of 150/90) for different groups and list what they are, including:
  + Pts w/ DM ICD9
  + Low eGFR (what's the number? Ask Susana for what's in the KB)
  + Pts younger than 60 vs. older than 60

* Need to say that recs for thiazides and CCBs will be blocked by SBP>1month old

**Wishlist from OneNote 9/1/15**

* + Pt on 4 drugs but not at max doses. Currently system refers pt for consultation if on 4 drugs at any doses:
    - Add to system capability to process which of the 4 drugs are preferred, which other ones might have a special indication (eg metoprolol), and to allow 4 drugs if not at max doses

* + Multiple BPs on same day. Current system, if there are multiple sets of BP on same day, how it handles:
    - Samson: depends on the type of criteria. If you don't have time-stamped data it will select one SBP and one DBP at random. If you have time-stamped data, what happens depends on the PAL criteria. If it involves the presence criteria and the numerical comparison criteria then it is the most recent one based on timestamp.
    - We can revisit in the future whether we want to do any averaging of BPs within a day

5/15/15 Not implementing JNC8 CKD definition which includes albumin- on wish list. Using only most recent eGFR<60. [JNC8 definition is (eGFR<60 OR ACR>30) AND (age <70 AND >18). Need to check with Amy whether Dashboard evaluates BP for ages <75 or for all ages? The CKD module uses the Dashboard computations. The Dashboard definitions are in the SQL code.

Request from Mike 5/19/2015:

* + If 'unknown' race, send message (not primary) reminding provider to update race.
  + Again add message if on higher than upper limit recommended dose. Case 500020 (HCTZ 87.5). These messages should appear for all scenarios.

* + IHD and DBP<60 scenario (in this scenario we don't give rec's and we give a warning about the low DBP); if patient also has SBP above target, we will keep patient in this scenario but we want to issue another message pointing out that SBP is above target and clinician should use clinical judgment. We can have alternate messages depending on whether the SBP is in the 140-150 range or above 150.

NOTE this would be a major change to how we conceive of the system because the system is designed so that the scenarios are mutually exclusive. Samson says we have choices of how we partition the criteria wihtin a scenario. Could merge the scenarios, if pt has only IHD/low-DBP then give one message but if patient has that plus the SBP between targets, you can customize the message you give depending on the SBP.

Currently have 6 scenarios. If pt does not have IHD/lowDBP, the pt is somewhere in one of the other 5 scenarios. Each is mutually exclusive. Can put the special message for SBP between targets into the IHD/lowDBP scenario. If pt doesn’t have IHD/lowDBP then pt will be sorted into a different scenario, which might be the SBP between targets scenario

* Issue of BPs that are very old. In the dashboard we don't have the capability of having the PCP enter today's BP and update advisory. And we don't think we have the ability to reach out to get updated BP as we did in VISN collab.

 Mike recommended that if BP is older than one year , that the only recommendation we make is to get an updated BP. (per Susana: currently if BP is older than a month (absence of SBP in past month), we do a "blocked rec"). Do we need to make a distinction between Blocked Rec’s for older than one month, and NO recommendations for older than one year except to say get an updated BP?

* + Patient with active prescription for furosemide and hctz - no HF. Should we issue message alerting the provider against the use of 2 diuretics. Also 3x dose of amlodipine. YES, agree, give a message
  + on ACE and ARB, no HF - warn them against use of ACE and ARB, YES, give message

9/15/15 other notes from discussion w/ Samson. The Knowledge Tree was set up as a way to view drugs. There is a way to set it up so that only those drugs are used, but would requires special coding which we have not done.

Re: eligibility criteria. For patients who don’t have Age or eGFR, right now the system doesn’t rule them out. a long time ago we had decided to be inclusive and not exclude patients if data not available. Would be easy to exclude these patients if data not available, but might not be a good idea given the long-standing decision about behavior of the system. If we changed that, the system would be very different. May be better to encode as a separate scenario.

You can revise the clinical algorithm to check for the values of the eligibility criteria.