**Table 1a Supplemental:** Estimated Numbers and Types of Inpatient Bariatric Surgeries in the US: Overall 1993 to 2016 and Yearly from 1993 to 2004.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1993 -2016** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Primary inpatient bariatric surgery, N** | 1,903,273 | 8,631 | 8,257 | 7,657 | 8,634 | 11,014 | 13,364 | 22,604 | 30,680 | 55,546 | 67,788 | 108,184 | 118,297 |
| **Open gastric bypass, N (%)** | 475,419 (25) | 4,197 (48.6) | 4,975 (60.2) | 5,651 (73.8) | 6,523 (75.5) | 8,917 (81) | 10,655 (79.7) | 20,099 (88.9) | 26,607 (86.7) | 47,363 (85.2) | 61,510 (90.7) | 97,200 (89.8) | 94,842 (80.2) |
| **Laparoscopic gastric bypass, N (%)** | 701,483 (36.9) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13,221 (11.2) |
| **Open sleeve/VBG, N (%)** | 67,048 (3.5) | 4,228 (49.0) | 3,062 (37.1) | 1,707 (22.3) | 1,739 (20.1) | 1,740 (15.8) | 2,371 (17.7) | 1,990 (8.8) | 2,889 (9.4) | 6,280 (11.3) | 4,220 (6.2) | 9,115 (8.4) | 5,575 (4.7) |
| **Laparoscopic sleeve gastrectomy, N (%)** | 454,628 (23.9) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 476  (0.4) |
| **Laparoscopic adjustable gastric band, N (%)** | 161,396 (8.5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,545 (1.3) |
| **BPD-DS, N (%)** | 43,299 (2.3) | 205 (2.4) | 220 (2.7) | 299 (3.9) | 372 (4.3) | 357 (3.2) | 337 (2.5) | 515 (2.3) | 1,184 (3.9) | 1,903 (3.4) | 2,058 (3) | 1,869 (1.7) | 2,639 (2.2) |

VBG: Vertical banded gastroplasty. BPD-DS: Biliopancreatic diversion-duodenal switch

**Table 1b Supplemental**: Estimated Numbers and Types of Inpatient Bariatric Surgeries in the US: Yearly from 2005 to 2016.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** |
| **Primary inpatient bariatric surgery, N** | 111,414 | 91,791 | 84,562 | 120,083 | 118,816 | 102,340 | 83,038 | 122,340 | 139,350 | 148,560 | 157,354 | 162,969 |
| **Open gastric bypass, N (%)** | 23,997 (21.5) | 16,338 (17.8) | 9,856 (11.7) | 9,303 (7.7) | 5,813 (4.9) | 6,898 (6.7) | 3,586 (4.3) | 3,330 (2.7) | 2,495 (1.8) | 2,020 (1.4) | 1,940 (1.2) | 1,305  (0.8) |
| **Laparoscopic gastric bypass, N (%)** | 67,015 (60.1) | 57,128 (62.2) | 48,044 (56.8) | 70,250 (58.5) | 77,076 (64.9) | 66,391 (64.9) | 51,217 (61.7) | 59,055 (48.2) | 52,500 (37.7) | 48,390 (32.6) | 45,920 (29.2) | 45,275  (27.8) |
| **Open sleeve/VBG, N (%)** | 394 (1.3) | 1,342 (1.5) | 2,387 (2.8) | 1,761 (1.5) | 1,730 (1.5) | 2,195 (2.1) | 1,925 (2.3) | 2,125 (1.7) | 1,975 (1.4) | 2,335 (1.6) | 1,880 (1.2) | 1,080  (0.7) |
| **Laparoscopic sleeve gastrectomy, N (%)** | 3,432  (3.1) | 1,719 (1.9) | 2,893 (3.4) | 2,062 (1.7) | 2,017 (1.7) | 1,36 0 (1.3) | 8,891 (10.7) | 47,620 (38.9) | 75,715 (54.3) | 91,190 (61.4) | 103,495 (65.8) | 113,754  (69.8) |
| **Laparoscopic adjustable gastric band, N (%)** | 13,786 (12.3) | 13,292 (14.5) | 19,866 (23.5) | 34,681 (28.9) | 28,361  (23.9) | 23,155 (22.6) | 14,035 (16.9) | 6,665 (5.4) | 3,26 5 (2.3) | 1,240 (0.8) | 905 (0.6) | 600  (0.4) |
| **BPD-DS, N (%)** | 1,790 (1.6) | 1,972 (2.1) | 1,515 (1.8) | 2,024 (1.7) | 3,819 (3.2) | 2,343 (2.3) | 3,383 (4.1) | 3,545 (2.9) | 3,400 (2.4) | 3,385 (2.3) | 3,210 (2) | 955  (0.6) |

VBG: Vertical banded gastroplasty. BPD-DS: Biliopancreatic diversion-duodenal switch

**Table 2a:** Characteristics of the Patient Population Receiving Bariatric Surgery in the US: Overall 1993 to 2016 and Yearly from 1993 to 2003.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Complete data   N (%)** | **Variables** | **1993 -2016** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** |
| **Age (year)** | 1,903,273  (100) | **Mean (SEM)** | 43.9 (0.1) | 38.9  (0.5) | 39 (0.5) | 40.3 (0.5) | 39.7 (0.5) | 40.4 (0.5) | 39.8 (0.3) | 41.6 (0.3) | 40.9 (0.3) | 41 (0.2) | 41.6 (0.2) | 42.3 (0.2) |
| **Sex** | 1,898,903  (99.8) | **Male, N (%)** | 381,747 (20.1) | 1,317  (15.3) | 1,439  (17.4) | 1,299  (17) | 1,442  (16.7) | 1,905  (17.3) | 2,463  (18.4) | 4,154  (18.4) | 4,558  (14.9) | 8,884  (16) | 10,558  (15.6) | 19,129  (17.8) |
| **Female, N (%)** | 1,517,156  (79.9) | 7,314  (85) | 6,818  (82.6) | 6,357  (83) | 7,193  (83) | 9,109 (82.7) | 10,900  (81.6) | 18,442  (81.6) | 26,102  (85.1) | 46,662  (84) | 57,231  (84.4) | 88,312  (82.2) |
| **Race** | 1,632,089  (85.8) | **White, N (%)** | 1,157,730  (70.9) | 6,048  (86) | 5,436  (82) | 5,129  (81.1) | 5,343  (78.1) | 7,057  (82.4) | 8,551  (81) | 14,108  (84.5) | 17,245  (77.9) | 29,471  (80.5) | 40,869  (80.5) | 64,604  (77.8) |
| **Black, N (%)** | 232,482 (14.2) | 818  (11.6) | 963  (14.5) | 846  (13.4) | 965 (14.1) | 1,023  (12) | 1,241  (11.8) | 1,400  (8.4) | 2,992  (13.5) | 3,555 (9.7) | 5,006  (9.9) | 9,152 (11) |
| **Hispanic, N (%)** | 170,164 (10.4) | 95  (1.4) | 171  (2.6) | 289  (4.6) | 376  (5.5) | 320  (3.7) | 623  (5.9) | 927  (5.5) | 1,133  (5.1) | 2,598  (7.1) | 3,412  (6.7) | 6,229  (7.5) |
| **Other, N (%)** | 71,713  (4.4) | 68  (1) | 63  (1) | 58  (1) | 160  (2.3) | 161  (1.9) | 146  (1.4) | 264  (1.6) | 757  (3.4) | 977  (2.7) | 1,485  (2.9) | 3,055  (3.7) |
| **Insurance** | 1,896,557  (99.6) | **Private, N (%)** | 1,340,693 (70.7) | 6,726  (78.1) | 5,957  (72.4) | 5,499  (71.8) | 6,088  (70.5) | 7,423  (67.6) | 10,042  (75.5) | 16,946  (76) | 24,633  (80.4) | 45,782  (83.3) | 55,934  (82.6) | 88,687  (82.1) |
| **Medicare, N (%)** | 230,340  (12.2) | 435  (5) | 648  (7.9) | 868  (11.3) | 967  (11.2) | 1,275  (11.6) | 1,199  (9) | 1,993  (8.9) | 2,072  (6.8) | 3,214  (5.8) | 4,154  (6.1) | 7,308  (6.8) |
| **Medicaid, N (%)** | 178,230 (9.4) | 700  (8.1) | 877  (10.7) | 735  (9.6) | 886  (10.3) | 962  (8.8) | 933  (7) | 1,486  (6.7) | 2,151  (7) | 2,676  (4.9) | 3,356  (5) | 5,618  (5.2) |
| **Self-Pay, N (%)** | 83,359  (4.4) | 248  (2.9) | 172  (2.1) | 233  (3) | 319  (3.7) | 783  (7.1) | 698  (5.2) | 1,451  (6.5) | 1,111  (3.6) | 1,828  (3.3) | 2,417  (3.6) | 3,296  (3.0) |
| **Other, N (%)** | 63,936  (3.4) | 499  (5.8) | 576  (7) | 317  (4.1) | 370  (4.3) | 529  (4.8) | 420  (3.2) | 408  (1.8) | 654  (2.1) | 1,493  (2.7) | 1,861  (2.8) | 3,064  (2.8) |
| **Obesity-related Comorbidities** | 1,903,273  (100)\* | **Hypertension,  N (%)** | 1,005,779  (52.9) | 2,422  (28.1) | 2,413  (29.2) | 2,599  (34) | 3,160  (36.6) | 3,875  (35.2) | 4,836  (36.2) | 9,030  (40) | 11,664  (38) | 21,070  (37.9) | 30,235  (44.6) | 50,591  (46.8) |
| **Type-2 Diabetes,  N (%)** | 555,725  (29.2) | 877  (10.2) | 1,007  (12.2) | 1,109  (14.5) | 1,349  (15.6) | 1,696  (15.4) | 1,993  (14.9) | 4,082  (18.1) | 5,648  (18.4) | 10,418  (18.8) | 14,739  (21.7) | 26,740  (24.7) |
| **Obstructive sleep apnea, N (%)** | 742,634  (39) | 693  (8) | 993  (12) | 1,137  (14.8) | 1,460  (16.9) | 2,384  (21.6) | 2,514  (18.8) | 6,238  (27.6) | 6,892  (22.5) | 13,814  (24.9) | 17,969  (26.5) | 32,910  (30.4) |

**Table 2b:** Characteristics of the Patient Population Receiving Bariatric Surgery in the US: Yearly from 2004 to 2016.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Variables** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** |
| **Age (year)** | **Mean (SEM)** | 42.6 (0.2) | 42.9 (0.2) | 43.5 (0.2) | 43.8 (0.2) | 45  (0.2) | 45.5 (0.3) | 44.9 (0.2) | 45.2 (0.3) | 44.9 (0.1) | 44.9 (0.1) | 45.2 (0.1) | 45  (0.1) | 44.4  (0.1) |
| **Sex** | **Male, N (%)** | 20,533  (17.5) | 20,315  (18.4) | 17,956  (19.6) | 16,846  (20) | 24,903  (20.8) | 26,365  (22.2) | 21,561  (21.1) | 18,694  (22.5) | 26,975  (22.1) | 30,345  (21.8) | 32,910  (22.1) | 34,041  (21.6) | 33,155  (20.4) |
| **Female, N (%)** | 96,982  (82.5) | 89,952  (81.6) | 73,575  (80.4) | 67,321  (80) | 94,852  (79.2) | 92,223  (77.8) | 80,576  (78.9) | 64,263  (77.5) | 95,350  (78) | 109,000  (78.2) | 115,650  (77.9) | 123,298  (78.4) | 129,674  (79.6) |
| **Race** | **White, N (%)** | 72,435  (78.4) | 63,962  (75.9) | 53,147  (74.9) | 44,739  (71.7) | 77,903  (74.3) | 70,068  (70.9) | 65,548  (70.5) | 52,141  (69.8) | 76,850  (66.1) | 87,925  (66.5) | 93,035  (65.9) | 96,187  (64.3) | 99,929  (63.9) |
| **Black, N (%)** | 1,094  (11.8) | 9,093  (10.8) | 8,658  (12.2) | 7,925  (12.7) | 12,906  (12.3) | 12,747  (12.9) | 15,576  (16.8) | 11,011  (14.7) | 17,905  (15.4) | 21,270  (16) | 23,160  (16.4) | 25,626  (17.1) | 27,740  (17.7) |
| **Hispanic, N (%)** | 7,176  (7.8) | 7,747  (9.2) | 6,904  (9.7) | 5,601  (9) | 7,909  (7.5) | 10,389  (10.5) | 7,750  (8.3) | 9,434  (12.6) | 14,810  (12.7) | 16,665  (12.6) | 18,200  (12.9) | 20,016  (13.4) | 21,390  (13.7) |
| **Other, N (%)** | 1,831  (2) | 3,483  (4.1) | 2,246  (3.2) | 4,104  (6.6) | 6,185  (6.0) | 5,565  (5.6) | 4,066  (4.4) | 2,094  (2.8) | 6,675  (5.7) | 6,385  (4.8) | 6,860  (4.9) | 7,750  (5.2) | 7,275  (4.7) |
| **Insurance** | **Private, N (%)** | 92,251  (78) | 84,497  (76.1) | 65,544  (72.2) | 61,120  (72.8) | 88,936  (74.2) | 82,943  (69.9) | 69,385  (67.8) | 51,614  (62.3) | 81,870  (67.7) | 93,585  (67.3) | 96,900  (65.4) | 97,552  (62.1) | 100,779  (62) |
| **Medicare, N (%)** | 9,113  (7.7) | 9,224  (8.3) | 7,931  (8.7) | 6,988  (8.3) | 13,013  (10.9) | 18,489  (15.6) | 15,389  (15) | 14,808  (17.9) | 17,550  (14.5) | 21,885  (15.7) | 24,110  (16.3) | 24,641  (15.7) | 23,065  (14.2) |
| **Medicaid, N (%)** | 6,531  (5.5) | 6,560  (5.9) | 6,267  (6.9) | 5,513  (6.6) | 7,015  (5.9) | 8,083  (6.8) | 10,292  (10.1) | 9,898  (11.9) | 12,930  (10.7) | 14,390  (10.3) | 18,020  (12.2) | 24,311  (15.5) | 28,040  (17.2) |
| **Self-Pay, N (%)** | 6,419  (5.4) | 5,776  (5.2) | 6,903  (7.6) | 6,450  (7.7) | 6,371  (5.3) | 5,363  (4.5) | 3,100  (3) | 2,801  (3.4) | 4,730  (3.9) | 5,095  (3.7) | 5,615  (3.8) | 6,175  (3.9) | 6,005  (3.7) |
| **Other, N (%)** | 3,845  (3.2) | 4,968  (4.5) | 4,126  (4.6) | 3,910  (4.7) | 4,484  (3.7) | 3,800  (3.2) | 4,141  (4) | 3,752  (4.5) | 3,945  (3.3) | 4,160  (3) | 3,590  (2.4) | 4,310  (2.8) | 4,715  (3) |
| **Obesity-related Comorbidities** | **Hypertension,  N (%)** | 61,549  (52) | 56,540  (50.8) | 48,654  (53) | 45,361 (53.6) | 67,556  (56.3) | 70,832  (59.6) | 60,014  (58.6) | 48,722  (58.7) | 70,375  (57.5) | 78,460  (56.3) | 83,795  (56.4) | 85,712  (54.5) | 86,314  (53) |
| **Type 2 Diabetes,  N (%)** | 32,605  (27.6) | 31,210  (28) | 27,177  (29.6) | 25,419  (30.1) | 39,861  (33.2) | 41,789  (35.2) | 34,620  (33.8) | 28,925  (34.8) | 40,415  (33) | 44,190  (31.7) | 46,945  (31.6) | 46,836  (29.8) | 46,075  (28.3) |
| **Obstructive sleep apnea, N (%)** | 37,913  (32) | 36,617  (32.9) | 34,520  (37.6) | 32,118  (38) | 49,899  (42) | 52,938  (44.5) | 46,066  (41.5) | 38,633  (46.5) | 55,290  (45.2) | 62,380  (44.8) | 67,625  (45.5) | 69,367  (44.1) | 72,264  (44.3) |

**Table 3a:** Characteristics of the Hospitals Where Inpatient Bariatric Surgery Was Performed in the US: Overall 1993 to 2016 and Yearly from 1993 to 2003.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Complete data   N (%)** | **Variables** | **1993 -2016** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** |
| **Hospital location and teaching status** | 1,898,950  (99.8) | **Urban teaching,**  **N (%)** | 1,105,026  (58.2) | 1,982  (23) | 2,598  (31.5) | 3,230  (42.2) | 4,631  (53.6) | 6,432  (58.4) | 6,602  (49.4) | 14,185  (62.8) | 20,174  (65.8) | 26,367  (47.5) | 39,310  (58) | 54,083  (50) |
| **Urban nonteaching,**  **N (%)** | 722,764  (38) | 6,489  (75.2) | 5,415  (65.6) | 4,158  (54.3) | 3,671  (42.5) | 4,256  (38.6) | 6,253  (46.8) | 7,423  (32.8) | 9,800  (31.9) | 27,725  (49.9) | 24,453  (36.1) | 46,904  (43.4) |
| **Rural,**  **N (%)** | 71,159  (3.8) | 160  (1.9) | 243  (3) | 269  (3.5) | 332  (3.9) | 326  (3) | 505  (3.8) | 997  (4.4) | 706  (2.3) | 1,455  (2.6) | 4,024  (5.9) | 7,196  (6.7) |
| **Hospital size** | 1,898,950  (99.8) | **Large hospital,**  **N (%)** | 1,054,254  (55.5) | 4,609  (53.4) | 4,441  (53.8) | 4,412  (57.6) | 4,353  (50.4) | 4,767  (43.3) | 7,180  (53.8) | 12,737  (56.4) | 14,767  (48.1) | 35,785  (64.4) | 45,671  (67.4) | 65,666  (60.7) |
| **Medium hospital,**  **N (%)** | 542,158  (28.6) | 2,522  (29.2) | 2,240  (27.1) | 2,751  (35.9) | 3,197  (37) | 4,034  (36.6) | 3,712  (27.8) | 8,213  (36.3) | 8,338  (27.2) | 10,291  (18.5) | 15,876  (23.4) | 22,826  (21.1) |
| **Small hospital,**  **N (%)** | 302,537  (15.9) | 1,500  (17.4) | 1,576  (19.1) | 494  (6.5) | 1,085  (12.6) | 2,213  (20.1) | 2,466  (18.5) | 1,655  (7.3) | 7,575  (24.7) | 9,470  (17.1) | 6,241  (9.2) | 19,691  (18.2) |
| **Hospital region of the country** | 1,903,273  (100) | **South,**  **N (%)** | 633,946  (33.3) | 3,238  (37.5) | 3,502  (42.4) | 3,696  (48.3) | 3,338  (38.6) | 3,248  (29.5) | 3,815  (28.6) | 6,726  (29.8) | 11,500  (37.5) | 14,488  (26.1) | 19,339  (28.5) | 38,762  (35.8) |
| **Northeast,**  **N (%)** | 493,305  (25.9) | 691  (8) | 668  (8.1) | 1,414  (18.5) | 2,057  (23.8) | 3,290  (29.9) | 2,723  (20.4) | 3,307  (14.6) | 9,455  (30.8) | 12,811  (23.1) | 20,039  (29.6) | 27,835  (25.7) |
| **West,**  **N (%)** | 399,443  (21) | 2,369  (27.4) | 1,736  (21) | 1,689  (22.1) | 2,300  (26.6) | 3,159  (28.7) | 4,150  (31.1) | 8,529  (37.7) | 5,429  (17.7) | 14,041  (25.3) | 16,177  (23.9) | 21,091  (19.5) |
| **Midwest,**  **N (%)** | 376,581  (19.8) | 2,333  (27) | 2,351  (28.5) | 858  (11.2) | 940  (10.9) | 1,317  (12) | 2,676  (20) | 4,043  (17.9) | 4,297  (14) | 14,206  (25.6) | 12,234  (18.1) | 20,495  (18.9) |

**Table 3b:** Characteristics of the Hospitals Where Inpatient Bariatric Surgery Was Performed in the US*:* Yearly from 2004 to 2016.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Variables** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** |
| **Hospital location and teaching status** | **Urban teaching,**  **N (%)** | 61,253  (51.8) | 60,804  (54.6) | 51,597  (56.2) | 43,497  (51.4) | 60,046  (50.0) | 54,707  (46.2) | 49,386  (49.9) | 48,000  (58.1) | 70,870  (57.9) | 82,610  (59.3) | 109,480 (73.7) | 115,068  (73.1) | 118,114 (72.5) |
| **Urban nonteaching,**  **N (%)** | 51,413  (43.5) | 48,343  (43.4) | 37,635  (41) | 38,104  (45.1) | 56,109  (46.7) | 58,263  (49.3) | 42,687  (43.1) | 31,947  (38.7) | 47,625  (38.9) | 52,200  (37.5) | 34,715  (23.4) | 37,266  (23.7) | 39,910  (24.5) |
| **Rural,**  **N (%)** | 5,631  (4.8) | 2,268  (2) | 2,559  (2.8) | 2,961  (3.5) | 3,928  (3.3) | 5,316  (4.5) | 6,930  (7) | 2,639  (3.2) | 3,845  (3.1) | 4,540  (3.3) | 4,365  (2.9) | 5,020  (3.2) | 4,945  (3) |
| **Hospital size** | **Large hospital,**  **N (%)** | 77,482  (65.5) | 66,428  (59.6) | 56,281  (61.3) | 53,558  (63.3) | 72,435  (60.3) | 63,668  (53.8) | 55,077  (55.6) | 45,236  (54.8) | 64,545  (52.8) | 74,230  (53.3) | 70,060  (47.2) | 73,702  (46.8) | 77,164  (47.4) |
| **Medium hospital,**  **N (%)** | 31,439  (26.6) | 29,339  (26.3) | 23,628  (25.7) | 18,286  (21.6) | 38,002  (31.6) | 37,423  (31.6) | 29,560  (29.9) | 21,480  (26) | 36,740  (30) | 40,785  (29.3) | 45,805  (30.8) | 52,546  (33.4) | 53,125  (32.6) |
| **Small hospital,**  **N (%)** | 9,376  (7.9) | 15,647  (14) | 11,881  (12.9) | 12,718  (15) | 9,646  (8) | 17,196  (14.5) | 14,367  (14.5) | 15,869 (19.2) | 21,055  (17.2) | 24,335  (17.5) | 32,695  (22) | 31,106  (19.8) | 32,680  (20.1) |
| **Hospital region of the country** | **South,**  **N (%)** | 38,917  (32.9) | 31,629  (28.4) | 27,259  (29.7) | 27,509  (32.5) | 34,606  (28.8) | 35,840  (30.2) | 34,301  (33.5) | 28,008  (33.7) | 44,515  (36.4) | 52,500  (37.7) | 54,390  (36.6) | 55,786  (35.5) | 57,034  (35) |
| **Northeast,**  **N (%)** | 30,022  (25.4) | 3,247  (28.9) | 25,925  (28.2) | 21,728  (25.7) | 32,836  (27.3) | 23,971  (20.2) | 25,912  (25.3) | 21,038 (25.3) | 30,360  (24.8) | 36,395  (26.1) | 39,700  (26.7) | 43,201  (27.4) | 45,790 (28.1) |
| **West,**  **N (%)** | 24,976  (21.1) | 28,632  (25.7) | 22,221  (24.2) | 18,103  (21.4) | 32,678  (27.2) | 25,080  (21.1) | 15,795  (15.4) | 16,302  (19.6) | 24,015  (19.6) | 24,745  (17.8) | 27,155  (18.3) | 29,026  (18.4) | 30,045  (18.4) |
| **Midwest,**  **N (%)** | 24,381  (20.6) | 19,005  (17.1) | 16,386  (17.9) | 17,222  (20.4) | 19,974  (16.6) | 33,925  (28.6) | 26,332  (25.7) | 17,690  (21.3) | 23,450  (19.2) | 25,710  (18.4) | 27,315  (18.4) | 29,341  (18.6) | 30,100  (18.5) |

**Table 4a.** Estimated Complications, Deaths, and Hospital Length of Stay during Admissions for Bariatric Surgery in the US: Overall 1993 to 2016 and Yearly from 1993 to 2004.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Variables** | **1993 -2016** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Complications\*** | **Any complication**  **N (%)** | 91,404  (4.8) | 783  (9.1) | 822  (10) | 795  (10.4) | 878  (10.2) | 1,227  (11.1) | 1,560  (11.7) | 2,250  (10) | 2,706  (8.9) | 5,327  (9.6) | 5,684  (8.4) | 7,566  (7) | 6,770  (5.8) |
| **Gastrointestinal**  **N (%)** | 28,230  (1.5) | 415  (4.8) | 485  (5.9) | 469  (6.1) | 489  (5.7) | 570  (5.2) | 772  (5.8) | 973  (4.3) | 1,218  (4) | 2,390 (4.3) | 2,783  (4.1) | 2,311  (2.1) | 1,824  (1.5) |
| **Surgical**  **N (%)** | 22,126  (1.1) | 197  (2.3) | 184  (2.2) | 203  (2.7) | 214  (2.5) | 242  (2.2) | 363  (2.7) | 683  (3) | 668  (2.2) | 1225  (2.2) | 1239  (1.8) | 1949  (1.8) | 2100  (1.8) |
| **Bleeding**  **N (%)** | 19,969  (1) | 0 | 0 | 0 | 9  (0.1) | 237  (2.2) | 82  (0.6) | 267  (1.2) | 343  (1.1) | 780  (1.4) | 820  (1.2) | 1,652  (1.5) | 1,476  (1.3) |
| **CV/thromboembolic**  **N (%)** | 17,343  (0.9) | 208  (2.4) | 149  (1.8) | 138  (1.8) | 154  (1.8) | 200  (1.8) | 273  (2) | 404  (1.8) | 470  (1.5) | 881  (1.6) | 1,022  (1.5) | 1,636  (1.5) | 1,352  (1.1) |
| **Infectious**  **N (%)** | 12,981  (0.7) | 51  (0.6) | 47  (0.6) | 56  (0.7) | 105  (1.2) | 211  (1.9) | 238  (1.8) | 455  (2) | 473  (1.5) | 863  (1.6) | 854  (1.3) | 1,080  (1) | 1,046  (0.9) |
| **Other**  **N (%)** | 18,439  (1) | 24  (0.3) | 92 (1.1) | 99  (1.3) | 108  (1.3) | 198  (1.8) | 238  (1.8) | 308  (1.4) | 525  (1.7) | 964  (1.7) | 1,026  (1.5) | 1,571  (1.5) | 1,136  (1) |
| **Deaths\***  **N (%)** | | 2,966  (0.2) | 52  (0.6) | 22  (0.3) | 46  (0.6) | 64  (0.7) | 61  (0.6) | 131  (1) | 151  (0.7) | 158  (0.5) | 231  (0.4) | 224  (0.3) | 230  (0.2) | 231  (0.2) |
| **Length of Stay (days)\***  **N (SEM)** | | 2.6  (0.03) | 6.2  (0.3) | 6.3  (0.4) | 5.9  (0.3) | 5.3  (0.2) | 5.3  (0.3) | 5.2  (0.3) | 4.6  (0.3) | 4.3  (0.3) | 4  (0.2) | 3.8  (0.1) | 3.5  (0.1) | 3.1  (0.1) |

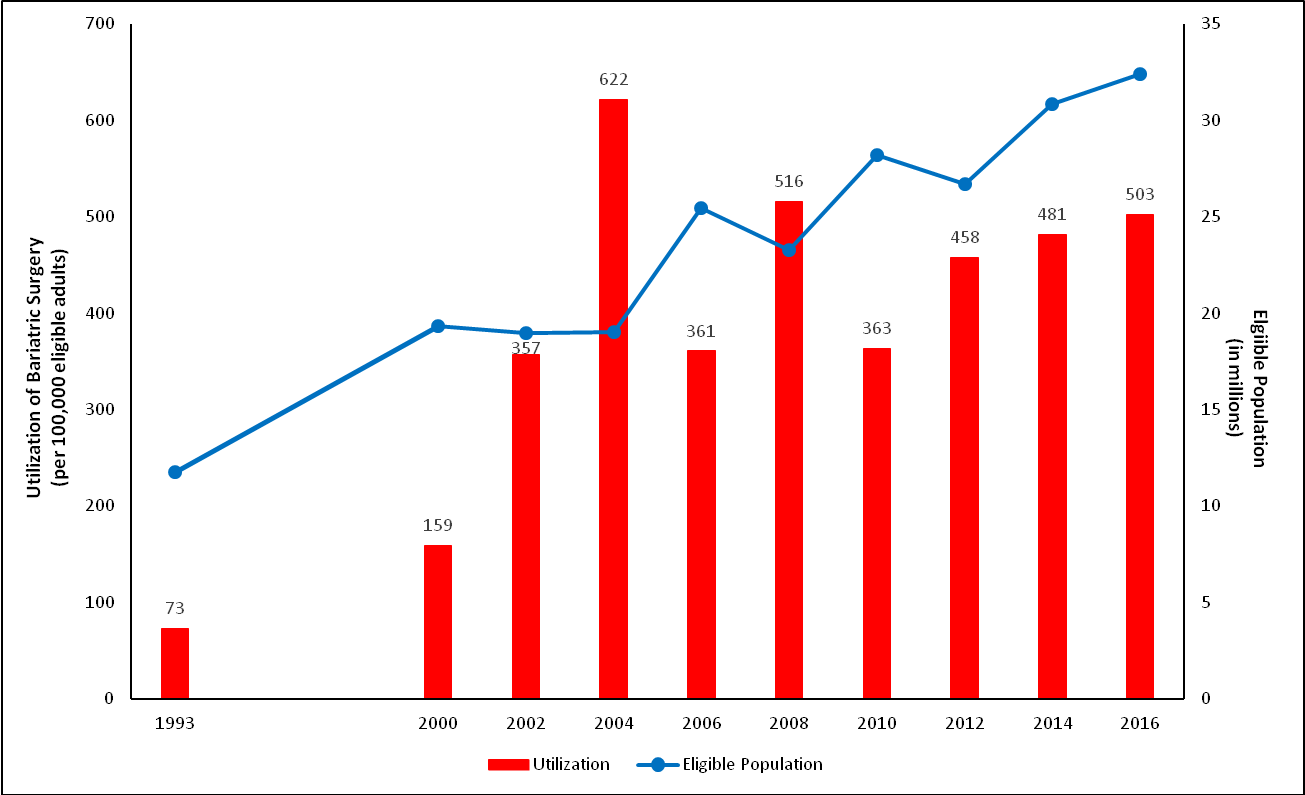
Abbreviations: CV, cardiovascular.

\*Complications, death, and length of stay data were available for 100% of the admissions.

**Table 4b.** Estimated Complications and Mortality Rates during Admissions for Bariatric Surgery in the US: Yearly from 2005 to 2016.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Variables** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** |
| **Complications\*** | **Any complication**  **N (%)** | 6,344  (5.7) | 5,422  (5.9) | 4,719  (5.6) | 5,220  (4.4) | 5,969  (5) | 5,168  (5.1) | 3,939  (4.7) | 3,955  (3.2) | 4,230  (3.0) | 4,165  (2.8) | 3,575  (2.3) | 2,330  (1.4) |
| **Gastrointestinal**  **N (%)** | 1,756  (1.6) | 1,624  (1.8) | 1,496  (1.8) | 1,759  (1.5) | 2,158  (1.9) | 1,912  ( 1.9) | 1,257  (1.6) | 305  ( 0.3) | 285  (0.2) | 325  ( 0.2) | 315  (0.2) | 340  ( 0.2) |
| **Surgical complications**  **N (%)** | 1731  (1.6) | 1532  (1.7) | 1278  (1.5) | 1186  (1) | 1232  (1) | 1092  (1.1) | 793  (1) | 875  (0.1) | 855  (0.6) | 765  (0.5) | 790  (0.5) | 730  (0.5) |
| **Bleeding**  **N (%)** | 1,866  (1.7) | 1,257  (1.4) | 1,160  (1.4) | 1,292  (1.1) | 1,466  (1.2) | 1,265  (1.2) | 911  (1.1) | 1,125  (0.9) | 1,280  (0.9) | 1,115  (0.8) | 895  (0.6) | 670  (0.4) |
| **Cardiovascular/thromboembolic**  **N (%)** | 1,103  (1) | 950  (1) | 802  (1) | 870  (0.7) | 1,129  (1) | 907  (0.9) | 736  (0.9) | 905  (0.7) | 905  (0.7) | 930  (0.6) | 710  (0.5) | 510  (0.3) |
| **Infection/abscess complications**  **N (%)** | 760  (0.7) | 654  (0.7) | 590  (0.7) | 616  (0.5) | 588  (0.5) | 572  (0.6) | 644  (0.8) | 780  (0.6) | 730  (0.5) | 615  (0.4) | 635  (0.4) | 320  (0.2) |
| **Other complications**  **N (%)** | 1,095  (1) | 947  (1) | 890  (1) | 1,087  (0.9) | 1,181  (1) | 927  (0.9) | 944  (1.1) | 1,045  (0.9) | 927  (1) | 1,610  (1.1) | 1,075  (0.7) | NA |
| **Deaths\***  **N (%)** | | 178  (0.2) | 140  (0.2) | 108  (0.1) | 101  (0.1) | 127  (0.1) | 111  (0.1) | 98  (0.1) | 145  (0.1) | 80  (0.1) | 95  (0.1) | 120  (0.1) | 60  (0.04) |
| **Length of Stay (days)\***  **N (SEM)** | | 2.7  (0.1) | 2.6  (0.1) | 2.4  (0.1) | 2.2  (0.1) | 2.2  (0.1) | 2.2  (0.1) | 2.4  (0.1) | 2.3  (0.03) | 2.2  (0.03) | 2.1  (0.04) | 2  (0.1) | 1.9  (0.1) |

\*Complications and mortality data were available for 100% of the admissions.



**Figure 3.** Estimated Number of Adults Possibly Eligible for Bariatric Surgery and Estimated Utilization of Surgery in the Eligible Population in the US from 1993 to 2016