## SUPPLEMENTAL MATERIAL

**Supplemental Table 1. Diagnosis Codes Used to Identify Index Conditions and Comorbidities**

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| --- | --- | --- |
| **Conditions and comorbidities** | **ICD-9-CM codesa** | **ICD-10-CM codesa** |
|  |  |  |
| **Index conditions** |  |  |
| Ankylosing spondylitis | 720 | M45 |
| Crohn's disease | 555 | K50 |
| Hidradenitis suppurativa | 705.83 | L73.2 |
| Psoriatic arthritis | 696.0 | L40.5 |
| Psoriasis | 696.1, 696.8 | L40.0-L40.4, L40.8-L40.9 |
| Rheumatoid arthritis | 714 | M05, M06.0, M06.8, M06.9 |
| Ulcerative colitis | 556 | K51 |
| Uveitis | 360.11, 360.12, 362.18, 363.00, 363.01, 363.03, 363.04, 363.05, 363.06, 363.10, 363.11, 363.12, 363.13, 363.14, 363.15, 363.20, 363.21, 363.22, 364.0, 364.00, 364.01, 364.02, 364.03, 364.04, 364.05, 364.1, 364.10, 364.11, 364.21, 364.22, 364.23, 364.24, 364.3 | H20.0, H30, H44.11, H44.13 |
| **Charlson comorbidity index (CCI)b** |  |  |
| HIV/AIDS | 042.x–044.x | B20.x-B22.x, B24.x |
| Cerebrovascular disease | 362.34, 430.x–438.x | G45.x, G46.x, H34.0, I60.x-I69.x |
| Chronic pulmonary disease | 416.8, 416.9, 490.x–505.x, 506.4, 508.1, 508.8 | I27.8, I27.9, J40.x-J47.x, J60.x-J67.x, J68.4, J70.1, J70.3 |
| Congestive heart failure | 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4–425.9, 428.x | I09.9, I11.0, I13.0, I13.2, I25.5, I42.0, I42.5-I42.9, I43.x, I50.x, P29.0 |
| Dementia | 290.x, 294.1, 331.2 | F00.x-F03.x, F05.1, G30.x, G31.1 |
| Diabetes with chronic complication | 250.4–250.7 | E10.2-E10.5, E10.7, E11.2-E11.5, E11.7, E12.2-E12.5, E12.7, E13.2-E13.5, E13.7, E14.2-E14.5, E14.7 |
| Diabetes without chronic complication | 250.0–250.3, 250.8, 250.9 | E10.0, E10.1, E10.6, E10.8, E10.9, E11.0, E11.1, E11.6, E11.8, E11.9, E12.0, E12.1, E12.6, E12.8, E12.9, E13.0, E13.1, E13.6, E13.8, E13.9, E14.0, E14.1, E14.6, E14.8, E14.9 |
| Hemiplegia or paraplegia | 334.1, 342.x, 343.x, 344.0–344.6, 344.9 | G04.1, G11.4, G80.1, G80.2, G81.x, G82.x, G83.0-G83.4, G83.9 |
| Mild liver disease | 070.22, 070.23, 070.32, 070.33, 070.44, 070.54, 070.6, 070.9, 570.x, 571.x, 573.3, 573.4, 573.8, 573.9, V42.7 | B18.x, K70.0-K70.3, K70.9, K71.3-K71.5, K71.7, K73.x, K74.x, K76.0, K76.2-K76.4, K76.8, K76.9, Z94.4 |
| Moderate or severe liver disease | 456.0–456.2, 572.2–572.8 | I85.0, I85.9, I86.4, I98.2, K70.4, K71.1, K72.1, K72.9, K76.5, K76.6, K76.7 |
| Myocardial infarction | 410.x, 412.x | I21.x, I22.x, I25.2 |
| Peptic ulcer disease | 531.x–534.x | K25.x-K28.x |
| Peripheral vascular disease | 093.0, 437.3, 440.x, 441.x, 443.1–443.9, 447.1, 557.1, 557.9, V43.4 | I70.x, I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9 |
| Renal disease | 403.01, 403.11, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 582.x, 583.0–583.7, 585.x, 586.x, 588.0, V42.0, V45.1, V56.x | I12.0, I13.1, N03.2-N03.7, N05.2-N05.7, N18.x, N19.x, N25.0, Z49.0-Z49.2, Z94.0, Z99.2 |
| Rheumatic disease | 446.5, 710.0–710.4, 714.0–714.2, 714.8, 725.x | M05.x, M06.x, M31.5, M32.x-M34.x, M35.1, M35.3, M36.0 |
| **Other comorbidities** |  |  |
| Asthma | 493 | J45 |
| Bronchitis | 466, 490, 491 | J20-J21, J40-J42 |
| Chronic renal disease | 403, 585 | I12, N18 |
| Depression | 296.2, 296.3, 296.82, 300.4, 311 | F32, F33, F34.1 |
| Hyperlipidemia | 272.2, 272.4 | E78.2, E78.4, E78.5 |
| Hypertension | 401-405 | I10-I13, I15-I16 |
| Multiple sclerosis | 340 | G35 |
| Myasthenia gravis | 358 | G70.0 |
| Neuropathy | 337.0, 337.1, 357, 377.34, 377.41 | G61.0. G61.8, G61.9, G62.0, G62.1, G62.2, G62.81, G62.89, G62.9, G63, H46, H47.01, E08.42, E09.42, E10.42, E11.42, E13.42 |
| Pericarditis | 391.0, 393, 420, 423.1, 423.2 | I01.0, I09.2, I30, I31.0, I31.1, I32 |
| Thyroiditis | 245 | E06 |

***Abbreviations:*** AIDS, acquired immunodeficiency syndrome; HIV, human immunodeficiency virus; ICD-9/10-CM, International Classification of Diseases- Ninth/Tenth Revision- Clinical Modification.

***Notes:***

a ICD-9-CM and ICD-10-CM codes were identified through text searches via Find-A-Code (www.findacode.com).

b Source: Quan, Hude, et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. Medical care (2005): 1130-1139.

**Supplemental Table 2. Drug Search Criteria Used to Identify Treatments**

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| --- | --- | --- |
| **Treatment group** | **Generic namesa** | **HCPCSb** |
|  |  |  |
| Aminosalicylates | Balsalazide, mesalamine, olsalazine, sulfasalazine | - |
| Antibiotics | Ciprofloxacin, metronidazole, rifaximin, vancomycin | C9479, J0744, J3370, J7342, S0030 |
| Biologics |  |  |
| Actemra® | Tocilizumab | J3262 |
| Cimzia® | Certolizumab | J0717, J0718 |
| Cosentyx® | Secukinumab | - |
| Enbrel®, Benepali® | Etanercept | J1438 |
| Entyvio® | Vedolizumab | C9026, J3380 |
| Ilumya® | Tildrakizumab | - |
| Kinera® | Anakinra | - |
| Orencia® | Abatacept | J0129 |
| Remicade® | Infliximab | J1745 |
| Rituxan® | Rituximab | J9310 |
| Siliq® | Brodalumab | - |
| Simponi® | Golimumab | J1602 |
| Skyrizi® | Risankizumab | - |
| Stelara® | Ustekinumab | C9487, J3357, J3358, Q9989 |
| Taltz® | Ixekizumab | - |
| Tremfya® | Guselkumab | C9029 |
| Tysabri® | Natalizumab | J2323, Q4079 |
| Corticosteroids | Betamethasone, dexamethasone, methylprednisone, methylprednisolone, triamcinolone, prednisone, prednisolone, hydrocortisone, cortisone, budesonide | C9256, J0702, J0704, J1020, J1030, J1040, J1094, J1100, J1700, J1710, J1720, J2650, J2920, J2930, J3300, J3301, J3302, J3303, J7312, J7506, J7509, J7510, J7512, J7624, J7626, J7627, J7633, J7634, J7637, J7638, J7683, J7684, J8540 |
| Humira® | Adalimumab | J0135 |
| Immunomodulators | Azathioprine, mercaptopurine, methotrexate | J7500, J7501, S0108 |
| NSAIDS | - | C9447, C9279, G9296, G9297, J1130, J1741, J1885 |

***Abbreviations:*** GPI, Generic Product Identifier; HCPCS, Healthcare Common Procedure Coding System; MDDB, Medi-Span Master Drug Data Base; NDC, National Drug Code; NSAID, non-steroidal anti-inflammatory drug.

***Notes:***

a GPI and text string searches of the MDDB were used to identify relevant NDC codes.

b HCPCS codes were identified through searches of the Centers for Medicare and Medicaid Services HCPCS database.