

SUPPLEMENTAL DIGITAL CONTENT

TABLE 1. Diagnosis Codes for HIV Infection

Category	Codes
Valid ICD-9 diagnosis codes	042*, V08*, or 795.71
Valid ICD-10 diagnosis codes	B20*
Diagnostic-related group codes	488–490

ICD-9, International Classification of Diseases, 9th Revision; ICD-10, International Classification of Diseases, 10th Revision.

TABLE 2. Bone Adverse Outcomes Defined by Diagnosis Codes¹

Osteoporosis^{1,2-4}

- Valid ICD-9 diagnosis codes: DX 733.00, 733.01, 733.02, 733.03, 733.09
 - *Abbreviated list of ICD-9 diagnosis codes: 733.0**
- Valid ICD-10 diagnosis codes: DX M80.00XA, M80.00XD, M80.00XG, M80.00XP, M80.00XS, M80.011A, M80.011D, M80.011G, M80.011K, M80.011P, M80.011S, M80012A, M80.012D, M80.012G, M80.012K, M80.012P, M80.012S, M80.019A, M80.019D, M80.019G, M80.019K, M80.019P, M80019S, M80.021A, M80.021D, M80.021G, M80.021K, M80.021P, M80.021S, M80.022A, M80.022D, M80.022G, M80.022K, M80022P, M80.022S, M80.029A, M80.029D, M80.029G, M80.029K, M80.029P, M80.029S, M80.031A, M80.031D, M80.031G, M80031K, M80.031P, M80.031S, M80.032A, M80.032D, M80.032G, M80.032K, M80.032P, M80.032S, M80.039A, M80.039D, M80039G, M80.039K, M80.039P, M80.039S, M80.041A, M80.041D, M80.041G, M80.041K, M80.041P, M80.041S, M80.042A, M80042D, M80.042G, M80.042K, M80.042P, M80.042S, M80.049A, M80.049D, M80.049G, M80.049K, M80.049P, M80.049S, M80051A, M80.051D, M80.051G, M80.051K, M80.051P, M80.051S, M80.052A, M80.052D, M80.052G, M80.052K, M80.052P, M80052S, M80.059A, M80.059D, M80.059G, M80.059K, M80.059P, M80.059S, M80.061A, M80.061D, M80.061G, M80.061K, M80061P, M80.061S, M80.062A, M80.062D, M80.062G, M80.062K, M80.062P, M80.062S, M80.069A, M80.069D, M80.069G, M80069K, M80.069P, M80.069S, M80.071A, M80.071D, M80.071G, M80.071K, M80.071P, M80.071S, M80.072A, M80.072D, M80072G, M80.072K, M80.072P, M80.072S, M80.079A, M80.079D, M80.079G, M80.079K, M80.079P, M80.079S, M80.08XA, M8008XD, M80.08XG, M80.08XK, M80.08XP, M80.08XS, M80.80XA, M80.80XD, M80.80XG, M80.80XK, M80.80XP, M80.80XS, M80811A, M80.811D, M80.811G, M80.811K, M80.811P, M80.811S, M80.812A, M80.812D, M80.812G, M80.812K, M80.812P, M80812S, M80.819A, M80.819D, M80.819G, M80.819K, M80.819P, M80.819S, M80.821A, M80.821D, M80.821G, M80.821K, M80821P, M80.821S, M80.822A, M80.822D, M80.822G, M80.822K, M80.822P, M80.822S, M80.829A, M80.829D, M80.829G, M80829K, M80.829P, M80.829S, M80.831A, M80.831D, M80.831G, M80.831K, M80.831P, M80.831S, M80.832A, M80.832D, M80832G, M80.832K, M80.832P, M80.832S, M80.839A, M80.839D, M80.839G, M80.839K, M80.839P, M80.839S, M80.841A, M80841D, M80.841G, M80.841K, M80.841P, M80.841S, M80.842A, M80.842D, M80.842G, M80.842K, M80.842P, M80.842S, M80849A, M80.849D, M80.849G, M80.849K, M80.849P, M80.849S, M80.851A, M80.851D, M80.851G, M80.851K, M80.851P, M80851S, M80.852A, M80.852D, M80.852G, M80.852K, M80.852P, M80.852S, M80.859A, M80.859D, M80.859G, M80.859K, M80859P, M80.859S, M80.861A, M80.861D, M80.861G, M80.861K, M80.861P, M80.861S, M80.862A, M80.862D, M80.862G, M80862K, M80.862P, M80.862S, M80.869A, M80.869D, M80.869G, M80.869K, M80.869P, M80.869S, M80.871A, M80.871D, M80871G, M80.871K, M80.871P,

M80.871S, M80.872A, M80.872D, M80.872G, M80.872K, M80.872P, M80.872S, M80.879A, M80.879D, M80.879G, M80.879K, M80.879P, M80.879S, M80.88XA, M80.88XD, M80.88XG, M80.88XK, M80.88XP, M80.88XS, M81.0, M81.6, M81.8

- *Note: All M80.**** codes were excluded from the CMS list. These are codes for osteoporosis in the context of a specific fracture.*
- *Note: M81.* codes are from the CMS list*
- *Abbreviated list of ICD-10 diagnosis codes: M80.**** through M81.**

Hip or Pelvic Fracture^{1,5}

- Valid ICD-9 diagnosis codes: DX 733.14, 733.15, 733.96, 733.97, 733.98, 808.0, 808.1, 808.2, 808.3, 808.41, 808.42, 808.43, 808.44, 808.49, 808.51, 808.52, 808.53, 808.54, 808.59, 808.8, 808.9, 820.00, 820.01, 820.02, 820.03, 820.09, 820.10, 820.11, 820.12, 820.13, 820.19, 820.20, 820.21, 820.22, 820.30, 820.31, 820.32, 820.8, 820.9, 821.00, 821.10
 - *Note: Codes 821.00 and 821.10 were excluded from the CMS list. These codes are for a fracture of an “unspecified” part of the femur. However, these codes are analogous to 733.15 (pathologic fracture of other specified part of femur), which is included in the CMS list.*
 - *Abbreviated list of ICD-9 diagnosis codes: 733.14, 733.15, 733.96, 733.97, 733.98, 808.*, 808.**, 820.*, 820.**, 821.00, 821.10*
- Valid ICD-9 procedure codes: 79.05, 79.093, 79.15, 79.151, 79.193, 79.25, 79.35, 79.351, 79.352
- Valid ICD-10 diagnosis codes: DX M80.051A, M80.051D, M80.051G, M80.052K, M80.051P, M80.051S, M80.052A, M80.052D, M80.052G, M80.052K, M80.052P, M80.052S, M80.059A, M80.059D, M80.059G, M80.059K, M80.059P, M80.059S, M80.851A, M80.851D, M80.851G, M80.851K, M80.851P, M80.851S, M80.852A, M80.852D, M80.852G, M80.852K, M80.852P, M80.852S, M80.859A, M80.859D, M80.859G, M80.859K, M80.859P, M80.859S, M84.350A, M84.350D, M84.350G, M84.350K, M84.350P, M84.350S, M84.351A, M84.351D, M84.351G, M84.351K, M84.351P, M84.351S, M84.352A, M84.352D, M84.352G, M84.352K, M84.352P, M84.352S, M84.353A, M84.353D, M84.353G, M84.353K, M84.353P, M84.353S, M84.359A, M84.359D, M84.359G, M84.359K, M84.359P, M84.359S, M84.451A, M84.451D, M84.451G, M84.451K, M84.451P, M84.451S, M84.452A, M84.452D, M84.452G, M84.452K, M84.452P, M84.452S, M84.453A, M84.453D, M84.453G, M84.453K, M84.453P, M84.453S, M84.454A, M84.454D, M84.454G, M84.454K, M84.454P, M84.454S, M84.459A, M84.459D, M84.459G, M84.459K, M84.459P, M84.459S, M84.550A, M84.550D, M84.550G, M84.550K, M84.550P, M84.550S, M84.551A, M84.551D, M84.551G, M84.551K, M84.551P, M84.551S, M84.552A, M84.552D, M84.552G, M84.552K, M84.552P, M84.552S, M84.553A, M84.553D, M84.553G, M84.553K, M84.553P, M84.553S, M84.559A, M84.559D, M84.559G, M84.559K, M84.559P, M84.559S, M84.650A, M84.650D, M84.650G, M84.650K, M84.650P, M84.650S, M84.651A, M84.651D, M84.651G, M84.651K, M84.651P, M84.651S, M84.652A, M84.652D, M84.652G, M84.652K, M84.652P, M84.652S, M84.653A, M84.653D, M84.653G, M84.653K, M84.653P, M84.653S, M84.659A, M84.659D, M84.659G, M84.659K, M84.659P, M84.659S, S32.301A, S32.301B, S32.301D, S32.301G, S32.301K, S32.301S, S32.302A, S32.302B, S32.302D, S32.302G, S32.302K,

S32.491B, S32.491D, S32.491G, S32.491K, S32.491S, S32.492A, S32.492B, S32.492D, S32.492G, S32.492K, S32.492S, S32.499A, S32.499B, S32.499D, S32.499G, S32.499K, S32.499S, S32.501A, S32.501B, S32.501D, S32.501G, S32.501K, S32.501S, S32.502A, S32.502B, S32.502D, S32.502G, S32.502K, S32.502S, S32.509A, S32.509B, S32.509D, S32.509G, S32.509K, S32.509S, S32.511A, S32.511B, S32.511D, S32.511G, S32.511K, S32.511S, S32.512A, S32.512B, S32.512D, S32.512G, S32.512K, S32.512S, S32.519A, S32.519B, S32.519D, S32.519G, S32.519K, S32.519S, S32.591A, S32.591B, S32.591D, S32.591G, S32.591K, S32.591S, S32.592A, S32.592B, S32.592D, S32.592G, S32.592K, S32.592S, S32.599A, S32.599B, S32.599D, S32.599G, S32.599K, S32.599S, S32.601A, S32.601B, S32.601D, S32.601G, S32.601K, S32.601S, S32.602A, S32.602B, S32.602D, S32.602G, S32.602K, S32.602S, S32.609A, S32.609B, S32.609D, S32.609G, S32.609K, S32.609S, S32.611A, S32.611B, S32.611D, S32.611G, S32.611K, S32.611S, S32.612A, S32.612B, S32.612D, S32.612G, S32.612K, S32.612S, S32.613A, S32.613B, S32.613D, S32.613G, S32.613K, S32.613S, S32.614A, S32.614B, S32.614D, S32.614G, S32.614K, S32.614S, S32.615A, S32.615B, S32.615D, S32.615G, S32.615K, S32.615S, S32.616A, S32.616B, S32.616D, S32.616G, S32.616K, S32.616S, S32.691A, S32.691B, S32.691D, S32.691G, S32.691K, S32.691S, S32.692A, S32.692B, S32.692D, S32.692G, S32.692K, S32.692S, S32.699A, S32.699B, S32.699D, S32.699G, S32.699K, S32.699S, S32.810A, S32.810B, S32.810D, S32.810G, S32.810K, S32.810S, S32.811A, S32.811B, S32.811D, S32.811G, S32.811K, S32.811S, S32.82XA, S32.82XB, S32.82XD, S32.82XG, S32.82XK, S32.82XS, S32.89XA, S32.89XB, S32.89XD, S32.89XG, S32.89XK, S32.89XS, S32.9XXA, S32.9XXB, S32.9XXD, S32.9XXG, S32.9XXK, S32.9XXS, S72.001A, S72.001B, S72.001C, S72.001D, S72.001E, S72.001F, S72.001G, S72.001H, S72.001J, S72.001K, S72.001M, S72.001N, S72.001P, S72.001Q, S72.001R, S72.001S, S72.002A, S72.002B, S72.002C, S72.002D, S72.002E, S72.002F, S72.002G, S72.002H, S72.002J, S72.002K, S72.002M, S72.002N, S72.002P, S72.002Q, S72.002R, S72.002S, S72.009A, S72.009B, S72.009C, S72.009D, S72.009E, S72.009F, S72.009G, S72.009H, S72.009J, S72.009K, S72.009M, S72.009N, S72.009P, S72.009Q, S72.009R, S72.009S, S72.011A, S72.011B, S72.011C, S72.011D, S72.011E, S72.011F, S72.011G, S72.011H, S72.011J, S72.011K, S72.011M, S72.011N, S72.011P, S72.011Q, S72.011R, S72.011S, S72.012A, S72.012B, S72.012C, S72.012D, S72.012E, S72.012F, S72.012G, S72.012H, S72.012J, S72.012K, S72.012M, S72.012N, S72.012P, S72.012Q, S72.012R, S72.012S, S72.019A, S72.019B, S72.019C, S72.019D, S72.019E, S72.019F, S72.019G, S72.019H, S72.019J, S72.019K, S72.019M, S72.019N, S72.019P, S72.019Q, S72.019R, S72.019S, S72.021A, S72.021B, S72.021C, S72.021D, S72.021E, S72.021F, S72.021G, S72.021H, S72.021J, S72.021K, S72.021M, S72.021N, S72.021P, S72.021Q, S72.021R, S72.021S, S72.022A, S72.022B, S72.022C, S72.022D, S72.022E, S72.022F, S72.022G, S72.022H, S72.022J, S72.022K, S72.022M, S72.022N, S72.022P, S72.022Q, S72.022R, S72.022S, S72.023A, S72.023B, S72.023C, S72.023D, S72.023E, S72.023F, S72.023G, S72.023H, S72.023J, S72.023K, S72.023M, S72.023N, S72.023P, S72.023Q, S72.023R, S72.023S, S72.024A, S72.024B, S72.024C, S72.024D, S72.024E, S72.024F, S72.024G, S72.024H, S72.024J, S72.024K, S72.024M, S72.024N, S72.024P, S72.024Q, S72.024R, S72.024S, S72.025A, S72.025B, S72.025C, S72.025D, S72.025E, S72.025F, S72.025G, S72.025H, S72.025J, S72.025K, S72.025M, S72.025N, S72.025P, S72.025Q, S72.025R, S72.025S, S72.026A, S72.026B, S72.026C, S72.026D, S72.026E, S72.026F, S72.026G, S72.026H, S72.026J, S72.026K, S72.026M, S72.026N, S72.026P, S72.026Q, S72.026R, S72.026S, S72.031A,

S72.142B, S72.142C, S72.142D, S72.142E, S72.142F, S72.142G, S72.142H, S72.142J, S72.142K, S72.142M, S72.142N, S72.142P, S72.142Q, S72.142R, S72.142S, S72.143A, S72.143B, S72.143C, S72.143D, S72.143E, S72.143F, S72.143G, S72.143H, S72.143J, S72.143K, S72.143M, S72.143N, S72.143P, S72.143Q, S72.143R, S72.143S, S72.144A, S72.144B, S72.144C, S72.144D, S72.144E, S72.144F, S72.144G, S72.144H, S72.144J, S72.144K, S72.144M, S72.144N, S72.144P, S72.144Q, S72.144R, S72.144S, S72.145A, S72.145B, S72.145C, S72.145D, S72.145E, S72.145F, S72.145G, S72.145H, S72.145J, S72.145K, S72.145M, S72.145N, S72.145P, S72.145Q, S72.145R, S72.145S, S72.146A, S72.146B, S72.146C, S72.146D, S72.146E, S72.146F, S72.146G, S72.146H, S72.146J, S72.146K, S72.146M, S72.146N, S72.146P, S72.146Q, S72.146R, S72.146S, S72.21XA, S72.21XB, S72.21XC, S72.21XD, S72.21XE, S72.21XF, S72.21XG, S72.21XH, S72.21XJ, S72.21XK, S72.21XM, S72.21XN, S72.21XP, S72.21XQ, S72.21XR, S72.21XS, S72.22XA, S72.22XB, S72.22XC, S72.22XD, S72.22XE, S72.22XF, S72.22XG, S72.22XH, S72.22XJ, S72.22XK, S72.22XM, S72.22XN, S72.22XP, S72.22XQ, S72.22XR, S72.22XS, S72.23XA, S72.23XB, S72.23XC, S72.23XD, S72.23XE, S72.23XF, S72.23XG, S72.23XH, S72.23XJ, S72.23XK, S72.23XM, S72.23XN, S72.23XP, S72.23XQ, S72.23XR, S72.23XS, S72.24XA, S72.24XB, S72.24XC, S72.24XD, S72.24XE, S72.24XF, S72.24XG, S72.24XH, S72.24XJ, S72.24XK, S72.24XM, S72.24XN, S72.24XP, S72.24XQ, S72.24XR, S72.24XS, S72.25XA, S72.25XB, S72.25XC, S72.25XD, S72.25XE, S72.25XF, S72.25XG, S72.25XH, S72.25XJ, S72.25XK, S72.25XM, S72.25XN, S72.25XP, S72.25XQ, S72.25XR, S72.25XS, S72.26XA, S72.26XB, S72.26XC, S72.26XD, S72.26XE, S72.26XF, S72.26XG, S72.26XH, S72.26XJ, S72.26XK, S72.26XM, S72.26XN, S72.26XP, S72.26XQ, S72.26XR, S72.26XS, S79.001A, S79.001D, S79.001G, S79.001K, S79.001P, S79.001S, S79.002A, S79.002D, S79.002G, S79.002K, S79.002P, S79.002S, S79.009A, S79.009D, S79.009G, S79.009K, S79.009P, S79.009S, S79.011A, S79.011D, S79.011G, S79.011K, S79.011P, S79.011S, S79.012A, S79.012D, S79.012G, S79.012K, S79.012P, S79.012S, S79.019A, S79.019D, S79.019G, S79.019K, S79.019P, S79.019S, S79.091A, S79.091D, S79.091G, S79.091K, S79.091P, S79.091S, S79.092A, S79.092D, S79.092G, S79.092K, S79.092P, S79.092S, S72.099A, S72.099D, S72.099G, S72.099K, S72.099P, S72.099S

- *Note: The codes that end in D, E, F, G, H, J, K, M, N, P, Q, R, or S are excluded from the CMS list. These are for subsequent encounters. (A codes are for the initial encounters.) However, given our analytic approach, if the primary encounter is included in VA or Medicare data, the patient will be censored and subsequent encounters will not be counted. However, if the initial encounter is not captured, we want to capture it on a subsequent encounter, so these codes were included.*
- *Note: The codes M84.454A (pathologic fracture of the pelvis) and M84.550A (pathologic fracture of the pelvis in neoplastic disease) are excluded from the CMS list. However, given that the analogous pelvic fractures in other sections are included in this list of “hip or pelvic fractures”, we have included them.*
- *Abbreviated list of ICD-10 diagnosis codes: M80.05**, M80.85**, M84.35**, M84.45**, M84.55**, M84.65**, S32.3*** through S32.9***, S72.0*** through S72.2***, S79.0****
- Valid ICD-10 procedure codes: OQS.204Z, OQS.205Z, OQS.20ZZ, OQS.23ZZ, OQS.2XZZ, OQS.304Z, OQS.345Z, OQS.34ZZ, OQS.3XZZ, OQS.404Z, OQS.40ZZ, OQS.504Z, OQS.54ZZ, OQS.5XZZ, OQS.604Z, OQS.605Z, OQS.606Z, OQS.60BZ, OQS.60CZ, OQS.60DZ, OQS.635Z, OQS.63CZ, OQS.63ZZ, OQS.645Z, OQS.646Z, OQS.64BZ,

OQS.64CZ, OQS.64DZ, OQS.70BZ, OQS.70DZ, OQS.734Z, OQS.735Z, OQS.736Z, OQS.73BZ, OQS.745Z, OQS.746Z, OQS.74CZ, OQS.234Z, OQS.235Z, OQS.244Z, OQS.245Z, OQS.24ZZ, OQS.305Z, OQS.30ZZ, OQS.334Z, OQS.335Z, OQS.33ZZ, OQS.344Z, OQS.434Z, OQS.43ZZ, OQS.444Z, OQS.44ZZ, OQS.4XZZ, OQS.50ZZ, OQS.534Z, OQS.53ZZ, OQS.544Z, OQS.60ZZ, OQS.634Z, OQS.636Z, OQS.63BZ, OQS.63DZ, OQS.644Z, OQS.64ZZ, OQS.6XZZ, OQS.704Z, OQS.705Z, OQS.706Z, OQS.70CZ, OQS.70ZZ, OQS.73CZ, OQS.73DZ, OQS.73ZZ, OQS.744Z, OQS.74BZ, OQS.74DZ, OQS.74ZZ, OQS.7XZZ, OSS.905Z, OSS.90ZZ, OSS.934Z, OSS.935Z, OSS.93ZZ, OSS.9X4Z, OSS.9X5Z, OSS.B04Z, OSS.B0ZZ, OSS.B34Z, OSS.B35Z, OSS.B44Z, OSS.B45Z, OSS.904Z, OSS.944Z, OSS.945Z, OSS.94ZZ, OSS.9XZZ, OSS.B05Z, OSS.B3ZZ, OSS.B4ZZ, OSS.BX4Z, OSS.BX5Z, OSS.BXZZ

- *Abbreviated list of ICD-10 procedure codes: OQS.2*** through OQS.7***, OSS.9***, OSS.B****

- Valid CPT procedure codes: 27193, 27194, 27210, 27212, 27214, 27215, 27216, 27217, 27218, 27220, 27222, 27224, 27225, 27226, 27227, 27228
 - *Abbreviated list of CPT codes: 27193, 27194, 27210 through 27228*

Vertebral Fractures (including thoracic and lumbar spine)

- Valid ICD-9 diagnosis codes: DX 733.13, 806.20, 806.21, 806.22, 806.23, 806.24, 806.25, 806.26, 806.27, 806.28, 806.29, 806.30, 806.31, 806.32, 806.33, 806.34, 806.35, 806.36, 806.37, 806.38, 806.39, 806.4, 806.5
 - *Note: CMS does not include this category of fractures in their CCW Conditions Algorithm. We selected these codes manually from complete ICD-9 tables using the same principles we applied above*
 - *Abbreviated list of ICD-9 diagnosis codes: 733.13, 805.2 through 805.9, 806.2* through 806.3*, 806.5*
- Valid ICD-9 procedure code: 03.53
- Valid ICD-10 diagnosis codes: DX M48.44XA, M48.44XD, M48.44XG, M48.44XS, M48.45XA, M48.45XD, M48.45XG, M48.45XS, M48.46XA, M48.46XD, M48.46XG, M48.46XS, M48.47XA, M48.47XD, M48.47XG, M48.47XS, M48.54XA, M48.54XD, M48.54XG, M48.54XS, M48.55XA, M48.55XD, M48.55XG, M48.55XS, M48.56XA, M48.56XD, M48.56XG, M48.56XS, M48.57XA, M48.57XD, M48.57XG, M48.57XS, M80.08XA, M80.08XD, M80.08XG, M80.08XK, M80.08XP, M80.08XS, M80.88XA, M80.88XD, M80.88XG, M80.88XK, M80.88XP, M80.88XS, S22.000A, S22.000B, S22.000D, S22.000G, S22.000K, S22.000S, S22.001A, S22.001B, S22.001D, S22.001G, S22.001K, S22.001S, S22.002A, S22.002B, S22.002D, S22.002G, S22.002K, S22.002S, S22.008A, S22.008B, S22.008D, S22.008G, S22.008K, S22.008S, S22.009A, S22.009B, S22.009D, S22.009G, S22.009K, S22.009S, S22.010A, S22.010B, S22.010D, S22.010G, S22.010K, S22.010S, S22.011A, S22.011B, S22.011D, S22.011G, S22.011K, S22.011S, S22.012A, S22.012B, S22.012D, S22.012G, S22.012K, S22.012S, S22.018A, S22.018B, S22.018D, S22.018G, S22.018K, S22.018S, S22.019A, S22.019B, S22.019D, S22.019G, S22.019K, S22.019S, S22.020A, S22.020B, S22.020D, S22.020G, S22.020K, S22.020S, S22.021A, S22.021B, S22.021D, S22.021G, S22.021K, S22.021S, S22.022A, S22.022B, S22.022D, S22.022G, S22.022K, S22.022S, S22.028A, S22.028B, S22.028D, S22.028G,

- *Note: CMS does not include this category of fractures in their CCW Conditions Algorithm. We selected these codes manually from complete ICD-10 tables using the same principles we applied above*
- *Abbreviated list of ICD-10 diagnosis codes: M48.44** through M48.47**, M48.54** through M48.57**, M80.08**, M80.88**, S22.0***, S32.0****
- Valid ICD-10 procedure codes: OPS.404Z, OPS.40ZZ, OPS.434Z, OPS.43ZZ, OPS.444Z, OPS.44ZZ, OPS.4XZZ, OQS.004Z, OQS.00ZZ, OQS.034Z, OQS.03ZZ, OQS.044Z, OQS.04ZZ, OQS.0XZZ, ORS.404Z, ORS.40ZZ, ORS.434Z, ORS.43ZZ, ORS.444Z, ORS.44ZZ, ORS.4X4Z, ORS.4XZZ, ORS.604Z, ORS.60ZZ, ORS.634Z, ORS.63ZZ, ORS.644Z, ORS.64ZZ, ORS.6X4Z, ORS.6XZZ, ORS.A04Z, ORS.A0ZZ, ORS.A34Z, ORS.A3ZZ, ORS.A44Z, ORS.A4ZZ, ORS.AX4Z, ORS.AXZZ, OSS.004Z, OSS.00ZZ, OSS.034Z, OSS.03ZZ, OSS.044Z, OSS.04ZZ, OSS.0X4Z, OSS.0XZZ, OSS.304Z, OSS.30ZZ, OSS.334Z, OSS.33ZZ, OSS.344Z, OSS.34ZZ, OSS.3X4Z, OSS.3XZZ, XNS.0032, XNS.0432, XNS.4032, XNS.4432
 - *Abbreviated list of ICD-10 procedure codes: OPS.4***, OQS.0***, ORS.4*** through ORS.6***, ORS.A***, OSS.0*** through OSS.3***, XNS.0***, XNS.4****

Wrist or Forearm Fractures

- Valid ICD-9 diagnosis codes: DX 733.12, 813.00, 813.01, 813.02, 813.03, 813.04, 813.05, 813.06, 813.07, 813.08, 813.10, 813.11, 813.12, 813.13, 813.14, 813.15, 813.16, 813.17, 813.18, 813.20, 813.21, 813.22, 813.23, 813.30, 813.31, 813.32, 813.33, 813.40, 813.41, 813.42, 813.43, 813.44, 813.45, 813.46, 813.47, 813.50, 813.51, 813.52, 813.53, 813.54, 813.80, 813.81, 813.82, 813.83, 813.90, 813.91, 813.92, 813.93, 814.00, 814.01, 814.02, 814.03, 814.04, 814.05, 814.06, 814.07, 814.08, 814.09, 814.10, 814.11, 814.12, 814.13, 814.14, 814.15, 814.16, 814.17, 814.18, 814.19
 - *Note: CMS does not include this category of fractures in their CCW Conditions Algorithm. We selected these codes manually from complete ICD-9 tables using the same principles we applied above*
 - *Abbreviated list of ICD-9 diagnosis codes: 733.12, 813.** through 814.***
- Valid ICD-9 procedure codes: 78.030, 78.031, 78.032, 78.040, 78.041, 78.042, 78.13, 78.14, 79.02, 79.03, 79.12, 79.13, 79.22, 79.23, 79.32, 79.33, 79.62, 79.63
- Valid ICD-10 diagnosis codes: DX M80.031A, M80.031D, M80.031G, M80.031K, M80.031P, M80.031S, M80.032A, M80.032D, M80.032G, M80.032K, M80.032P, M80.032S, M80.039A, M80.039D, M80.039G, M80.039K, M80.039P, M80.039S, M80.831A, M80.831D, M80.831G, M80.831K, M80.831P, M80.831S, M80.832A, M80.832D, M80.832G, M80.832K, M80.832P, M80.832S, M80.839A, M80.839D, M80.839G, M80.839K, M80.839P, M80.839S, M84.331A, M84.331D, M84.331G, M84.331K, M84.331P, M84.331S, M84.332A, M84.332D, M84.332G, M84.332K, M84.332P, M84.332S, M84.333A, M84.333D, M84.333G, M84.333K, M84.333P, M84.333S, M84.334A, M84.334D, M84.334G, M84.334K, M84.334P, M84.334S, M84.339A, M84.339D, M84.339G, M84.339K, M84.339P, M84.339S, M84.431A, M84.431D, M84.431G, M84.431K, M84.431P, M84.431S, M84.432A, M84.432D, M84.432G, M84.432K, M84.432P, M84.432S, M84.433A, M84.433D, M84.433G, M84.433K, M84.433P, M84.433S, M84.434A, M84.434D, M84.434G, M84.434K,

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S62.155K, S62.155P, S62.155S, S62.156A, S62.156B, S62.156D, S62.156G, S62.156K,
S62.156P, S62.156S, S62.161A, S62.161B, S62.161D, S62.161G, S62.161K, S62.161P,
S62.161S, S62.162A, S62.162B, S62.162D, S62.162G, S62.162K, S62.162P, S62.162S,
S62.163A, S62.163B, S62.163D, S62.163G, S62.163K, S62.163P, S62.163S, S62.164A,
S62.164B, S62.164D, S62.164G, S62.164K, S62.164P, S62.164S, S62.165A, S62.165B,
S62.165D, S62.165G, S62.165K, S62.165P, S62.165S, S62.166A, S62.166B, S62.166D,
S62.166G, S62.166K, S62.166P, S62.166S, S62.171A, S62.171B, S62.171D, S62.171G,
S62.171K, S62.171P, S62.171S, S62.172A, S62.172B, S62.172D, S62.172G, S62.172K,
S62.172P, S62.172S, S62.173A, S62.173B, S62.173D, S62.173G, S62.173K, S62.173P,
S62.173S, S62.174A, S62.174B, S62.174D, S62.174G, S62.174K, S62.174P, S62.174S,
S62.175A, S62.175B, S62.175D, S62.175G, S62.175K, S62.175P, S62.175S, S62.176A,
S62.176B, S62.176D, S62.176G, S62.176K, S62.176P, S62.176S, S62.181A, S62.181B,
S62.181D, S62.181G, S62.181K, S62.181P, S62.181S, S62.182A, S62.182B, S62.182D,
S62.182G, S62.182K, S62.182P, S62.182S, S62.183A, S62.183B, S62.183D, S62.183G,
S62.183K, S62.183P, S62.183S, S62.184A, S62.184B, S62.184D, S62.184G, S62.184K,
S62.184P, S62.184S, S62.185A, S62.185B, S62.185D, S62.185G, S62.185K, S62.185P,
S62.185S, S62.186A, S62.186B, S62.186D, S62.186G, S62.186K, S62.186P, S62.186S,

S62.90XA, S62.90XB, S62.90XD, S62.90XG, S62.90XK, S62.90XP, S62.90XS, S62.91XA, S62.91XB, S62.91XD, S62.91XG, S62.91XK, S62.91XP, S62.91XS, S62.92XA, S62.92XB, S62.92XD, S62.92XG, S62.92XK, S62.92XP, S62.92XS

- *Note: CMS does not include this category of fractures in their CCW Conditions Algorithm. We selected these codes manually from complete ICD-10 tables using the same principles we applied above*
- *Abbreviated list of ICD-10 diagnosis codes: M80.03**, M80.83**, M84.33**, M84.43**, M84.53**, M84.63**, S52.****, S59.0*** through S59.2***, S62.01** through S62.18**, S62.9*****

- Valid ICD-10 procedure codes: OPS.H04Z, OPS.H05Z, OPS.H06Z, OPS.H0BZ, OPS.H0CZ, OPS.H0DZ, OPS.H0ZZ, OPS.H34Z, OPS.H35Z, OPS.H36Z, OPS.H3BZ, OPS.H3CZ, OPS.H3DZ, OPS.H3ZZ, OPS.H44Z, OPS.H45Z, OPS.H46Z, OPS.H4BZ, OPS.H4CZ, OPS.H4DZ, OPS.H4ZZ, OPS.HXZZ, OPS.J04Z, OPS.J05Z, OPS.J06Z, OPS.J0BZ, OPS.J0CZ, OPS.J0DZ, OPS.J0ZZ, OPS.J34Z, OPS.J35Z, OPS.J36Z, OPS.J3BZ, OPS.J3CZ, OPS.J3DZ, OPS.J3ZZ, OPS.J44Z, OPS.J45Z, OPS.J46Z, OPS.J4BZ, OPS.J4CZ, OPS.J4DZ, OPS.J4ZZ, OPS.JXZZ, OPS.K04Z, OPS.K05Z, OPS.K06Z, OPS.K0BZ, OPS.K0CZ, OPS.K0DZ, OPS.K0ZZ, OPS.K34Z, OPS.K35Z, OPS.K36Z, OPS.K3BZ, OPS.K3CZ, OPS.K3DZ, OPS.K3ZZ, OPS.K44Z, OPS.K45Z, OPS.K46Z, OPS.K4BZ, OPS.K4CZ, OPS.K4DZ, OPS.K4ZZ, OPS.KXZZ, OPS.L04Z, OPS.L05Z, OPS.L06Z, OPS.L0BZ, OPS.L0CZ, OPS.L0DZ, OPS.L0ZZ, OPS.L34Z, OPS.L35Z, OPS.L36Z, OPS.L3BZ, OPS.L3CZ, OPS.L3DZ, OPS.L3ZZ, OPS.L44Z, OPS.L45Z, OPS.L46Z, OPS.L4BZ, OPS.L4CZ, OPS.L4DZ, OPS.L4ZZ, OPS.LXZZ, OPS.M04Z, OPS.M05Z, OPS.M0ZZ, OPS.M34Z, OPS.M35Z, OPS.M3ZZ, OPS.M44Z, OPS.M45Z, OPS.M4ZZ, OPS.MXZZ, OPS.N04Z, OPS.N05Z, OPS.N0ZZ, OPS.N34Z, OPS.N35Z, OPS.N3ZZ, OPS.N44Z, OPS.N45Z, OPS.N4ZZ, OPS.NXZZ, ORS.N04Z, ORS.N05Z, ORS.N0ZZ, ORS.N34Z, ORS.N35Z, ORS.N3ZZ, ORS.N44Z, ORS.N45Z, ORS.N4ZZ, ORS.NX4Z, ORS.NX5Z, ORS.NXZZ, OPS.P04Z, OPS.P05Z, OPS.P0ZZ, OPS.P34Z, OPS.P35Z, OPS.P3ZZ, OPS.P44Z, OPS.P45Z, OPS.P4ZZ, OPS.PX4Z, OPS.PX5Z, OPS.PXZZ, OPS.Q04Z, OPS.Q05Z, OPS.Q0ZZ, OPS.Q34Z, OPS.Q35Z, OPS.Q3ZZ, OPS.Q44Z, OPS.Q45Z, OPS.Q4ZZ, OPS.QX4Z, OPS.QX5Z, OPS.QXZZ, OPS.R04Z, OPS.R05Z, OPS.R0ZZ, OPS.R34Z, OPS.R35Z, OPS.R3ZZ, OPS.R44Z, OPS.R45Z, OPS.R4ZZ, OPS.RX4Z, OPS.RX5Z, OPS.RXZZ
- *Abbreviated list of ICD-10 procedure codes: OPS.H***, OPS.J***, OPS.K***, OPS.L***, OPS.M***, OPS.N***, ORS.N***, ORS.P***, ORS.Q***, ORS.R****

CCW, Chronic Conditions Data Warehouse; CMS, Centers for Medicare and Medicaid Services; CPT, Current Procedural Terminology; ICD-9, International Classification of Diseases, 9th Revision; ICD-10, International Classification of Diseases, 10th Revision.

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TABLE 3. Covariate Definitions and Codes

Covariate	Description	Medications	ICD-9 Diagnosis	ICD-9 Procedure	ICD-10 Diagnosis	ICD-10 Procedure	CPT-4
Age	A numeric variable of the patient's age, in years, at index date						
Male	Male patients. If there are discrepancies during the study period, this will be defined as the mode for all observations						
Married	An indicator variable identifying the patient as married as of the index date						
Race	The patient's race. The value for race will be defined as Caucasian, black, Hispanic, Asian, or other. Race observations will be taken throughout the entire study period and, if there are discrepancies, the mode of all observations will be used						
CD4 count	A numeric variable representing the patient's most proximal CD4 count on or before the index date						
Viral load	A numeric variable representing the patient's most proximal HIV viral load on or before the index date						
Chronic kidney disease	Dichotomous variable indicating whether the patient had evidence of chronic kidney disease in the pre-index period from inpatient and outpatient records		016.0*, 095.4, 189.0, 190.0, 223.0, 223.9, 236.9*, 249.4*, 250.4*, 271.4, 274.10, 283.11, 403.**, 404.**, 440.1, 442.1, 572.4, 580.*– 588.* and		A18.11, A52.74, B52.0, C64.*, C68.9, D30.0*, D30.9, D41.0*, D41.9, D59.3, E08.2*, E09.2*, E10.2*, E11.2*, E13.2*, I12.*, I13.0, E13.1*, E13.2, I70.1,		

Covariate	Description	Medications	ICD-9 Diagnosis	ICD-9 Procedure	ICD-10 Diagnosis	ICD-10 Procedure	CPT-4
			580.**-588.**, 591, 753.12- 753.29, 794.4, V42.0		I72.2, K76.7, M10.30, M10.31*-, M10.37*, M10.3*, M32.14, M32.15, M35.04, N0*.*, N08, N13.1, N13.2, N13.3*, N14.*, N15.*, N16, N17.*, N18.*, N19, N25.0, N25.1, N25.8*, N25.9, N26.1, Q61.02, Q61.1*, Q61.2- Q61.8, Q62.0, Q62.1*, Q62.0, Q62.1*, Q62.2, Q62.3*, R94.4		
eGFR	A numeric variable representing the patient's most proximal eGFR on or before the index date						
Cardiovascular and cerebrovascular disease	Dichotomous variable indicating whether the patient had diagnosis of a cardiovascular or cerebrovascular disorder in the pre-index period from inpatient and outpatient records		410*-414*, 430*-438*, 440*-448*		I20*-I25*, I60*-I69*		
Heart failure	Dichotomous variable indicating whether the patient had diagnosis of congestive heart failure in the pre-index period from inpatient and outpatient records		398.91, 402.*1, 404.*1, 404.*3, 428.*, 428.**		I09.8*, I11.0, I13.0, I13.2, I50.*, I50.**		
Dyslipidemia diagnosis	Dichotomous variable indicating whether the patient had evidence of dyslipidemia in		272.4		E78.0, E78.4, E78.5		

Covariate	Description	Medications	ICD-9 Diagnosis	ICD-9 Procedure	ICD-10 Diagnosis	ICD-10 Procedure	CPT-4
	the pre-index period from inpatient and outpatient records						
Hypertension diagnosis	Dichotomous variable indicating whether the patient had evidence of hypertension in the pre-index period from inpatient and outpatient records		401*, 402*, 403*, 404*, 405*		I10*, I11*, I12*, I13*, I15*		
Diabetes mellitus diagnosis	Dichotomous variable indicating whether the patient had evidence of diabetes in the pre-index period from inpatient and outpatient visits		249**, 250**, 357.2, 362.0*, 366.41		E10*, E11*, E13*, E14*		
End-stage renal disease	Dichotomous variable indicating whether the patient had diagnosis of end-stage renal disease in the pre-index period from inpatient and outpatient visits		585.6, 403.*1, 404.*2, 404.*3, V42.0, V45.1*, 458.21, 792.5, 996.56, 996.68, 996.73, E87.91, V456, V43.0, 996.81	39.951, 54.981, 55.6*, 38.95, 39.27, 39.42, 39.43, 39.95*, 54.98*	I12.0, I13.11, I13.2, N18.6, N18.5, T81.502*, T81.512*, T81.522*, T81.532*, T81.592*, T82.4*, T85.611*, T85.621*, T85.631*, T85.691*, T85.698*, Z49.0*, I95.3, R88.0, Y84.1, Z99.2, T86.1*, Z48.22, Z94.0	0TT00ZZ, 0TT04ZZ, 0TT10ZZ, 0TT14ZZ, 0TT60ZZ, 0TT64ZZ, 0TT67ZZ, 0TT68ZZ, 0TT70ZZ, 0TT74ZZ, 0TT77ZZ, 0TT78ZZ, 0TT20ZZ, 0TT24ZZ, 0TT00ZZ, 0TS00ZZ, 0TS10ZZ, 0TY00Z0, 0TY00Z1, 0TY00Z2, 0TY10Z0, 0TY10Z1, 0TY10Z2	90935–90999, 08658, 76776, 76778, 50360–50380
Viral hepatitis	Dichotomous variable indicating whether		70.0*–70.9*		B15*–B19*		

Covariate	Description	Medications	ICD-9 Diagnosis	ICD-9 Procedure	ICD-10 Diagnosis	ICD-10 Procedure	CPT-4
diagnosis	the patient had evidence of viral hepatitis from inpatient and outpatient records						
Tuberculosis	Dichotomous variable indicating whether the patient had evidence of tuberculosis from inpatient and outpatient records		010*-018*		A15*, A19*		
Psychiatric disorder	Dichotomous variable indicating whether the patient had evidence of a diagnosis of schizophrenia, psychosis, bipolar or major depression, or posttraumatic stress disorder from inpatient and outpatient records		295*, V11.0, 293*, 294*, 298*, 299*, 296*, V11.1, 309.81		F20*, F06*, F28*, F23*, F29*, F84*, F30, Z65.8*, F43.1, F43.10, F43.11, F43.12		
Bone disease	Dichotomous variable indicating whether the patient had evidence of osteoporosis from inpatient and outpatient records.		733.0*		M81*, M80*		
Tobacco	Dichotomous variable indicating of whether the patient had evidence of tobacco use in the pre-index period from inpatient and outpatient records		305.1, 649.0*, 989.84, V15.82		F17.2*, T65.2*, O99.33*, Z50.8, Z72.0, Z87.891		
Alcohol abuse	Dichotomous variable indicating whether the patient had an alcohol abuse disorder in the pre-index period from inpatient and outpatient records		291**, 303**, 305.0*, 357.5, 425.5, 535.3*, 571.0, 571.1, 571.2, 571.3, 790.3, 980.0, 980.9, E860, E860.0, E860.1, E860.8, E860.9, V11.3		F10*, Z71.4,Z		
Body mass index	The patient's body mass index on or before the index date. This variable will be calculated from height and weight observations in the CDW vital status file. The most proximal valid observation for						

Covariate	Description	Medications	ICD-9 Diagnosis	ICD-9 Procedure	ICD-10 Diagnosis	ICD-10 Procedure	CPT-4
	height or weight on or before the index date will be identified as any value that is within 3 standard deviations of the mean of all heights and weights for the cohort. For patients without observations within 3 standard deviations of the mean, other values will be accepted as valid if (a) for height, there are at least 2 identical observations or (b) for weight, there are at least 2 observations within 5 pounds						
Methadone	Dichotomous variable indicating whether the patient had evidence of methadone treatment in the pre-index period based on CDW pharmacy records of relevant medications	Methadone					
Proton pump inhibitor	Dichotomous variable indicating whether the patient had evidence of proton pump inhibitor treatment in the pre-index period based on CDW pharmacy records of relevant medications	Dexlansoprazole, esomeprazole, lansoprazole, omeprazole, pantoprazole, rabeprazole					
Bisphosphonate	Dichotomous variable indicating whether the patient had evidence of bisphosphonate treatment in the pre-index period based on CDW pharmacy records of relevant medications	Alendronate, ibandronate, risedronate, zoledronic acid					

CDW, Clinical Data Warehouse; CPT-4, Current Procedural Terminology, 4th Edition; eGFR, estimated glomerular filtration rate; ICD-9, International Classification of Diseases, 9th Revision; ICD-10, International Classification of Diseases, 10th Revision.

TABLE 4. Baseline Covariate Balance: SMDs Before and After Weighting

	Unweighted SMDs – EFV vs				Weighted SMDs* – EFV vs			
	All Non-EFV	EVG/c	RPV	RTV-Boosted PI	All Non-EFV	EVG/c	RPV	RTV-Boosted PI
Demographics and physical								
Age, years	0.095	0.12	0.277	0.081	0.007	-0.034	-0.118	0.004
Male	0.04	0.082	0.143	0.03	0.001	-0.038	-0.06	-0.001
Married	0.031	-0.111	-0.129	0.056	-0.001	-0.019	0.065	-0.001
Race								
White	-0.003	-0.033	0.042	-0.004	0	-0.027	-0.071	0
African American	0.04	0.139	-0.012	0.035	0.002	0.035	0.044	0.001
Hispanic	-0.023	-0.078	0.018	-0.021	-0.003	-0.013	-0.008	-0.002
Asian	-0.011	-0.142	-0.038	0.002	0.006	0.014	0.057	0.002
Other	-0.047	-0.045	-0.086	-0.047	-0.005	-0.029	0.042	-0.003
Missing	-0.049	-0.117	-0.053	-0.044	-0.001	0.001	0.058	-0.002
Body mass index, kg/m ²	0.042	-0.055	-0.275	0.072	-0.002	0.036	-0.074	0.002
Pre-index[†] prognostic indices								
CD4⁺ count, cells/mm³								
<200	-0.114	0.113	0.384	-0.166	0	-0.028	-0.047	-0.001
200–299	0.03	0.071	-0.018	0.029	0.002	0.054	0.058	0.005
300–399	0.117	0.019	0.249	0.116	-0.003	-0.011	-0.037	-0.003
400–499	0.084	-0.022	-0.32	0.123	0	0.016	0.076	0
≥500	0.004	-0.341	-0.637	0.08	0.001	-0.011	-0.016	0.001
Missing	-0.064	0.126	0.193	-0.096	-0.001	-0.01	-0.002	-0.002
HIV viral load, copies/mL								
<10,000	-0.061	0.013	-0.246	-0.056	-0.002	0.063	0.01	-0.003
10,000–100,000	0.076	0.022	-0.095	0.092	0.005	0.02	0.118	0.005
>100,000	-0.015	-0.101	0.324	-0.029	-0.001	-0.022	-0.115	0.002
Missing	-0.005	0.073	0.067	-0.016	-0.003	-0.076	-0.023	-0.006
Pre-index[†] renal function								
eGFR, mL/min/1.73 m²								
≥90	0.034	-0.173	-0.204	0.068	-0.003	-0.02	-0.037	-0.005
60–89	0.006	0.03	0.028	0.003	0	0.038	0.027	0.004
30–59	-0.005	0.139	0.084	-0.023	0.002	-0.05	0.086	0.002
15–29	-0.027	0.036	0.035	-0.035	-0.002	0.034	0.034	-0.002
<15	-0.072	0.1	0.1	-0.093	0.004	0.095	0.096	0.003
Missing	-0.033	0.122	0.217	-0.061	0.002	-0.015	-0.052	0
Pre-index[†] comorbid diagnoses								
CAD/CVD	0.051	-0.041	0.104	0.056	0.004	-0.034	-0.145	0.003
Heart failure	0.07	0.059	0.116	0.067	0	0.077	0.049	-0.002
Dyslipidemia	0.065	-0.153	-0.028	0.091	0.002	-0.002	-0.051	0.003
Hypertension	0.141	0.021	-0.014	0.162	0.005	0	0.038	0.003
Diabetes mellitus	0.051	0.018	0.072	0.053	0.001	0.017	-0.08	-0.001
Chronic kidney disease	0.05	-0.004	0.061	0.053	0.001	-0.031	0.121	-0.001
End-stage renal disease	-0.006	-0.011	0.062	-0.009	0.012	0.006	0.059	0.002
Viral hepatitis	-0.06	0.038	0.058	-0.076	-0.001	0.002	-0.029	-0.001

Tuberculosis	-0.023	0.075	0.008	-0.033	-0.002	0.031	0	-0.002
Psychiatric disorder	-0.197	-0.315	-0.513	-0.168	0	0.015	0.033	-0.002
Depression	-0.133	-0.294	-0.388	-0.104	0	0.017	-0.03	-0.004
Schizophrenia	-0.144	-0.098	-0.103	-0.153	0	0.033	-0.01	0
Bipolar disorder	-0.159	-0.3	-0.587	-0.123	-0.002	0.023	0.102	-0.001
Psychosis	-0.175	-0.239	-0.212	-0.173	-0.001	-0.003	0.02	0
PTSD	-0.121	-0.275	-0.736	-0.072	0.002	0.003	0.039	0
Tobacco use	0.012	0.016	-0.304	0.033	0	0.012	-0.086	-0.003
Alcohol abuse	-0.026	-0.061	-0.165	-0.014	0.001	0.009	-0.128	0.001
Medications								
Methadone	-0.089	0.03	0.001	-0.103	0.007	0.04	0.067	0.004
Proton pump inhibitors	0.112	0.097	0.336	0.097	0	0.042	-0.1	0
Bisphosphonates	-0.021	0.045	0.045	-0.03	0.001	0.043	0.043	0.001
Testosterone (current use)	0.008	-0.114	0.017	0.019	0	0.018	0.055	-0.004
Testosterone (pre-index use)	-0.007			-0.013	-0.001			-0.001
Index year								
2004	-0.021			-0.035	-0.001			-0.001
2005	-0.187			-0.245	0.001			0.001
2006	-0.05			-0.107	0.001			0.001
2007	0.13			0.08	-0.005			-0.005
2008	0.084			0.033	0			0
2009	0.124			0.077	0.001			0.001
2010	0.128			0.083	0.004			0.004
2011	0.066			0.03	-0.003			-0.003
2012	-0.008			0.006	0.001			0.001
2013	-0.075			0.024	0			0.002
2014	-0.189			0.001	-0.003			0
2015	-0.223			0.007	0.007			-0.001

*Weights were calculated by inverse probability treatment weighting method.

†Pre-index comorbidities and clinical characteristics were identified in the 6–12-month pre-index period.

CAD, coronary artery disease; CVD, cerebrovascular disease; EFV, efavirenz; eGFR, estimated glomerular filtration rate; EVG/c, elvitegravir/cobicistat; PI, protease inhibitor (RTV-boosted atazanavir, lopinavir, or darunavir); PTSD, posttraumatic stress disorder; RPV, rilpivirine; RTV, ritonavir; SMD, standardized mean difference.

TABLE 5. Summary by Exposure for Bone Adverse Outcomes

Primary Outcomes	Initial Antiretroviral Therapy Containing TDF/FTC Plus				
	EFV (n = 4137)	Non-EFV* (n = 3024)	EVG/c (n = 232)	RPV (n = 171)	RTV- Boosted PI (n = 2621)
All bone					
Events	144	101	7	6	88
Mean time to event (years)	660.64	596.04	139.71	240.00	656.61
Mean follow-up time (years)	1.19	0.81	0.61	0.80	0.83
Total follow-up time (patient-years)	4917.00	2442.78	141.41	137.19	2164.19
Osteoporosis					
Events	43	33	3	1	29
Mean time to event (years)	810.86	872.91	204.67	142.00	967.24
Mean follow-up time (years)	1.23	0.84	0.62	0.82	0.86
Total follow-up time (patient-years)	5100.34	2541.98	144.42	140.96	2256.61
Osteopenia					
Events	81	43	5	2	36
Mean time to event (years)	776.28	750.67	178.00	67.50	868.17
Mean follow-up time (years)	1.21	0.84	0.61	0.82	0.86
Total follow-up time (patient-years)	5000.80	2529.93	142.17	140.66	2247.10
Osteoporosis or osteopenia					
Events	102	62	5	3	54
Mean time to event (years)	734.83	710.00	178.00	92.33	793.57
Mean follow-up time (years)	1.20	0.83	0.61	0.81	0.85
Total follow-up time (patient-years)	4976.08	2507.21	142.17	139.06	2225.98
All fractures					
Events	52	46	2	4	40
Mean time to event (years)	614.40	418.91	44.00	326.50	446.90
Mean follow-up time (years)	1.23	0.83	0.63	0.81	0.85
Total follow-up time (patient-years)	5093.64	2517.85	145.97	139.09	2232.79
Vertebral fracture					
Events	13	12	1	1	10
Mean time to event (years)	925.38	408.33	23.00	143.00	473.40
Mean follow-up time (years)	1.24	0.85	0.63	0.82	0.87
Total follow-up time (patient-years)	5146.88	2578.26	146.43	140.96	2290.87
Hip fracture					
Events	22	8	1	2	5

Mean time to event (years)	558.41	412.88	23.00	257.50	553.00
Mean follow-up time (years)	1.24	0.85	0.63	0.83	0.87
Total follow-up time (patient-years)	5125.80	2574.37	146.43	142.19	2285.75

Wrist/forearm fracture

Events	21	28	1	1	26
Mean time to event (years)	522.14	396.11	65.00	648.00	399.15
Mean follow-up time (years)	1.24	0.84	0.63	0.82	0.86
Total follow-up time (patient-years)	5138.17	2535.02	146.28	141.05	2247.70

*Non-EFV includes the EVG/c, RPV, and RTV-boosted PI groups.

EFV, efavirenz; EVG/c, elvitegravir/cobicistat; FTC, emtricitabine; PI, protease inhibitor (atazanavir, darunavir, or lopinavir); RPV, rilpivirine; RTV, ritonavir; TDF, tenofovir disoproxil fumarate.

FIG. 1.

Baseline demographics: verification that IPT weighting achieves baseline covariate balance between TDF/FTC-containing regimens with EFV versus (A) EVG/c; (B) RTV-boosted PIs; and (C) RPV. CAD/CVD, coronary artery disease/cerebrovascular disease; CKD, chronic kidney disease; EFV, efavirenz; eGFR, estimated glomerular filtration rate; EVG/c, elvitegravir/cobicistat; FTC, emtricitabine; IPT, inverse probability of treatment; PI, protease inhibitor (atazanavir, darunavir, or lopinavir); RPV, rilpivirine; RTV, ritonavir; TDF, tenofovir disoproxil fumarate.



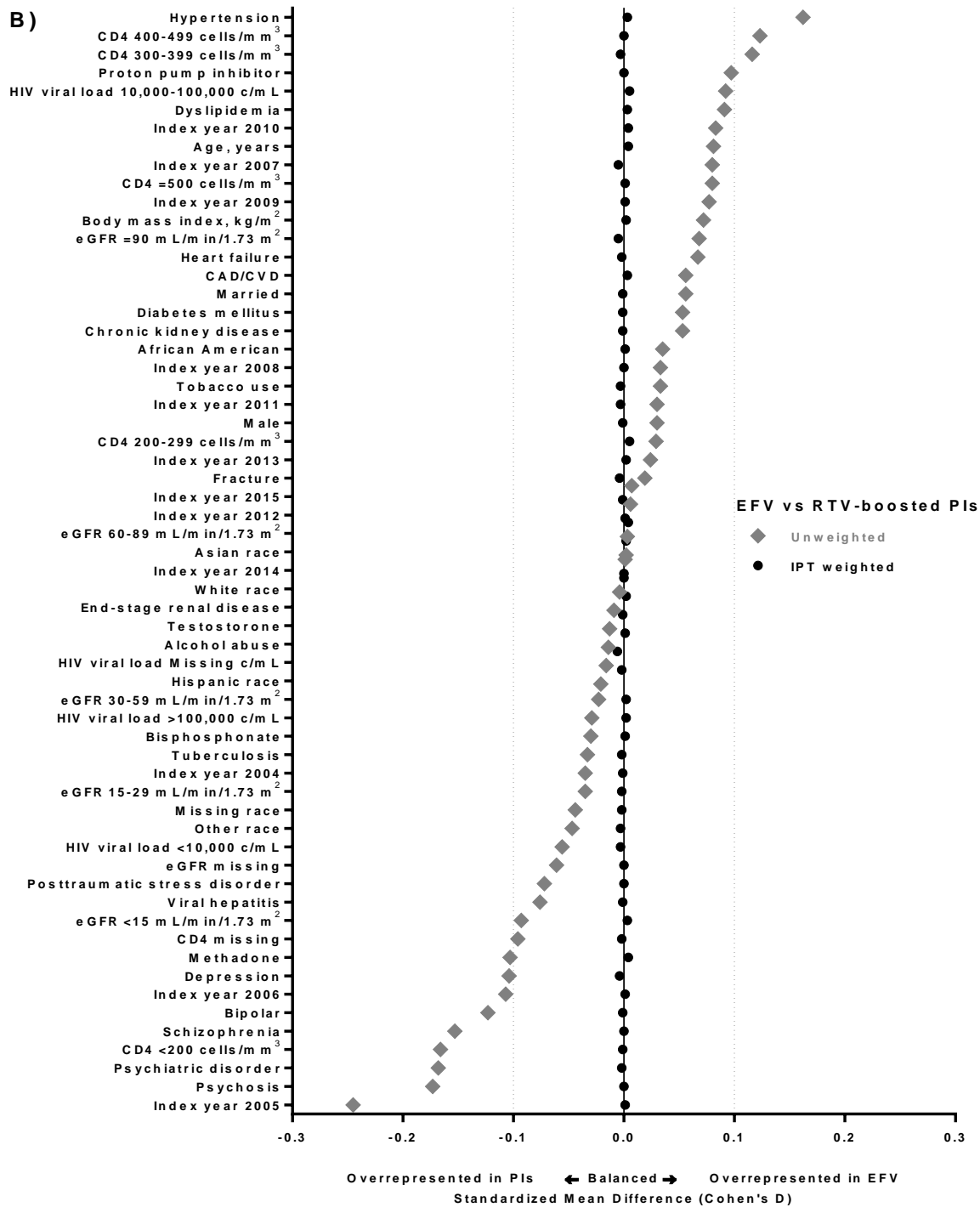




Table 6. Proportion with baseline or post-baseline DEXA scans.

Treatment group	Percent with pre-index scan	Percent with post-index scan
EFV/TDF/FTC	0.85%	16.75%
Non-EFV*	0.83%	14.15%
EVG/c/TDF/FTC	1.29%	6.03%
RPV/TDF/FTC	1.75%	6.43%
RTV-boosted PI/TDF/FTC	0.72%	15.38%

*Non-EFV includes the EVG/c, RPV, and RTV-boosted PI groups.

DEXA, dual energy X-ray absorptiometry; EFV, efavirenz; EVG/c, elvitegravir/cobicistat; FTC, emtricitabine; PI, protease inhibitor (atazanavir, darunavir, or lopinavir); RPV, rilpivirine; RTV, ritonavir; SD, standard deviation; TDF, tenofovir disoproxil fumarate.

Table 7. Baseline characteristics by post-index DEXA scan, identified through NLP or CPT code.

Pre-index demographic and clinical characteristics*	All patients	Post index scan	
		No scan	Scan
Age, mean (SD), years	49.9 (10.1)	49.5 (10.2)	52.0 (9.1)
Male	96%	97%	93%
Married	8%	8%	9%
Race			
White	30%	30%	32%
Black	59%	60%	58%
Hispanic	7%	7%	6%
Asian	1%	1%	1%
Other	1%	1%	0%
Missing	2%	1%	3%
CD4 ⁺ , cells/mm ³			
<200	33%	34%	31%
200–299	16%	16%	17%
300–399	14%	13%	15%
400–499	9%	9%	8%
≥500	14%	14%	13%
Missing	14%	13%	16%
HIV viral load, copies/ml			
<10,000	30%	30%	29%
10,000–100,000	33%	33%	34%
>100,000	22%	22%	23%
Missing	15%	15%	14%
Chronic kidney disease [†]	6%	6%	6%
eGFR ^d , ml/min per 1.73 m ²			
Stage 1, ≥90	52%	53%	50%
Stage 2, 60–89	33%	32%	35%
Stage 3, 30–59	4%	4%	5%
Stage 4, 15–29	0%	0%	0%
Stage 5, <15	1%	1%	2%
Missing	9%	10%	8%
Cardiovascular and cerebrovascular disease	10%	10%	11%
Heart failure	3%	3%	3%
Dyslipidemia	15%	14%	17%
Hypertension	34%	33%	37%
Diabetes mellitus	13%	12%	15%
End-stage renal disease [‡]	0%	0%	0%
Viral hepatitis	28%	28%	27%
Tuberculosis	1%	1%	1%
Psychiatric disorder	40%	40%	40%
Depression	26%	26%	26%
Schizophrenia	5%	5%	4%

Bipolar	18%	18%	17%
Psychosis	8%	8%	6%
Posttraumatic stress disorder	10%	11%	10%
Fracture	1%	1%	1%
Tobacco use [§]	31%	31%	31%
Alcohol abuse	23%	24%	21%
Body mass index, mean (SD), kg/m ²	25.5 (5.1)	25.5 (5.1)	25.6 (5.1)
Medications			
Methadone	2%	2%	2%
Proton pump inhibitor	26%	26%	30%
Bisphosphonate	0%	0%	1%
	2%	1%	3%
Year			
2003	0%	0%	0%
2004	1%	1%	1%
2005	8%	8%	10%
2006	11%	11%	14%
2007	13%	12%	15%
2008	12%	12%	14%
2009	12%	11%	15%
2010	11%	11%	11%
2011	10%	10%	9%
2012	7%	8%	5%
2013	7%	7%	3%
2014	5%	6%	2%
2015	3%	4%	1%

*Pre-index comorbidities and clinical characteristics were identified in the 6–12-month pre-index period.

†Defined as either a chronic kidney disease diagnosis or 2 consecutive measures of eGFR <60 mL/min/1.73 m² occurring at least 30 days apart.

‡Defined as either a diagnosis of end-stage renal disease, kidney transplant, or dialysis.

§Includes abuse, dependence, rehabilitation, and toxicity related to tobacco.

CPT, Current Procedural Terminology; DEXA, dual energy X-ray absorptiometry; EFV, efavirenz; eGFR, estimated glomerular filtration rate; EVG/c, elvitegravir/cobicistat; FTC, emtricitabine; NLP, natural language processing; PI, protease inhibitor (atazanavir, darunavir, or lopinavir); RPV, rilpivirine; RTV, ritonavir; SD, standard deviation; TDF, tenofovir disoproxil fumarate.