

Supplement 1. ICD-9 & 10 codes and CPT codes used to identify patient population, comorbidities, and outcomes

Patient selection	Billing codes
Single-level lumbar fusion with additional levels (two and three)	ICD-9-P: 8104, 8105, 8106, 8107, 8108 ICD-10-P: 0SG0070, 0SG0071, 0SG007J, 0SG00A0, 0SG00A1, 0SG00AJ, 0SG00J0, 0SG00J1, 0SG00JJ, 0SG00K0, 0SG00K1, 0SG00KJ, 0SG00Z0, 0SG00Z1, 0SG00ZJ, 0SG0370, 0SG0371, 0SG03A0, 0SG03A1, 0SG03AJ, 0SG03J1, 0SG03JJ, 0SG03K1, 0SG03KJ, 0SG03Z0, 0SG03Z1, 0SG03ZJ, 0SG0471, 0SG047J, 0SG04A0, 0SG04A1, 0SG04AJ, 0SG04K1, 0SG04Z1 CPT: 22533, 22558, 22612, 22630, 22632, 22633, 22634, 22534, 22585, 22614
Reported cannabis use	ICD-10-D-F1210, ICD-10-D-F12120, ICD-10-D-F12121, ICD-10-D-F12122, ICD-10-D-F12129, ICD-10-D-F12150, ICD-10-D-F12151, ICD-10-D-F12159, ICD-10-D-F12180, ICD-10-D-F12188, ICD-10-D-F1219, ICD-10-D-F1220, ICD-10-D-F12220, ICD-10-D-F12221, ICD-10-D-F12222, ICD-10-D-F12229, ICD-10-D-F1223, ICD-10-D-F12250, ICD-10-D-F12251, ICD-10-D-F12259, ICD-10-D-F12280, ICD-10-D-F12288, ICD-10-D-F1229, ICD-10-D-F1290, ICD-10-D-F12920, ICD-10-D-F12921, ICD-10-D-F12922, ICD-10-D-F12929, ICD-10-D-F1293, ICD-10-D-F12950, ICD-10-D-F12951, ICD-10-D-F12959, ICD-10-D-F12980, ICD-10-D-F12988, ICD-10-D-F1299, ICD-10-D-T407X5A, ICD-10-D-T407X5D, ICD-10-D-T407X5S
Comorbidities	ICD-9 & 10 codes
Anxiety	ICD-9-D-29384, ICD-9-D-30000, ICD-9-D-30001, ICD-9-D-30002, ICD-9-D-30009, ICD-9-D-30924, ICD-9-D-30981, ICD-10-D-F064, ICD-10-D-F410, ICD-10-D-F411, ICD-10-D-F413, ICD-10-D-F418, ICD-10-D-F419, ICD-10-D-F430, ICD-10-D-F4310, ICD-10-D-F4311, ICD-10-D-F4312, ICD-10-D-F4322
Depression	ICD-9-D-2962:ICD-9-D-29636, ICD-9-D-29651:ICD-9-D-29659, ICD-9-D-3004, ICD-9-D-3090:ICD-9-D-3099, ICD-9-D-311, ICD-10-D-F204, ICD-10-D-F3130:ICD-10-D-F315, ICD-10-D-F320:ICD-10-D-F339, ICD-10-D-F341, ICD-10-D-F412, ICD-10-D-F4320:ICD-10-D-F4329
Social determinants of health disparity	Economic: ICD-9: V620, V605, V602, V691, E9041, E9042, 9942, 9943, 99552, 99584; ICD-10: E40, E41, E42, E43, E440, E441, E45, E46, E5111, E5112, E519, E52, E530, E531, E538, E539, E54, E550, E559, E560, E561, E568, E569, E58, E59, E60, E610, E611, E612, E613, E614, E615, E616, E617, E618, E619, E630, E631, E638, E639, E640, E641, E642, E643, E648, E649, T730, T730XXA, T730XXD, T730XXS, T731, T731XXA, T731XXD, T731XXS, T738, T738XXA, T738XXD, T738XXS, T739, T739XXA, T739XXD, T739XXS, X58, Z560, Z569, Z594, Z595, Z596, Z597, Z724, Z91120 Educational: ICD-9: V623; ICD-10: Z550, Z551, Z552, Z553, Z554, Z558, Z559 Social context: ICD-9: V603, V604, V613, V618, V619, V624, V625, V629, V692, V693, V694, V698, V699, V6101, V6102, V6103, V6104, V6105, V6106, V6107, V6108, V6109, V6141, V6142, V6149, V6281, V6282, V6289; ICD-10: F439, Z600, Z602, Z603, Z604, Z605, Z608, Z609, Z624, Z630, Z631, Z634, Z635, Z636, Z637, Z638, Z639, Z650, Z651, Z652, Z653, Z658, Z659, Z728, Z732, Z733, Z738, Z6331, Z6332, Z6371, Z6372, Z6379, Z7289, Z7389 Health access: ICD-9: V638, V639; ICD-10: Z74.8, Z75.4, Z75.9, Z75.3 Physical environment: ICD-9: V600, V601, V609, V621, V713, V6089, V6129, V6229, V6283, V7181, 99550, 99551, 99553, 99554, 99555, 99559, 99580, 99581, 99582, 99583, 99585, E9600, E9601, E961, E9620, E9621, E9622, E9629, E963, E964, E9650, E9651, E9652, E9653, E9654, E9655, E9656, E9658, E9659, E966, E9680, E9681, E9682, E9683, E9684, E9685, E9686, E9687, E9688, E9689, E969, V8731 ICD-10: O9A311, O9A312, O9A313, O9A319, O9A32, O9A33, O9A411, O9A412, O9A413, O9A419, O9A42, O9A43, O9A511, O9A512, O9A513, O9A519, O9A52, O9A53, T7401XA, T7401XD, T7401XS, T7402XA, T7402XD, T7402XS, T7411XA, T7411XD, T7411XS, T7412XA, T7412XD, T7412XS, T7421XA, T7421XD, T7421XS, T7422XA, T7422XD, T7422XS, T7431XA, T7431XD, T7431XS, T7432XA, T7432XD, T7432XS, T7491XA, T7491XD, T7491XS, T7492XA, T7492XD, T7492XS, T7601XA, T7601XD, T7601XS, T7602XA, T7602XD, T7602XS, T7611XA, T7611XD, T7611XS, T7612XA, T7612XD, T7612XS, T7621XA, T7621XD, T7621XS, T7622XA, T7622XD, T7622XS, T7631XA, T7631XD, T7631XS, T7632XA, T7632XD, T7632XS, T7691XA, T7691XD, T7691XS, T7692XA, T7692XD, T7692XS, T560X1A, T560X1D, T560X1S, T603X1A, T603X1D, T603X1S, T744XXA, T744XXD, T744XXS, Z561, Z562, Z563, Z564, Z565, Z566, Z570, Z571, Z572, Z5731, Z5739, Z574, Z575, Z576, Z577, Z578, Z579, Z590, Z591, Z598, Z599, Z620, Z626, Z629, Z654, Z655, Z734, Z5681, Z5689, Z6221, Z6222, Z6229, Z77011, Z77120, Z91410, Z91411, Z91412, Z91419Z62810, Z62811, Z62812, Z62819, Z62820, Z62821, Z62822, Z62890, Z62891, Z62898

ICD, International Classification of Diseases; CPT, Current Procedural Terminology.