**Supplement 1.** Diagnosis codes of excluded diseases for IBS diagnosis.

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| **Category of excluded disease** | **Diagnostic codes** |
| Gastrointestinal cancer | Colon (C18-C21) |
|  | Esophagus or stomach (C15, C16) |
|  | Small bowel (C17) |
|  | Pancreato-biliary (C22-C25, C64) |
| Inflammatory bowel disease | Ulcerative colitis (K51) |
|  | Crohn’s disease (K50) |
|  | Intestinal tuberculosis (A183, K930) |
| Acute colitis or infectious colonic disease | Gastritis/enterocolitis (A09) |
|  | Other non-infectious gastritis/enterocolitis (K52) |
|  | Other infectious enterocolitis (A04) |
|  | Viral or other enteric infection (A08) |
|  | Other infectious food poisoning (A05) |
|  | Diverticulitis (K57) |
| Peptic ulcer disease | Gastric ulcer (K25) |
|  | Duodenal ulcer (K26) |
|  | Other unspecified peptic ulcer (K27-K28) |
| Pancreato-biliary disease or liver cirrhosis | Pancreato-biliary disease (K80-K87) |
|  | Hepatic fibrosis and cirrhosis (K74) |
| Genitourinary disease | Urinary tract stone (N20-N23) |
|  | Cystitis (N30) |
|  | Pelvic inflammatory disease (N738-N739) |
|  | Endometriosis (N80) |
| Intestinal obstructive disease | Intestinal vascular disease (K55) |
| or peritoneal disease | Paralytic ileus or mechanical intestinal obstruction (K56) |
|  | Postoperative intestinal obstruction (K913) |
|  | Peritoneal disease (K65-K67) |
| Appendicitis | Acute appendicitis, other appendicitis, unspecified acute appendicitis (K35-K37) |
| Metabolic diseases | Hypothyroidism (K05) |
|  | Other hypothyroidism (E03) |
|  | Elevated blood glucose level (R73) |
| Cerebrovascular disease/mental disease | Other mental disorders due to brain damage and dysfunction due to physical disease (F06) |
|  | Cerebrovascular diseases (I60-I69) |

**Supplement 2.** Prescription codes for drugs excluded because of their associated risk of osteoporosis

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| **Category of drug** | **Drug name (ATC code)** |
| Anticoagulants | Heparin (B01AB01) |
| PPI | Esomeprazole (A02BC05), Lansoprazole (A02BC03), Rabeprazole (A02BC04), Pantoprazole (A02BC02), Omeprazole (A02BC01), Ilaprazole (A02BX) |
| Aromatase inhibitors | Anastrozole (L02BG03), Letrozole (L02BG04), Exemestane (L02BG06) |
| SSRI | Escitalopram (N06AB10), Fluvoxamine (N06AB08), Paroxetine (N06AB05), Sertraline (N06AB06), Fluoxetine (N06AB03), Dapoxetine (G04BX14) |
| Glucocorticoid | Prednisone (H02AB15 H02AB16 H02AB17), Hydrocortisone (H02AB09), Methylprednisolone (H02AB04), Dexamethasone (H02AB02), Betamethasone + Dexchlorpheniramine Maleate (H02BX), Betamethasone (H02AB01), Triamcinolone (H02AB08), Fludrocortisone Acetate (H02AA02) |
| Thyroid hormone | Levothyroxine (H03AA01 H03AA02), Levothyroxine Sodium 50 μg + Liothyronine Sodium 12.5 μg (H03AA03) |
| Anticonvulsants | Phenobarbital (R03CK N03AA02 A02AX), Carbamazepine (N03AF01), Clonazepam (N03AE01)  Ethosuximide (N03AD01), Levetiracetam (N03AX14), Valproic acid (N03AG01), Vigabatrin (N03AG04), Oxcarbazepine (N03AF02), Topiramate (N03AX11), Gabapentin (N03AX12), Pregabalin (N03AX16), Phenytoin (N03AB02), Fosphenytoin (N03AB05)  Primidone (N03AA03), Acetazolamide (S01EC01), Lamotrigine (N03AX09) |
| GnRH | Busereline (L02AE01), Gonadorelin (H01CA01), Goserelin (L02AE03), Leuprorelin (L02AE02), Triptorelin (L02AE04) |
| Loop diuretics | Furosemide (C03CA01) |
| Depo-progesterone | Medroxyprogesterone acetate (G03DA02) |
| Antivirals | Tenofovir 300 mg (J05AF07), Tenofovir 300 mg, Emtricitabine 200 mg (J05AR03)  Tenofovir 300 mg + Emtricitabine 200 mg + Elvitegravir 150 mg + Cobicitat silicon dioxide 288.5 mg (J05AR09) |
| Anticancer drugs | cisplatin 10mg/20ml (L01XA01), carboplatin (L01XA02), oxaliplatin(L01XA03), Cyclophosphamide (L01AA01), Ifosfamide (L01AA06), Melphalan (L01AA03), Chlorambucil (L01AA02), Altretamine (L01XX03), Busulfan (L01AB01), Dacarbazine (L01AX04), Fluorouracil (L01BC02), Capecitabine (L01BC06), Cytarabine (L01BC01), Gemcitabine (L01BC05), Methotrexate (L01BA01), Mercaptopurine (L01BB02), Vinblastine (L01CA01), Vincristine (L01CA02), Paclitaxel (L01CD01), Docetaxel (L01CD02), Etoposide (L01CB01), Topotecan (L01XX17), Irinotecan (L01XX19), Doxorubicin (L01DB01), Daunorubicin (L01DB02), Mitomycin (L01DC03), Bleomycin (L01DC01), L-Asparaginase (L01XX02) |
| Immunosuppressants | Cyclosporine (L04AD01), Tacrolimus (L04AD02) |
| Thiazolinedione | Pioglitazone 15 mg (A10BG03), Rosiglitazone 4 mg (A10BG02)  Pioglitazone 30 mg + Glimepiride 2 mg (A10BD06)  Pioglitazone 15 mg + Metformin 850 mg (A10BD05)  Rosiglitazone 4 mg + Glimepiride 1 mg (A10BD04) |