CHRONIC KIDNEY DISEASE

Intermountain Healthcare and KDIGO Guidelines

Preventing Kidney Failure is the Goal
CHRONIC KIDNEY DISEASE

KDIGO: Kidney Disease, Improving Global Outcomes, 2013 Guidelines
OBJECTIVES:

• Identify two simple laboratory tests needed to diagnosis Chronic Kidney Disease.
• Name a potential leverage point in your clinic process to increase the rate of screening for CKD.
• Correctly identify CKD by stage and risk level using the classification system set forth by KDIGO.
• Identify appropriate blood pressure goals based on ACR level.
Who:

• Over 20 million adults estimated prevalence

• one 2007 study estimated only 27% diagnosed with CKD

• 1:3 with diabetes and 1:5 with hypertension
Why:

• **Prevent Renal Failure.** One year of hemodialysis costs $72,000 per person.

• **Chronic kidney disease is a significant CVD risk factor.** Patients with an eGFR < 70 (CKD Stage G2) have a 51% greater risk of death from CVD than non-CKD patients.

• **Increased hospitalization and medical expenditure.** CKD results in a significant increase in all-cause hospitalization in patients over 65.
Why:

• Dose drugs safely,

• delay metabolic complications such as anemia, hyperkalemia and bone disease
What:

- Abnormality in kidney structure and/or function
- eGFR < 60 on two occasions over 90 days apart
- albumin/creatinine ratio > 30 on two occasions over 90 days apart
CKD classification system

**Composite ranking for relative risks by GFR and albuminuria (KDIGO 2009)**

<table>
<thead>
<tr>
<th>Albuminuria stages, description and range (mg/g)</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
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</thead>
<tbody>
<tr>
<td>Optimal and high-normal</td>
<td>&lt;10</td>
<td>10–29</td>
<td>30–299</td>
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<tr>
<td>High</td>
<td>300–1999</td>
<td>≥2000</td>
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<table>
<thead>
<tr>
<th>GFR stages, description and range (ml/min per 1.73 m²)</th>
<th>G1</th>
<th>G2</th>
<th>G3a</th>
<th>G3b</th>
<th>G4</th>
<th>G5</th>
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<td>Kidney failure</td>
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<td>CKD Patient Counts by Stage and Category as of November 2016 For IMG and affiliates (System Total)</td>
<td>A1 Normal to Mildly Increased</td>
<td>A2 Moderately Increased</td>
<td>A3 Severely Increased</td>
<td>Missing Test</td>
<td>Grand Total</td>
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<td>542</td>
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<tr>
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<td>2,388</td>
<td>241</td>
<td>1,152</td>
<td>5,086</td>
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</table>
## SCREEN FOR CHRONIC KIDNEY DISEASE

### Chronic conditions
1. Diabetes Type 1 and Type 2
2. Hypertension
3. Cardiovascular disease (CVD)
4. Structural renal tract disease
5. Systemic illness affecting kidneys (HIV, lupus, vasculitis, rheumatoid arthritis, hyperuricemia, multiple myeloma)

### History
1. Family history of kidney disease (dialysis, renal failure)
2. History of acute renal failure

### Urologic problems
1. Urinary obstruction, structural renal tract disease, urinary diversion surgery, or reflux nephropathy
2. Recurrent urinary tract infections (UTIs) (> 3 in 1 year)
3. Kidney stones

### Meds
1. High dose or chronic treatment with nephrotoxic medications, including NSAIDs
When:

• Diabetes visits
• Hypertension visits
• Cardiovascular disease visits
• Any chronic disease or preventative visit
SCREEN patients at risk for CKD ANNUALLY

- Basic metabolic panel (BMP) for serum creatinine and eGFR
- Urine sample for albumin creatinine ratio (ACR)
- Evaluate for and treat acute and/or treatable kidney or urinary conditions

- eGFR <60
  - yes: Rescreen annually
  - no: no

- Other reasons for nephrologist care
  - yes: Refer to nephrologist
  - no: no

- Suspect CKD, retest eGFR in 3 months to confirm
  - Retesting confirm results?
    - yes: DIAGNOSE CKD
    - no: Rescreen annually

- ACR >30
  - yes: Refer to nephrologist
  - no: no

- ACR >300
  - yes: no
  - no: yes

Intermountain Healthcare - Helping for Life
Patient found to have low eGFR

ACE/ARB started if ACR or BP elevated

ACR ordered if DM or provider concerned

Patient referred to nephrologist

Existing process

eGFR<30

eGFR 60 40

eGFR<30
AIM STATEMENT:

Increase the numbers of urine albumin creatinine ratios obtained on patients in stage 3a and 3b from 15% to 25% by April of 2017, by developing a method for team members to easily obtain albumin creatinine ratios.
Current proposed Physician Centric process in the CKD Care Process Model

**DIAGNOS PER KIDIGO CLASSIFICATION**
- Physician identify when reviewing problem list if at risk or alert on icentra
- Order chem panel for eGFR and urine for ACR

**IDENTIFY:**
- htn, ckd, dm, cvd, meds-nsaids structural, immune
- Physician add Ckd to problem list
- Physician: start ACE/arb
- Physician: fu bp protocol to goal <140/90 if scr <300 or <130/80 if scr > 300
- Discuss stopping nsaid immunize, start statin, treat diabetes
- Stop metformin when eGFR<30

**FOLLOW UP:**
- yearly
- Twice yearly
- Refer to nephrology

**TREATMENT**
- Physician: inform patient has ckd, include pt ed
- Physician add ckd to problem list
- Physician: add ckd to problem list
- Physician: order chem panel for eGFR and urine for ACR
Current proposed Physician Centric process in the CKD Care Process Model

**IDENTIFY:**
- HTN, CVD, DM, CKD
- meds-nsaids, structural, Auto-immune

**DIAGNOS PER KIDIGO CLASSIFICATION**

Physician identify when reviewing problem list if at risk or alert on icentra

Order chem panel for eGFR and urine for ACR

Physician add CKD to problem list

Physician Inform patient has CKD, include pt ed
Aim statement

Increase use of ACR by from 15% to 25%, by April of 2017

Key Drivers

- Physicians
- Care Manager
- Medical Assistant
- EMR

Interventions

- Education at provider meeting
- Care manager to add comment on schedule scrubbing
- MA to obtain urine while patient waiting
- Educate MA’s on key patients
- Patient education tool
- Patient advisories on EMR
**IDENTIFY:**
HTN, CVD, DM, CKD meds - nsaid
structural, Auot-immune

**Physician identify when reviewing problem list if at risk or alert on icentra**

**MA to ask patient if taking nsaid daily or has kidney problems**

**MA take bp per protocol each time, 5 min sitting, use red heart if >140/90**

**Care team add note to daily scrub sheet alerting clinician to low eGFR or missing ACR**

**Order bmp for eGFR**
**Order ACR**
**Consider treatable causes**

**Physician repeat BP If elevated**
**Send message to care manager for pt to return**

**Physician**
**Inform patient has ckd, include pt ed**

**MA to obtain urine while patient waits**

**Order eGFR**

**Proposed Team Based Model with Leverage Points in Yellow**

**Confirm with second reading 90 days apart**

**Care manager to educate**

**EMR advisory to order labs**

**DIAGNOS PER KIDIGO CLASSIFICATION**

**MA**
Percentage of CKD Stage 3 Patients Receiving Timely ACR Test
• FOLLOW UP:
  • Yearly
  • Twice yearly
  • Refer to nephrology
CKD classification system

<table>
<thead>
<tr>
<th>GFR stages, description and range (ml/min per 1.73 m²)</th>
<th>Albuminuria stages, description and range (mg/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td>Optimal and high-normal</td>
</tr>
<tr>
<td>&lt;10</td>
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<td>300–1999</td>
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<td>&gt;2000</td>
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</table>

- **G1**: High and optimal
- **G2**: Mild
- **G3a**: Mild-moderate
- **G3b**: Moderate-severe
- **G4**: Severe
- **G5**: Kidney failure
## MANAGE CKD

<table>
<thead>
<tr>
<th></th>
<th>Low or no risk</th>
<th>Moderately increased risk</th>
<th>High risk</th>
<th>Very high/extremely high risk</th>
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<td><strong>Red: Very High/Extremely High Risk</strong></td>
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<td><strong>Orange: High Risk</strong></td>
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<td><strong>Yellow: Moderately Increased Risk</strong></td>
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<td><strong>Green: Low or No Risk</strong></td>
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</tbody>
</table>
Physician: start ACE/arb

Physician: fu bp protocol to goal
<140/90 if acr <300 or <130/80 if acr > 300

Discuss stopping nsaid
immunize, start statin,
treat diabetes

Stop metformin when eGFR<30
Albuminuria in relation to the percentage of clinical visits in which blood pressure (BP) values were reduced to <140/90 mmHg or to <130/80 mmHg.

ONTARGET data
ALGORITHM 4: ALBUMINURIA/HYPERTENSION MANAGEMENT

**Abbreviations used in this algorithm:**
- ACR = albumin-to-creatinine ratio
- SBP = systolic blood pressure
- ARA = aldosterone receptor antagonist
- BB = beta blocker
- CCB = calcium channel blocker

**Management Goals**

**Albuminuria:**
- Patients with moderately increased albuminuria (ACR 30–300): Eliminate detectable albumin
- Patients with severely increased albuminuria (ACR > 300): Reduce to 50% of baseline, or lower to ACR < 200 in high-risk CVD

**Hypertension:**
- Patients without albuminuria: ≤ 140/90, patients with ACR > 300: ≤ 130/80

**Therapeutic Lifestyle Change (TLC)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Dietary Sodium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase regular aerobic activity to at least 30 minutes 5 days a week (expected SBP reduction: 2–8 mm Hg). The DASH diet can be helpful at CKD Stage G1–G2, at stage G3–G5, potassium in DASH diet is too high.</td>
<td>Reduce dietary sodium to less than 1,500 mg/day (expected SBP reduction: 2–8 mm Hg).</td>
</tr>
</tbody>
</table>

**Weight**
- If overweight, lose weight: Maintain BMI of 18.5–24.9 (expected SBP reduction: 5–20 mm Hg per 10 kg weight loss).

**Alcohol**
- Reduce alcohol to no more than 7 drinks per day for men, or no more than 5 drinks per day for women and lighter-weight men (expected SBP reduction: 2–4 mm Hg).

**Initiate Medication** (with special consideration of albuminuria) in the order below:
- If the goal is not met, move to the next medication step.

- **Start ACEI or ARB**
- **Increase ACEI or ARB if possible**
- **Add at CKD Stages G1–G2: thiazide diuretic, ARA, or CCB**
- **Add at CKD Stages G3–G5: loop diuretic, ARA, CCB, or BB**
- **Add any agent not tried previously**

**Test serum creatinine (SC): Within 2 weeks of starting an ACEI or ARB or any dose change:**
- If SC is increased by < 15% compared to baseline, increase dose if needed.
- If SC is increased by 15% or 25% from baseline, retake in 2 weeks.
- If potassium is reduced or further lowering, maintain dose.
- If SC is increased > 25% from baseline, reduce dose by 50% or stop ACEI/ARB. Switch to the next-line agent. Retest in 2 weeks to ensure that the problem is resolved.

**Test potassium: Within 8–10 days when adding an ARB or increasing dose (if patient is on ACEI or ARB) or between 1–10 days (if patient is not on ACEI or ARB):**
- If potassium is > 5.5 mmol/L, reduce dose or stop therapy. Switch to the next-line agent. Suggest that patient reduce dietary potassium.

**Notes:**
- Monitor for signs of anaphylaxis, especially after change in medical therapy and withdrawal of or compromised patients.
- In patients with HBP, many nephrologists encourage starting with an ACEI or an ARB even if the ACR is normal even though the benefit for preventing future albuminuria has not been proven.
CKD Patients on an ACE/ARB

System as a Whole (Medical Group Providers)

<table>
<thead>
<tr>
<th></th>
<th>Jan-16</th>
<th>Dec-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>68%</td>
<td>57%</td>
<td>71%</td>
</tr>
<tr>
<td>n=6,840</td>
<td>n=2,178</td>
<td>n=7,893</td>
</tr>
</tbody>
</table>

- CKD & Diabetes w/ACR ≥ 30
- CKD w/ACR > 300
CKD Patients on an ACE/ARB

Timpanogos Region

Jan-16

CKD & Diabetes w/ ACR ≥ 30: 70% (n=582)
CKD w/ ACR > 300: 52% (n=189)

Dec-16

CKD & Diabetes w/ ACR ≥ 30: 71% (n=670)
CKD w/ ACR > 300: 60% (n=206)
CKD Patients on an ACE/ARB

Cache Valley Region

<table>
<thead>
<tr>
<th></th>
<th>Jan-16</th>
<th>Dec-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>CKD &amp; Diabetes w/ACR ≥ 30</td>
<td>74%</td>
<td>76%</td>
</tr>
<tr>
<td></td>
<td>n=604</td>
<td>n=704</td>
</tr>
<tr>
<td>CKD w/ACR &gt; 300</td>
<td>66%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>n=182</td>
<td>n=236</td>
</tr>
</tbody>
</table>
CKD Patients on an ACE/ARB

Weber/North Davis Region

- Jan-16: 72% (n=1,087)
- Dec-16: 75% (n=1,361)

CKD & Diabetes w/ACR ≥ 30

- Jan-16: 65% (n=306)
- Dec-16: 70% (n=393)
Percent of CKD Patients Whose Blood Pressure is in Recommended Range

System as a Whole (Medical Group Providers)

<table>
<thead>
<tr>
<th>Month</th>
<th>CKD w/ACR ≤ 300: Target 140/90</th>
<th>CKD w/ACR &gt; 300: Target 130/80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-16</td>
<td>66% (n=22,405)</td>
<td>30% (n=2,025)</td>
</tr>
<tr>
<td>Dec-16</td>
<td>71% (n=25,011)</td>
<td>29% (n=2,449)</td>
</tr>
</tbody>
</table>
Percent of CKD Patients Whose Blood Pressure is in Recommended Range

Timpanogos Region

Jan-16
- CKD w/ACR ≤ 300: Target 140/90
  - 60%
  - n=1,840
- CKD w/ACR > 300: Target 130/80
  - 22%
  - n=172

Dec-16
- CKD w/ACR ≤ 300: Target 140/90
  - 67%
  - n=2,103
- CKD w/ACR > 300: Target 130/80
  - 26%
  - n=183
Percent of CKD Patients Whose Blood Pressure is in Recommended Range

Cache Valley Region

<table>
<thead>
<tr>
<th>Month</th>
<th>CKD w/ACR ≤ 300: Target 140/90</th>
<th>CKD w/ACR &gt; 300: Target 130/80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-16</td>
<td>66% (n=2,003)</td>
<td>30% (n=180)</td>
</tr>
<tr>
<td>Dec-16</td>
<td>72% (n=2,287)</td>
<td>31% (n=235)</td>
</tr>
</tbody>
</table>
Percent of CKD Patients Whose Blood Pressure is in Recommended Range

Weber/North Davis Region

CKD w/ACR ≤ 300: Target 140/90  CKD w/ACR > 300: Target 130/80
Statins and CKD

CKD patient with eGFR ≤ 59 OR ACR ≥ 30*

On dialysis or eGFR < 15?

yes

AVOID starting statin therapy; CONTINUE if already taking a statin or statin/ezetimibe combination.

no

Age ≥ 50

yes

START statin therapy with a moderate dose (see table below).

no

(ASCVD, diabetes, CV risk ≥ 7.5% on AHA calculator)

yes

no

FOLLOW Intermountain's Cardiovascular Risk and Cholesterol guidelines CPM
PRESCRIBE A STATIN

CKD patients with an eGFR<59 or ACR >30

Age >50

yes

Start statin with a moderate dose

no

Follow standard guidelines

eGFR<15 or on dialysis

Do not start statin, continue if on one
Vaccinate

• Pneumococcal vaccines when eGFR <60
• Hepatitis B when eGFR < 30 and risk of progression
Refer to nephrologist when:

- Acute kidney injury or abrupt sustained fall in eGFR
- eGFR ≤ 45 (GFR categories G3b–G5)
  A consistent finding of significant albuminuria (ACR ≥ 300)
- Rapid progression of CKD
- Urinary red cell casts, RBC > 20 per high power field sustained and not readily explained
- CKD and hypertension refractory to treatment with 4 or more antihypertensive agents
- Persistent abnormalities of serum potassium
- Recurrent or extensive nephrolithiasis
- Hereditary kidney disease
When referring to nephrologist:

- Include recent eGFR and ACR.
- Include imaging, ultrasound is preferred.
- Include phosphorus level with renal panel.
### CKD classification system (KDIGO 2009)

<table>
<thead>
<tr>
<th>GFR stages, description and range (ml/min per 1.73 m²)</th>
<th>G1 High and optimal</th>
<th>G2 Mild</th>
<th>G3a Mild-moderate</th>
<th>G3b Moderate-severe</th>
<th>G4 Severe</th>
<th>G5 Kidney failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100</td>
<td>&gt;105</td>
<td>75–89</td>
<td>45–59</td>
<td>30–44</td>
<td>15–29</td>
<td>&lt;15</td>
</tr>
<tr>
<td>100–104</td>
<td>90–104</td>
<td>60–74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105–100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimal and high-normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1 A2 A3</td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
</tr>
<tr>
<td>Optimal and high-normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2 A3</td>
<td>refer*</td>
<td></td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
</tr>
<tr>
<td>Very high and nephrotic</td>
<td></td>
<td></td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
</tr>
<tr>
<td>A3</td>
<td>refer*</td>
<td></td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
<td>refer*</td>
</tr>
</tbody>
</table>

**Legend:**
- **Green**: Optimal and high-normal
- **Yellow**: High
- **Red**: Very high and nephrotic

**Note:** The table depicts relative risks by GFR and albuminuria.
ADD CHRONIC KIDNEY DISEASE TO PROBLEM LIST

IF on two separate occasions 90 days apart

- eGFR 60 – 89 with UACR >30 stage 2 NI8.2
- eGFR 59 – 30 any UACR stage 3 NI8.3
- eGFR < 30 stage 4 NI8.4

[Also leads to higher level of payment]
OBJECTIVES:

- Identify two simple laboratory tests needed to diagnosis Chronic Kidney Disease.
- Name a potential leverage point in your clinic process to increase the rate of screening for CKD.
- Correctly identify CKD by stage and risk level using the classification system set forth by KDIGO.
- Identify appropriate blood pressure goals based on ACR level.
Order ACR on high risk patients with CKD yearly

- **Identifies** patients at higher risk of progression

- **Low cost test:** $28 to patient, A1c is $27

- Allows **intensifications of blood pressure control**, < 130/80

- **Educate** patients

- Earlier **referral** to nephrologists to control risk factors and bone disease
Think outside the box

Order ACR on HTN patients

Start ACE/ARB on normotensive patients with ACR>30
THANK YOU FOR YOUR ATTENTION

You can reach me at Paula.Haberman@imail.org with any questions or if you would like to join us!