greater per 10-mL/min/1.73 m² lower eGFR and was 2-fold greater among individuals with proteinuria independent of other risk factors. In a large population of HIV-1 infected women, a graded relationship between albuminuria and the risk of all-cause and AIDS mortality was identified. In a large predominantly HIV-1 infected male cohort followed for a mean of 5.7 years, the incidence of all-cause mortality, ESRD, cardiovascular disease, and heart failure increased incrementally with the severity of AKI.

**Management of kidney disease in HIV-1 infected individuals**

Patients with eGFR <60 mL/min per 1.73 m² or proteinuria (≥+) should be referred to a nephrologist with consideration for kidney biopsy. Drug dosing in HIV-1 infected individuals with kidney disease should be adjusted according to their level of kidney function as incorrect dosing in HIV-1 infected individuals may explain the higher mortality associated with kidney disease in this population. Based on observational studies showing the efficacy of ART in treating HIVAN, ART initiation is recommended in patients diagnosed with HIVAN irrespective of immune status. The findings of severe interstitial inflammation on kidney biopsy in patients with HIVAN may explain the partial efficacy of steroids in treating HIVAN.

Suggested dose is 1 mg/kg/day of prednisone for 4 weeks with subsequent taper. Angiotensin-converting enzyme inhibitors can be utilized as an adjunctive therapy if tolerated. The use of ART in patients who are diagnosed with HIVICK has been shown less effective. Given the strong link between both acute and chronic kidney disease with cardiovascular disease observed in HIV-1 infected individuals, treatment needs to encompass management of blood pressure, diabetes, and dyslipidemia. All modalities of renal replacement therapy should be entertained and discussed with those who progress to ESRD. No special precautions are required for HIV-1 infected individuals on maintenance dialysis and no necessity to assign a dedicated nurse or an isolated chair to those patients while on hemodialysis.

Those with undetectable viral load, CD4>200, and on stable ART should be considered for kidney transplant. It is advisable to consider substituting protease inhibitors and potentially nephrotoxic antiretroviral agents prior to transplant to avoid drug-drug interactions with immunosuppressive agents as well as renal graft dysfunction respectively.

### Table 1: Creatinine clearance and eGFR equations

<table>
<thead>
<tr>
<th>Equation</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cockcroft-Gault</td>
<td>CrCl = [(140-age) x weight/(72 xScr)] x 0.85 if female</td>
</tr>
<tr>
<td>Re-expressed MDRD</td>
<td>eGFR = 175 x standardized Scr^-1.154 x age^-0.203 x 0.742 if female x 1.212 if Black</td>
</tr>
<tr>
<td>CKD-EPI</td>
<td>eGFR=141 x min (Scr/k,1) α x max (Scr/k,1) - 1.209 x 0.933k x 1.018 if female x 1.159 if Black where α is 0.7 for males and 0.9 for females; α is -0.411 for males and -0.329 for females; min indicates minimum of Scr/k or 1; and max indicates maximum of Scr/k or 1</td>
</tr>
</tbody>
</table>

**Abbreviations:** CrCl, creatinine clearance; Scr, serum creatinine; MDRD, modification of diet in renal disease; CKD-EPI, Chronic Kidney Disease Epidemiology Collaboration; eGFR, estimated glomerular filtration rate

Units: age in years, weight in kg, Scr in mg/dl

* A CDD-EPI calculator is now available as a smart phone app, see the OxMD website (http://www.qmd.com/calculate-online/nephrology/ckd-eapi-eGfr) for more information.

### References