**Supplemental Table 1. Cohort definitions**

|  |  |  |
| --- | --- | --- |
| **Diagnosis** | **ICD-10-CM codes** | **Definition** |
| SCI/D |  | VA SCI/D Registry\* |
| MS | G35 | ≥3 codes in one year  OR  ≥1 code and ≥1 MS-specific disease modifying therapy\*\* prescribed in one year |
| PD | G20 | ≥2 codes within 3 months  AND  ≥1 PD medication\*\*\* prescribed during study period |
| NB | N31.x, N32.81 | ≥2 codes that are a minimum of 2 months apart  OR  ≥2 prescriptions for ≥ 1 bladder management supply (e.g., catheters) during the study period |
| UTI | N30.0x, N30.9x, N39.0, T83.51x | Any encounter with at least 1 code |

\* Abbreviated summary of inclusion criteria: patients assigned to a SCI Patient Aligned Care Team or with utilization in an SCI/D treating specialty or with a SCI/D annual exam or with at least 2 encounters in an SCI outpatient clinic, telephone clinic, telehealth Virtual clinic, or Home Care program with a qualifying SCI/D diagnosis on 2 different calendar days. Included patients are also required to have had utilization in at least 2 of 10 workload categories derived from CDW identified patient encounters for various SCI care settings or with primary or secondary qualifying SCI and MS diagnoses (via ICD9 and 10 codes

\*\*Glatiramer acetate, Interferon-beta 1b, Interferon-beta 1a, Natalizumab, Fingolimod, Dimethyl fumarate, Teriflunomide, Ocrelizumab, Siponimod

\*\*\*Levodopa-carbidopa, Carbidopa-levodopa-entacapon, Carbidopa, Levodopa, Levodopa-Benserazide, Pramipexole, Ropinirole, Pergolide, Rotigotine, Cabergoline, Monoamine Oxidase B (MAO-B) inhibitors

**Supplemental Table 2. ASB and UTI diagnosis categorizations**

|  |  |  |
| --- | --- | --- |
|  | **Signs or symptoms criterion** | **Microbiologic criterion** |
| **UTI Diagnosis** | | |
| Appropriate | ≥1 of the following signs and/or symptoms:  Temperature >38.0°C or 100.4°Fa  Rigorsa  Altered mental statusa  Malaise, lethargy, or sense of uneasea  Flank pain  Pelvic pain or discomfort  Acute hematuria  Increased spasticitya  Increased autonomic dysreflexiaa  Discomfort or pain during urination  New onset or increase in urinary incontinence | Urine culture performed within ± 7 days of the encounter grew ≥10^3 cfu/ml of ≥1 bacterial species |
| Appropriate without positive culture | ≥1 of the above signs and/or symptoms | Urine cultures not meeting microbiologic criterion or no urine culture within ± 7 days of the encounter |
| Inappropriate—true ASB | No signs or symptoms | Urine culture performed within ± 7 days of the encounter grew ≥10^5 cfu/ml of ≥1 bacterial species |
| Inappropriate without positive culture | No signs or symptoms | Urine cultures not meeting microbiologic criterion or no urine culture within ± 7 days of the encounter |
| **ASB Diagnosis** | | |
| Appropriate | No signs or symptoms | Urine culture performed within ± 7 days of the encounter grows ≥10^5 cfu/ml of ≥1 bacterial species |
| Inappropriate – true UTI | ≥1 of the above signs and/or symptoms | Urine culture performed within ± 7 days of the encounter grew ≥10^3 cfu/ml of ≥1 bacterial species |

aWith no alternate better explanation identified for these symptoms.

**Supplemental Table 3. ASB and UTI treatment categorizations**

|  |  |
| --- | --- |
|  | **Criteria** |
| **UTI Treatment** | |
| Appropriate | An antibiotic prescribed ± 5 days from the culture date that meets all three criteria:   1. The cultured organism(s) is susceptible to the antibiotic selected 2. The antibiotic penetrates the urinary tract with proven efficacy for UTI 3. The antibiotic selected was prescribed for 7-14 days |
| Inappropriate | An antibiotic prescribed including ± 5 days from the culture date that does not meet all three criteria above  OR  No antibiotic prescribed |
| Inappropriate UTI diagnosis -- True ASB | Any antibiotic prescribed within ± 5 days from the culture date |
| Overprescribing | Antibiotic duration of >14 days  OR  Inappropriately broad-spectrum antibiotic in the absence of other concomitant infections or relevant antibiotic allergies that may necessitate it |
| Inadequate prescribing | No antibiotic prescribed  OR  Antibiotic prescribed for <7 days  OR  Antibiotic prescribed to which the cultured organism(s) was non-susceptible |
| **ASB Treatment** | |
| Appropriate | No antibiotic prescribed ± 5 days from the culture date  OR  An antibiotic prescribed ± 5 days from the culture date but for a suspected infection outside the urinary tract |
| Inappropriate | Any antibiotic prescribed within ± 5 days from the culture date |

**Supplemental Table 4. Bivariate analysis of associations between ASB and UTI diagnosis and treatment groups and clinical outcomes in patients with NB due to SCI/D or MS (n=142 encounters)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **ASB/UTI Diagnosis** | | | | **ASB/UTI Treatment** | | | |
| **Outcome** | Appropriate (n=110, 77.5%) | Inappropriate (n=32, 22.5%) | OR (95% CI) | p-value | Appropriate  (n=87, 61.3%) | Inappropriate (n=55, 38.7%) | OR (95%CI) | p-value |
| **90-day readmission** |  |  |  |  |  |  |  |  |
| Yes | 34 (30.9) | 10 (32.3) | 0.94 (0.40-2.2) | 0.89 | 29 (33.3) | 15 (27.3) | 1.3 (0.62-2.7) | 0.49 |
| No | 76 (69.1) | 21 (67.7) | ref | 58 (66.7) | 39 (70.9) | ref |
| **CDI** |  |  |  |  |  |  |  |  |
| Yes | 6 (5.4) | 0 | - | - | 3 (3.4) | 3 (5.4) | 0.62 (0.12-3.2) | 0.57 |
| No | 104 (94.6) | 32 (100) | ref | 84 (96.6) | 52 (94.6) | ref |
| **AKI** |  |  |  |  |  |  |  |  |
| Yes | 12 (10.9) | 2 (6.2) | 1.8 (0.39-8.7) | 0.42 | 11 (12.6) | 3 (5.4) | 2.5 (0.67-9.4) | 0.15 |
| No | 98 (89.1) | 30 (93.8) | ref | 76 (87.4) | 52 (94.6) | ref |
| **MDRO on subsequent urine culture** |  |  |  |  |  |  |  |  |
| Yes | 33 (30.0) | 11 (34.4) | 0.82 (0.35-1.9) | 0.64 | 27 (31.0) | 17 (30.9) | 1.0 (0.48-2.1) | 0.99 |
| No | 77 (70.0) | 21 (65.6) | ref | 60 (69.0) | 38 (69.1) | ref |
| **Post-culture LOS, median days (IQR)** | 14 (57) | 7 (17) | - | 0.02 | 14 (46) | 9 (43) | - | 0.18 |

# OR, odds ratio; CI, confidence interval; CDI, *C. difficile* infection; AKI, acute kidney injury; MDRO, multidrug-resistant organism; LOS, length of stay; IQR, interquartile range