|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristics** | **Curative treatment**  **(N=64057)** | **Pain management**  **(N = 380)** | ***P*** |
| Mean Age (years) | 65 ± 11 | 71 ± 12 | **<0.001** |
| Sex |  |  | 0.101 |
| Female | 27581 (43.0) | 180 (47.4) |  |
| Male | 36476 (57.0) | 200 (52.6) |  |
| Race |  |  |  |
| White | 59463 (92.8) | 355 (93.4) | Ref |
| Black | 3362 (5.2) | 18 (4.7) | 0.738 |
| Asian or Pacific Islander | 1129 (1.8) | 6 (1.6) | 0.931 |
| American Indian/Alaska Native | 103 (0.2) | 1 (0.3) | ~1 |
| Ethnicity |  |  | 0.062 |
| Hispanic | 3087 (4.8) | 10 (2.6) |  |
| Not Hispanic | 60970 (95.2) | 370 (97.4) |  |
| Median Household Income 2020 |  |  |  |
| < $46,277 | 9788 (15.3) | 71 (18.7) | Ref |
| $46,277 - $57,856 | 13772 (21.5) | 92 (24.2) | 0.660 |
| $57,857 - $74,062 | 15667 (24.4) | 95 (25.0) | 0.289 |
| $74,063 + | 24830 (38.8) | 122 (32.1) | **0.011** |
| Residence |  |  |  |
| Metro | 53465 (83.5) | 296 (77.9)) | Ref |
| Urban | 9419 (14.7) | 74 (19.5) | **0.009** |
| Rural | 1173 (1.8) | 10 (2.6) | 0.250 |
| Percent No High School Degree 2020 |  |  |  |
| 15.3%+ | 11499 (18.0) | 73 (19.2) | Ref |
| 9.1% - 15.2% | 15839 (24.7) | 93 (24.5) | 0.675 |
| 5.0% - 9.0% | 18853 (29.4) | 109 (28.7) | 0.589 |
| < 5.0% | 17866 (27.9) | 105 (27.6) | 0.669 |
| Insurance Status |  |  |  |
| No Insurance | 2135 (3.3) | 14 (3.7) | Ref |
| Private Provider | 27701 (43.3) | 91 (23.9) | **0.024** |
| Public Provider | 34221 (53.4) | 275 (72.4) | 0.538 |
| Charlson-Deyo Score |  |  |  |
| 0 | 44559 (69.6) | 209 (55.0) | Ref |
| 1 | 11660 (18.2) | 94 (24.7) | **<0.001** |
| 2 | 5192 (8.1) | 51 (13.4) | **<0.001** |
| ≥ 3 | 2646 (4.1) | 26 (6.9) | **<0.001** |
| Facility Type |  |  |  |
| CCP | 2827 (4.4) | 16 (4.2) | Ref |
| CCCP | 23729 (37.0) | 151 (39.7) | 0.750 |
| Academic | 24839 (38.8) | 134 (35.3) | 0.964 |
| INCP | 12662 (19.8) | 79 (20.8) | 0.825 |
| Distance to Hospital (miles) | 34 ± 118 | 27 ± 70 | 0.584 |
| Laterality |  |  |  |
| Not Paired | 15236 (23.8) | 128 (33.7) | Ref |
| Left | 23665 (36.9) | 135 (35.5) | **0.002** |
| Right | 25156 (39.3) | 117 (30.8) | **<0.001** |
| Hospital Volume |  |  | **0.016** |
| High Volume Facilities (HVFs) | 26235 (41.0) | 132 (34.7) |  |
| Non-HVFs | 37822 (59.0) | 248 (65.3) |  |
| Tumor Size (mm) | 50 ± 68 | 55 ± 72 | **<0.001** |
| Survival Months1 | 9.36 [9.26-9.49] | 1.84 [1.64-2.07] | **<0.001** |
| 1Median [95% CI] Survival Time in Months calculated with Kaplan Meier method and compared with log-rank test. | | | |

**Table 1. Overall cohort characteristics for glioblastoma patient with pain management palliative care and curative treatment (N=64437)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Univariable Logistic Regression** | | **Multivariable Logistic Regression** | |
|  | **Odds ratio [95% CI]** | ***P*** | **Adjusted Odds ratio [95% CI]** | ***P*** |
| **Surgical Recommendation** | | | | |
| Increasing Age | 1.05 [1.04-1.06] | **<0.001** | 1.04 [1.02-1.05] | **<0.001** |
| Sex |  |  |  |  |
| Female | Ref |  | Ref |  |
| Male | 0.84 [0.69-1.03] | 0.091 | 0.89 [0.73-1.10] | 0.282 |
| Race |  |  |  |  |
| White | Ref |  | Ref |  |
| Black | 0.90 [0.54-1.40] | 0.653 | 0.89 [0.53-1.41] | 0.642 |
| Asian/Pacific Islander | 0.89 [0.35-1.82] | 0.778 | 1.00 [0.39-2.07] | 0.994 |
| American Indian/Alaska Native | 1.63 [0.09-7.31] | 0.629 | 1.58 [0.09-7.20] | 0.651 |
| Ethnicity |  |  |  |  |
| Not Hispanic | Ref |  | Ref |  |
| Hispanic | 0.53 [0.27-0.95] | 0.051 | 0.55 [0.27-1.00] | 0.074 |
| Median Household Income |  |  |  |  |
| < $46,277 | Ref |  | Ref |  |
| $46,277 - $57,856 | 0.92 [0.68-1.26] | 0.603 | 0.93 [0.67-1.30] | 0.665 |
| $57,857 - $74,062 | 0.84 [0.62-1.14] | 0.255 | 0.85 [0.59-1.22] | 0.376 |
| $74,063 + | 0.68 [0.51-0.91] | **0.009** | 0.66 [0.44-0.99] | **0.045** |
| Residence |  |  |  |  |
| Metro | Ref |  | Ref |  |
| Urban | 1.42 [1.09-1.82] | **0.007** | 1.30 [0.98-1.72] | 0.066 |
| Rural | 1.54 [0.76-2.74] | 0.181 | 1.33 [0.65-2.42] | 0.389 |
| Percent No High School Degree 2020 |  |  |  |  |
| 15.3%+ | Ref |  | Ref |  |
| 9.1% - 15.2% | 0.92 [0.68-1.26] | 0.619 | 0.95 [0.69-1.32] | 0.763 |
| 5.0% - 9.0% | 0.91 [0.68-1.23] | 0.538 | 1.05 [0.75-1.50] | 0.765 |
| < 5.0% | 0.93 [0.69-1.25] | 0.614 | 1.29 [0.87-1.92] | 0.201 |
| Insurance Status |  |  |  |  |
| No Insurance | Ref |  | Ref |  |
| Private Provider | 0.5 [0.29-0.92] | **0.016** | 0.49 [0.29-0.90] | **0.014** |
| Public Provider | 1.23 [0.74-2.2] | 0.459 | 0.68 [0.40-1.25] | 0.176 |
| Charlson-Deyo Score |  |  |  |  |
| 0 | Ref |  | Ref |  |
| 1 | 1.72 [1.34-2.19] | **<0.001** | 1.49 [1.16-1.90] | **0.002** |
| 2 | 2.09 [1.52-2.82] | **<0.001** | 1.83 [1.33-2.47] | **<0.001** |
| ≥ 3 | 2.09 [1.36-3.09] | **<0.001** | 1.74 [1.13-2.59] | **0.008** |
| Facility Type |  |  |  |  |
| CCP | Ref |  | Ref |  |
| CCCP | 1.12 [0.69-1.96] | 0.657 | 1.22 [0.75-2.13] | 0.460 |
| Academic | 0.95 [0.59-1.67] | 0.857 | 1.33 [0.79-2.39] | 0.306 |
| INCP | 1.10 [0.66-1.96] | 0.723 | 1.30 [0.77-2.33] | 0.349 |
| Increasing Distance | 1.00 [1.00-1.00] | 0.303 | 1.00 [1.00-1.00] | 0.266 |
| Laterality |  |  |  |  |
| Not Paired | Ref |  | Ref |  |
| Left | 0.68 [0.53-0.87] | **0.002** | 0.71 [0.56-0.90] | **0.006** |
| Right | 0.55 [0.43-0.71] | **<0.001** | 0.55 [0.43-0.71] | **<0.001** |
| Hospital Volume |  |  |  |  |
| HVFs | Ref |  | Ref |  |
| Non-HVFs | 1.3 [1.06-1.61] | **0.014** | 1.19 [0.93-1.53] | 0.162 |
| Increasing Tumor Size (mm) | 1.00 [1.00-1.00] | 0.094 | 1.00 [1.00-1.00] | 0.143 |

**Table 2. Odds of receiving pain management only as palliative care in glioblastoma (N=64437)**

|  |  |  |
| --- | --- | --- |
| **Overall Survival** | **Hazard Ratio [95% CI]** | ***P*** |
| Age | 1.03 [1.03-1.04] | **<0.001** |
| Sex |  |  |
| Female | Ref |  |
| Male | 1.06 [1.04-1.07] | **<0.001** |
| Race |  |  |
| White | Ref |  |
| Black | 0.88 [0.85-0.91] | **<0.001** |
| Asian/Pacific Islander | 0.83 [0.78-0.89] | **<0.001** |
| American Indian/Alaska Native | 0.98 [0.80-1.20] | 0.819 |
| Ethnicity |  |  |
| Not Hispanic | Ref |  |
| Hispanic | 0.78 [0.75-0.81] | **<0.001** |
| Median Household Income |  |  |
| < $46,277 | Ref |  |
| $46,277 - $57,856 | 0.94 [0.92-0.97] | **<0.001** |
| $57,857 - $74,062 | 0.91 [0.88-0.94] | **<0.001** |
| $74,063 + | 0.81 [0.78-0.83] | **<0.001** |
| Residence |  |  |
| Metro | Ref |  |
| Urban | 1.04 [1.01-1.06] | **0.003** |
| Rural | 1.02 [0.96-1.08] | 0.623 |
| Percent No High School Degree 2020 |  |  |
| 15.3%+ | Ref |  |
| 9.1% - 15.2% | 1.00 [0.98-1.03] | 0.754 |
| 5.0% - 9.0% | 1.01 [0.99-1.04] | 0.303 |
| < 5.0% | 1.01 [0.97-1.04] | 0.749 |
| Insurance Status |  |  |
| No Insurance | Ref |  |
| Private Provider | 0.9 [0.86-0.94] | **<0.001** |
| Public Provider | 0.94 [0.89-0.98] | 0.246 |
| Charlson-Deyo Score |  |  |
| 0 | Ref |  |
| 1 | 1.15 [1.12-1.17] | **<0.001** |
| 2 | 1.25 [1.21-1.29] | **<0.001** |
| ≥ 3 | 1.47 [1.42-1.53] | **<0.001** |
| Facility Type |  |  |
| CCP | Ref |  |
| CCCP | 1.02 [0.98-1.06] | 0.456 |
| Academic | 0.94 [0.90-0.98] | **0.003** |
| INCP | 1.04 [1.00-1.09] | 0.054 |
| Increasing Distance | 1.00 [1.00-1.00] | 0.081 |
| Laterality |  |  |
| Not Paired | Ref |  |
| Left | 0.83 [0.81-0.84] | **<0.001** |
| Right | 0.83 [0.81-0.84] | **<0.001** |
| Hospital Volume |  |  |
| HVFs | Ref |  |
| Non-HVFs | 1.08 [1.06-1.10] | **<0.001** |
| Increasing Tumor Size (mm) | 1.00 [1.00-1.00] | **<0.001** |

**Table 3. Multivariable Cox regression overall survival analysis for glioblastoma (N=64437)**

**Figure 1 Kaplan Meier curve depicting overall survival difference between patients who received pain management palliative care vs curative treatment for glioblastoma(N=64437)**

