Table 1. Patient characteristics of study groups

| **Variable/Group (%)** | **Offsite CS**  **(12.7)** | **Onsite CS**  **(87.3)** | **Total** | **p-value** |
| --- | --- | --- | --- | --- |
| **Number of weighted discharges** | 29134 | 192472 | 221606 |  |
| **Age (years), median (IQR)** | 78 (67,84) | 72 (60,80) | 72 (61,81) | <0.001 |
| **Males, %** | 51.1 | 60.4 | 59.2 | <0.001 |
| **Ethnicity, %** |  |  |  | <0.001 |
| **White** | 80.2 | 78.0 | 78.3 |  |
| **Black** | 9.1 | 11.3 | 11.0 |  |
| **Hispanic** | 6.4 | 6.2 | 6.3 |  |
| **Asian/Pacific Islander** | 2.1 | 1.5 | 1.6 |  |
| **Native American** | 0.5 | 0.6 | 0.6 |  |
| **Other** | 1.6 | 2.4 | 2.3 |  |
| **Elective Admission** | 32.8 | 39.3 | 38.5 | <0.001 |
| **Weekend admission** | 14.9 | 12.2 | 12.6 | <0.001 |
| **Primary expected payer, %** |  |  |  | <0.001 |
| **Medicare** | 78.2 | 70.2 | 71.3 |  |
| **Medicaid** | 5.1 | 6.1 | 5.9 |  |
| **Private Insurance** | 14.2 | 20.2 | 19.4 |  |
| **Self-pay** | 1.3 | 1.6 | 1.6 |  |
| **No charge** | 0.1 | 0.2 | 0.2 |  |
| **Other** | 1.2 | 1.7 | 1.6 |  |
| **Median Household Income (Percentile), %** |  |  |  | <0.001 |
| **0-25th** | 23.0 | 28.1 | 27.5 |  |
| **26-50th** | 26.5 | 26.0 | 26.0 |  |
| **51-75th** | 22.3 | 24.2 | 23.9 |  |
| **76-100th** | 28.2 | 21.7 | 22.6 |  |
| **ICD in situ, %** | 5.2 | 14.1 | 13.0 | <0.001 |
| **Cardiac Arrest, %** | 2.2 | 1.8 | 1.8 | <0.001 |
| **Ventricular Tachycardia, %** | 5.9 | 13.3 | 12.3 | <0.001 |
| **Ventricular Fibrillation, %** | 0.9 | 2.2 | 2.0 | <0.001 |
| **All-cause infection during admission, %\*** | 12.2 | 26.6 | 24.7 | <0.001 |
| **Shock, %** | 0.6 | 2.2 | 2.0 | <0.001 |
| **Charlson Comorbidity Index (CCI) (Mean ± Standard Deviation)** | 1.24 (1.53) | 1.43 (1.59) | 1.41 (1.58) | <0.001 |
| **Comorbidities, %** |  |  |  |  |
| **Dyslipidemia** | 35.7 | 39.0 | 38.6 | <0.001 |
| **Smoking** | 4.6 | 6.8 | 6.5 | <0.001 |
| **Atrial Fibrillation** | 35.1 | 34.6 | 34.7 | 0.132 |
| **Thrombocytopenia** | 2.4 | 5.0 | 4.7 | <0.001 |
| **Previous AMI** | 8.7 | 13.2 | 12.6 | <0.001 |
| **History of IHD** | 38.0 | 46.2 | 45.2 | <0.001 |
| **Previous PCI** | 5.7 | 9.4 | 8.9 | <0.001 |
| **Previous CABG** | 11.2 | 14.2 | 13.8 | <0.001 |
| **Previous CVA** | 4.2 | 4.7 | 4.6 | <0.001 |
| **Family history of CAD** | 1.5 | 2.5 | 2.4 | <0.001 |
| **AIDS** | 0.1 | 0.1 | 0.1 | 0.781 |
| **Alcohol abuse** | 1.2 | 1.4 | 1.4 | 0.006 |
| **Deficiency anemias** | 12.8 | 14.0 | 13.9 | <0.001 |
| **Chronic Blood loss anemia** | 0.6 | 0.7 | 0.7 | 0.236 |
| **RA/collagen vascular**  **diseases** | 2.0 | 2.1 | 2.1 | 0.053 |
| **Heart Failure** | 31.7 | 45.2 | 43.4 | <0.001 |
| **Chronic pulmonary disease** | 19.6 | 18.4 | 18.6 | <0.001 |
| **Coagulopathy** | 3.7 | 7.4 | 6.9 | <0.001 |
| **Depression** | 6.1 | 6.0 | 6.0 | 0.441 |
| **Diabetes** | 23.0 | 24.5 | 24.3 | <0.001 |
| **Diabetes with complications** | 4.5 | 4.3 | 4.3 | 0.061 |
| **Drug abuse** | 0.9 | 1.3 | 1.2 | <0.001 |
| **Hypertension** | 62.0 | 60.1 | 60.3 | <0.001 |
| **Hypothyroidism** | 13.5 | 12.5 | 12.7 | <0.001 |
| **Liver disease** | 1.4 | 1.5 | 1.5 | 0.056 |
| **Lymphomas** | 0.6 | 0.5 | 0.5 | 0.504 |
| **Fluid and electrolyte disturbances** | 15.0 | 16.7 | 16.5 | <0.001 |
| **Metastatic cancer** | 0.6 | 0.3 | 0.4 | <0.001 |
| **Other neurological disorders** | 7.1 | 5.0 | 5.3 | <0.001 |
| **Obesity** | 8.0 | 9.6 | 9.4 | <0.001 |
| **Paralysis** | 1.7 | 1.3 | 1.4 | <0.001 |
| **Peripheral vascular disease** | 7.1 | 7.8 | 7.7 | <0.001 |
| **Psychoses** | 2.2 | 1.9 | 1.9 | <0.001 |
| **Pulmonary circulation disorder** | 0.8 | 0.7 | 0.7 | 0.04 |
| **Renal failure (chronic)** | 14.1 | 17.7 | 17.2 | <0.001 |
| **Solid tumor without metastases** | 1.3 | 1.2 | 1.2 | 0.009 |
| **Peptic ulcer disease** | 0.1 | 0.0 | 0.0 | <0.001 |
| **Valvular heart disease** | 1.6 | 1.3 | 1.4 | <0.001 |
| **Weight loss** | 2.1 | 3.2 | 3.0 | <0.001 |
| **Dementia** | 3.0 | 1.2 | 1.5 | <0.001 |
| **Hospital bed size, %** |  |  |  | <0.001 |
| **Small** | 18.0 | 6.5 | 8.0 |  |
| **Medium** | 37.3 | 17.2 | 19.8 |  |
| **Large** | 44.7 | 76.3 | 72.2 |  |
| **Hospital Region, %** |  |  |  | <0.001 |
| **Northeast** | 33.0 | 20.3 | 21.9 |  |
| **Midwest** | 10.8 | 17.6 | 16.7 |  |
| **South** | 37.0 | 41.8 | 41.1 |  |
| **West** | 19.2 | 20.4 | 20.2 |  |
| **Location/ Teaching status, %** |  |  |  | <0.001 |
| **Rural** | 15.8 | 3.0 | 4.7 |  |
| **Urban non-teaching** | 57.5 | 32.2 | 35.5 |  |
| **Urban- teaching** | 26.7 | 64.8 | 59.8 |  |
| **Annual Hospital Mean Procedural Volume, %** |  |  |  | <0.001 |
| **Low (<30 cases)** | 70.5 | 17.2 | 24.2 |  |
| **High (≥30 cases)** | 29.5 | 82.8 | 75.8 |  |

\***All-cause infection**: Composite septicemia, viremia, bacteremia or device-related infection; CS: cardiac surgery

Table 2. Clinical outcomes of full cohort and propensity-matched cohort according to admitting hospital cardiac surgery facilities

|  | **Full Study Cohort** | | | | **Propensity Matched Cohort** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable/Group (% of cohort)** | **Offsite CS**  **(12.7)** | **Onsite CS**  **(87.3)** | **Total** | **p-value** | **Offsite CS**  **(50.3)** | **Onsite CS**  **(49.7)** | **Total** | **p-value** |
| **In-hospital MACE, %\*** | 4.7 | 7.1 | 6.8 | <0.001 | 4.3 | 6.8 | 5.6 | <0.001 |
| **In-hospital mortality, %** | 1.1 | 1.9 | 1.8 | <0.001 | 0.8 | 1.8 | 1.3 | <0.001 |
| **In-hospital procedure-related bleeding, %** | 1.6 | 5.9 | 5.4 | <0.001 | 1.6 | 5.0 | 3.3 | <0.001 |
| **In-hospital thoracic complications, %** | 3.4 | 4.4 | 4.3 | <0.001 | 3.2 | 4.1 | 3.6 | <0.001 |
| **In-hospital cardiac complications, %** | 0.5 | 1.3 | 1.2 | <0.001 | 0.5 | 1.5 | 1.0 | <0.001 |
| **Length of stay (days), median (IQR)** | 4 (2,7) | 4(2,9) | 4 (2,9) | 0.04 | 4 (2,7) | 4 (2,8) | 4 (2,8) | 0.05 |
| **Total charge ($), median (IQR)** | 41513  (23071, 74129) | 62699  (31251, 129594) | 58918  (29686, 120921) | <0.001 | 42210  (23240,  74811) | 53145  (26941,  105527) | 46960  (25041,  88359) | <0.001 |

\***MACE:** Composite of mortality, thoracic complications and cardiac complications; **CS:** cardiac surgery

Table 3. Predictors of admission to an on-site cardiac surgery facility

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **OR** | **p-value** | **Variable** | **OR** | **p-value** |
| Age (per year) | 0.99 [0.99, 0.99] | <0.001 | Coagulopathy | 1.28 [1.15, 1.43] | <0.001 |
| Female | 0.89 [0.87, 0.92] | <0.001 | Depression | 0.95 [0.90, 1.00] | 0.051 |
| Race | 1.00 [0.98, 1.01] | 0.673 | Diabetes, uncomplicated | 0.82 [0.78, 0.85] | <0.001 |
| Weekend admission | 0.86 [0.82, 0.89] | <0.001 | Diabetes with chronic complications | 0.54 [0.50, 0.59] | <0.001 |
| Primary expected payer, | 1.04 [1.03, 1.06] | <0.001 | Drug abuse | 0.87 [0.76, 1.00] | 0.048 |
| Median Household Income | 0.89 [0.88, 0.90] | <0.001 | Hypertension | 0.98 [0.95, 1.01] | 0.164 |
| Cardiac arrest | 0.70 [0.64, 0.77 | <0.001 | Hypothyroidism | 1.07 [1.03, 1.11] | <0.001 |
| Ventricular Tachycardia, | 1.78 [1.68, 1.87] | <0.001 | Liver disease | 0.69 [0.61, 0.77] | <0.001 |
| Ventricular Fibrillation, | 1.64 [1.44, 1.87] | <0.001 | Lymphoma | 1.08 [0.9, 1.29] | 0.421 |
| Dyslipidemia | 1.14 [1.11, 1.18] | <0.001 | Fluid and electrolyte disorders | 0.95 [0.91, 0.98] | 0.005 |
| Smoking | 1.20 [1.13, 1.28] | <0.001 | Metastatic cancer | 0.30 [0.23, 0.39] | <0.001 |
| Atrial Fibrillation | 1.07 [1.04, 1.10] | <0.001 | Other neurological disorders | 0.87 [0.82, 0.92] | <0.001 |
| Previous AMI | 0.96 [0.91, 1.02] | 0.165 | Obesity | 1.04 [0.99, 1.09] | 0.137 |
| History of IHD | 1.13 [1.09, 1.16] | <0.001 | Paralysis | 0.57 [0.51, 0.64] | <0.001 |
| Previous PCI | 1.41 [1.33, 1.49] | <0.001 | Peripheral vascular disorders | 0.90 [0.85, 0.95] | <0.001 |
| Previous CABG | 1.04 [0.99, 1.08] | 0.113 | Psychoses | 0.78 [0.71, 0.85] | <0.001 |
| Previous CVA | 0.96 [0.89, 1.03] | 0.230 | Pulmonary circulation disorders | 0.74 [0.64, 0.86] | <0.001 |
| Family history of CAD | 1.40 [1.27, 1.55] | <0.001 | Renal failure | 0.84 [0.78, 0.91] | <0.001 |
| AIDS | 0.29 [0.16, 0.53] | <0.001 | Solid tumor without metastasis | 1.16 [1.03, 1.31] | 0.016 |
| Alcohol abuse | 0.89 [0.79, 1.00] | 0.058 | Valvular disease | 0.83 [0.75, 0.92] | 0.001 |
| Deficiency anemias | 1.01 [0.97, 1.05] | 0.750 | Weight loss | 1.06 [0.97, 1.16] | 0.208 |
| Chronic Blood loss anemia | 1.06 [0.90, 1.24] | 0.512 | Dementia | 0.57 [0.52, 0.63] | <0.001 |
| RA/collagen vascular  diseases | 0.99 [0.90, 1.09] | 0.859 | CCI score | 1.14 [1.11, 1.18] | <0.001 |
| Heart Failure | 1.36 [1.32, 1.41] | <0.001 | ICD in situ | 2.21[2.09, 2.33] | <0.001 |
| Chronic pulmonary disease | 0.73 [0.69, 0.76] | <0.001 |  |  |  |