**Supplemental Figure 1. Distribution of scheduled dates for patients with elective procedures cancelled due to COVID-19**a

**![Chart, histogram

Description automatically generated]()**

aSample restricted to scheduled elective procedures that were cancelled on March 13-19, 2020.

**Supplemental Table 1.** Characteristics of patients with elective procedures cancelled due to COVID-19 and all patients and matched patients with completed elective procedures in March-June 2018 and 2019

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | March-June 2018 and 2019 | | March 13-19, 2020 |  |
|  | All Completed Procedures  n=315,713 | Matched Completed Procedures n=298,445 | Matched COVID-19 Cancelleda  n=3,326 | Standardized Difference |
| Age, mean (SD), y | 64.3 (13) | 64.3 (13) | 63.9 (13.2) | 0.03 |
| Race, n (%) |  |  |  |  |
| White | 234703 (74.3) | 222243 (74.5) | 2397 (72.1) | 0.07 |
| Black | 58938 (18.7) | 55399 (18.6) | 692 (20.8) |  |
| Other | 6240 (2) | 5881 (2) | 80 (2.4) |  |
| Unknown | 15832 (5) | 14922 (5) | 157 (4.7) |  |
| Ethnicity, n (%) |  |  |  |  |
| Hispanic or Latino | 18485 (5.9) | 17405 (5.8) | 138 (4.1) | 0.08 |
| Not Hispanic or Latino | 289740 (91.8) | 273999 (91.8) | 3118 (93.7) |  |
| Unknown | 7488 (2.4) | 7041 (2.4) | 70 (2.1) |  |
| Sex, n (%)b |  |  |  |  |
| Male | 289577 (91.7) | 274362 (91.9) | 3002 (90.3) | 0.06 |
| Female | 26110 (8.3) | 24061 (8.1) | 323 (9.7) |  |
| Marital status, n (%) |  |  |  |  |
| Married | 162366 (51.4) | 154415 (51.7) | 1749 (52.6) | 0.07 |
| Divorced | 85530 (27.1) | 80440 (27) | 883 (26.5) |  |
| Never married | 37116 (11.8) | 34794 (11.7) | 407 (12.2) |  |
| Separated | 11780 (3.7) | 11090 (3.7) | 119 (3.6) |  |
| Widowed | 17022 (5.4) | 15923 (5.3) | 136 (4.1) |  |
| Unknown | 1899 (0.6) | 1783 (0.6) | 32 (1) |  |
| VA priority group |  |  |  |  |
| 1 and 4: High disability | 147284 (46.7) | 139316 (46.7) | 1549 (46.6) | 0.10 |
| 5: Low-income | 69100 (21.9) | 64944 (21.8) | 687 (20.7) |  |
| 2, 3, and 6: Low/moderate disability | 62481 (19.8) | 59420 (19.9) | 712 (21.4) |  |
| 7 and 8: Non-disabled, co-pay required | 34676 (11) | 33022 (11.1) | 376 (11.3) |  |
| Unknownc | 2172 (0.7) | 1743 (0.6) | ---- |  |
| Elixhauser comorbidity score index, mean (SD) | 4.3 (3.1) | 4.2 (3.1) | 3.3 (2.6) | 0.34 |
| Nosos score, mean (SD) | 2.2 (2.8) | 2.1 (2.7) | 1.7 (2.1) | 0.18 |
| Surgical specialtyd |  |  |  |  |
| Ophthalmology | 57983 (18.4) | 56664 (20.4) | 855 (25.7) | 0.30 |
| General surgery | 64515 (20.4) | 59935 (21.6) | 591 (17.8) |  |
| Orthopedics | 37716 (12) | 36470 (13.2) | 545 (16.4) |  |
| Urology | 43520 (13.8) | 42583 (15.4) | 420 (12.6) |  |
| Plastic surgery | 12614 (4) | 11965 (4.3) | 207 (6.2) |  |
| Ear, nose, throat (Ent) | 16300 (5.2) | 14920 (5.4) | 197 (5.9) |  |
| Podiatry | 11370 (3.6) | 10943 (3.9) | 159 (4.8) |  |
| Neurosurgery | 6398 (2) | 5764 (2.1) | 94 (2.8) |  |
| Peripheral vascular | 15008 (4.8) | 12964 (4.7) | 75 (2.3) |  |
| Obstetrics/gynecology | 3741 (1.2) | 3083 (1.1) | 45 (1.4) |  |
| Other | 24023 (7.6) | 21861 (7.9) | 138 (4.1) |  |
| Missing | 22525 (7.1) | 21293 (7.1) | 0 (0) |  |

aElective procedures cancelled on March 13-19, 2020.

bCases with no matching concept or unknown sex are not reported due to small cell size.

cCases with unknown VA priority group assignment are not reported due to small cell size.

dSurgical specialty was not used in nearest neighbor match.

**Supplemental Table 2. Surgical case category of elective procedures most frequently cancelled due to COVID-19 and procedures completed in March-June of 2018-2019.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **2018-2019 Matched Completed Procedures** | | **COVID-19 Cancelled**a | | **Total** | |
|  | **n=298,445** | | **n=3,326** | | **n=301,771** | |
| **Surgical Case Category** | **No** | **%** | **No** | **%** | **No** | **%** |
| Lens and cataract procedures | 50014 | 16.8 | 779 | 23.4 | 50793 | 16.8 |
| Colonoscopy and biopsy | 19568 | 6.6 | 166 | 5.0 | 19734 | 6.5 |
| Arthroplasty knee | 6854 | 2.3 | 166 | 5.0 | 7020 | 2.3 |
| Other therapeutic procedures on muscles and tendons | 9508 | 3.2 | 149 | 4.5 | 9657 | 3.2 |
| Excision of skin lesion | 14944 | 5.0 | 135 | 4.1 | 15079 | 5.0 |
| Inguinal and femoral hernia repair | 8831 | 3.0 | 120 | 3.6 | 8951 | 3.0 |
| Decompression peripheral nerve | 7696 | 2.6 | 118 | 3.6 | 7814 | 2.6 |
| Other OR therapeutic procedures, male genital | 3723 | 1.3 | 66 | 2.0 | 3789 | 1.3 |
| Bunionectomy or repair of toe deformities | 2435 | 0.8 | 64 | 1.9 | 2499 | 0.8 |
| Other OR therapeutic procedures on joints | 3922 | 1.3 | 64 | 1.9 | 3986 | 1.3 |
| Other hernia repair | 5048 | 1.7 | 61 | 1.8 | 5109 | 1.7 |
| Other therapeutic procedures on eyelids, conjunctiva, cornea | 4450 | 1.5 | 59 | 1.8 | 4509 | 1.5 |
| Transurethral excision, drainage, or removal urinary obstruction | 7289 | 2.4 | 58 | 1.7 | 7347 | 2.4 |
| Hip replacement, total and partial | 3440 | 1.2 | 58 | 1.7 | 3498 | 1.2 |
| Laminectomy, excision intervertebral disc | 3175 | 1.1 | 55 | 1.7 | 3230 | 1.1 |
| Insertion of catheter or spinal stimulator and injection into spinal canal | 8601 | 2.9 | 53 | 1.6 | 8654 | 2.9 |
| Arthroplasty other than hip or knee | 2403 | 0.8 | 51 | 1.5 | 2454 | 0.8 |
| Other non-OR therapeutic procedures, male genital | 2113 | 0.7 | 49 | 1.5 | 2162 | 0.7 |
| Plastic procedures on nose | 2637 | 0.9 | 46 | 1.4 | 2683 | 0.9 |
| Other OR therapeutic procedures on nose, mouth and pharynx | 2699 | 0.9 | 44 | 1.3 | 2743 | 0.9 |
| Upper gastrointestinal endoscopy, biopsy | 7720 | 2.6 | 40 | 1.2 | 7760 | 2.6 |
| Endoscopy and endoscopic biopsy of the urinary tract | 13338 | 4.5 | 40 | 1.2 | 13378 | 4.4 |
| Otherb | 108037 | 36.17 | 885 | 26.55 | 108922 | 36.11 |

Abbreviation: OR, operating room

aElective procedures cancelled on March 13-19, 2020.

bOther represents the remaining 74 AHRQ CCS surgical cases categories.

**Supplemental Table 3. Operative complexity for elective procedures cancelled due to COVID-19 and the comparison group of procedures completed in March-June of 2018-2019.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| VASQIP Operative Complexity Designation | Completed Procedures | | COVID-19 Cancelleda | | Total | |
|  | **#** | **%** | **#** | **%** | **%** | **%** |
| Complex | 4227 | 1.4 | 27 | 0.8 | 4254 | 1.4 |
| Intermediate | 38158 | 13.1 | 483 | 14.6 | 38641 | 13.1 |
| Standard | 249699 | 85.5 | 2792 | 84.6 | 252491 | 85.5 |
| Not assignedb | 1457 | 0.5 | --- | --- | 1466 | 0.5 |
| Total | **298445** |  | **3326** |  | **301771** |  |

Abbreviation: VASQIP, Veterans Affairs Surgical Quality Improvement Program

aElective procedures cancelled on March 13-19, 2020.

bCases with not assigned operative complexity are not reported due to small cell size.

**Supplemental Table 4. Association of elective procedures cancelled due to COVID-19 and emergency department utilization – Restricted COVID-19 Sample.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Completed Proceduresa | | | COVID-19 Cancelledb | | |
|  | **No.** | **% 30-Day ED Visit Mean (SD)** | **% 90-Day ED Visit Mean (SD)** | **No.** | **30-Day ED**  **Difference (SE) [CI]**c | **90-Day ED**  **Difference (SE) [CI]**c |
| COVID-19 Cancelled v.  All Completed Procedures | 216891 | 0.1 (0.3) | 0.19 (0.392) | 2129 | -0.031 (0.02)  [-0.07,0.008] | 0.044 (0.035)  [-0.025,0.113] |
| COVID-19 Cancelled v. All Scheduled Procedures | 233061 | 0.099 (0.299) | 0.189 (0.392) | 2129 | -0.032 (0.02)  [-0.07,0.007] | 0.04 (0.034)  [-0.027,0.107] |
| VASQIP Cases | 58675 | 0.137 (0.344) | 0.227 (0.419) | 656 | -0.087 (0.021)  [-0.129,-0.046] | -0.08 (0.041)  [-0.16,0] |
| Intermediate Operative Complexity | 24340 | 0.15 (0.357) | 0.248 (0.432) | 283 | -0.02 (0.049)  [-0.117,0.076] | -0.023 (0.071)  [-0.162,0.115] |
| Standard Operative Complexity | 183007 | 0.09 (0.286) | 0.178 (0.382) | 1806 | -0.035 (0.021)  [-0.075,0.005] | 0.02 (0.039)  [-0.057,0.096] |

Abbreviations: ED, emergency department; VASQIP, Veterans Affairs Surgical Quality Improvement Program

aComparison group includes all matched completed elective procedures in March-June 2018 and 2019 unless stated otherwise.

bElective procedures cancelled on March 16-17, 2020.

cEstimates are percentage point difference from the comparison group.

**Supplemental Table 5. Association of elective procedures cancelled due to COVID-19 and mortality – Restricted COVID-19 Sample**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Completed Proceduresa | | | COVID-19 Cancelledb | | |
|  | **No.** | **% 30-Day Mortality Mean (SD)** | **% 90-Day Mortality Mean (SD)** | **No.** | **30-Day Mortality**  **Difference (SE) [CI]**c | **90-Day Mortality**  **Difference (SE) [CI]**c |
| COVID-19 Cancelled v.  All Completed Procedures | 216891 | 0.004 (0.0633) | 0.0102 (0.1007) | 2129 | -0.0036 (0.0013)  [-0.0062,-0.001] | -0.0066 (0.002)  [-0.0105,-0.0027] |
| COVID-19 Cancelled v. All Scheduled Procedures | 233061 | 0.0041 (0.0642) | 0.0105 (0.1018) | 2129 | -0.0036 (0.0016)  [-0.0067,-0.0005] | -0.0072 (0.002)  [-0.0112,-0.0032] |
| VASQIP Cases | 58675 | 0.0058 (0.0758) | 0.0113 (0.1055) | 656 | -0.0057 (0.0003)  [-0.0064,-0.0051] | -0.0094 (0.0011)  [-0.0116,-0.0072] |
| Intermediate Operative Complexity | 24340 | 0.0074 (0.0854) | 0.0148 (0.1207) | 283 | -0.0073 (0.0005)  [-0.0084,-0.0063] | -0.0147 (0.0008)  [-0.0162,-0.0131] |
| Standard Operative Complexity | 183007 | 0.003 (0.055) | 0.0086 (0.0926) | 1806 | -0.0026 (0.0018)  [-0.0062,0.001] | -0.0058 (0.0048)  [-0.0152,0.0036] |

aComparison group includes all matched completed elective procedures in March-June 2018 and 2019 unless stated otherwise.

bElective procedures cancelled on March 16-17, 2020.

cEstimates are percentage point difference from the comparison group.