**Appendix 1**. ICD-9 Codes Used for Analysis

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| --- | --- | --- |
|  | **ICD 9 Codes Used** | **Variables in NIS** |
| Liver Transplant | 50.59 | PR1-PR15 |
| Morbid Obesity | V85.4, V85.41, V85.42, V85.43, V85.44, V85.45, 278.01 | DX1-DX25 |
| Diabetes | 250, 250.1, 250.2, 250.3, 250.02, 250.22, 250.32, 250.40, 250.50, 250.60, 250.70, 250.80, 250.90, 250.42, 250.52, 250.62, 250.72, 250.82, 25.092, 250.01, 250.03, 250.11, 250.13, 250.21, 250.23, 250.31, 250.33, 250.41, 250.43, 250.51, 250.53, 250.61, 250.63, 250.71, 250.73, 250.81, 250.83, 250.91, 250.93, 249.00, 249.01, 249.10, 249.20, 249.21, 249.30, 249.31, 249.40, 249.41, 249.50, 249.51, 249.60, 249.61, 249.70,249.71, 249.80, 249.81, 249.90, 249.91 | DX1-DX25 |
| Post LT Infection | Septicemia – 038, 038.0,038.1, 038.10, 038.11, 038.19, 038.2, 038.3, 038.40, 038.41, 038.42, 038.43, 038.44, 038.49, 038.8, 038.9  1 \*Sepsis 995.91   1. \*Bacteremia 790.7 2. \*Septic shock 785.52 3. \*Severe sepsis 995.92 4. \*Fungemia 117.9 5. \*Disseminated candidal infection 112.5 6. \*candidal endocarditis 112.81 7. \*candidal meningitis 112.83 8. \*Histoplasmosis meningitis: 115.01, 115.11, 115.91, 9. \*Histoplasmosis pneumonia: 115.05, 115.15, 115.95, 10. \*Aspergillosis 117.3 11. \*other fungal 484.6,484.7, 321.0 321.1, 12. \*following codes were unchanged since 2000 13. \*Disseminated fungal infection 117.9 14. \*fungal endocarditis 115.04, 115.14, 115.94, 15. Meningococcal septicemia 036.2 16. \* Staphylococcus:     * 1. toxic shock syndrome 040.82       2. scalded skin syndrome 695.81       3. pneumonia - 482.40-482.42,482.49       4. meningitis - 320.3       5. septicemia - 038.1, 038.11, 038.19,       6. unspecified site - 041.10, 041.11, 041.12, 041.19 17. \*Streptococcus:   septicemia - 038.0, 038.2  pneumonia 481, 482.30-39,  meningitis- 320, 320.1   * + 1. erysipelas - 035     2. pharyngitis/scarlet fever - 034.0, 034.1     3. rheumatic fever - 390, 391.0-2, 391.8-9, 392     4. unspecified site - 041.00-09  1. E coli - 041.4, 038.42,482.82, 2. H. influenza - 041.5, 038.41,482.2, 320.0, 3. Proteus - 041.6, 4. klebsiella - 482.0, 5. legionella - 482.84, 6. pseudomonas 041.7, 038.43, 482.1 7. serratia - 038.44 8. other gram negative 041.85,038.40,038.49,482.83,320.82 9. \*Anaerobes 10. \*pneumonia - 482.81 11. \*meningitis - 320.81 12. \*bacteriodes - 041.82 13. \*unspecified - 041.84 14. \*septicemia - 038.3 15. \*CNS abscess 324.0,324,1,324.9 16. \*Empyema 510.0,510.9 17. \*Lung abscess 513.0,513.1 18. \*Peritonitis 567.0,567.1,567.21,567.22,567.23,567.29 19. \*Anal and rectal abscess 566 20. \*abdominal abscess: 567.31,567.38,567.39,567.81,567.9 21. \*Intestinal abscess 569.5 22. \*clostridium perfringens - 041.83 23. \*Abscess of liver 572.0 24. \*Portal pyemia 572.1 25. \*Pyelonephritis 590, 590.10, 590.11, 590.2, 590.3, 590.80, 590.81, 590.9 26. \*Other cellulitis or abscess 682.0-9 27. \*Bacterial meningitis 320.0-3, 320.7 ,320.81, 320.82, 320.89, 320.9 28. \*Meningitis due to other organism:321.0-4,321.8 29. \*Phlebitis of intracranial sinus 325 30. \*Acute or subacute endocarditis 421.0, 421.1, 421.9 31. \*Thrombophlebitis 451.0, 451.11, 451.19, 451.2, 451.81, 4510.82, 451.83, 451.84, 451.89, 451.9 32. \*Acute sinusitis 461.0-3,461.8,461.9 33. \*Acute COPD exacerbation 491.21,491.22 34. \*Bronchiectasis 494.1 35. \*Lung abscess 513.0, 513.1 36. \*Peritonitis 567.0,567.1,567.21,567.22,567.23,567.29 37. \*Anal and rectal abscess 566 38. \*abdominal abscess: 567.31,567.38,567.39,567.81,567.9 39. \*Intestinal abscess 569.5 40. \*Perforation of intestine 569.83 41. \*Abscess of liver 572.0 42. \*Portal pyemia 572.1 43. \*cystitis: 595.0, 44. \*Urethritis/urethral syndrome 597.0 45. \*Urinary tract infection not otherwise specified 599.0, 46. \*Pyelonephritis: 590.10, 590.11, 590.2, 590.3, 590.80, 590.81, 590.9 47. \*Pyogenic arthritis 711.00-09 48. \*Osteomyelitis 730.00-09 49. \*Postoperative infection 998.51, 998.59 50. \*Urinary tract infection due to urinary catheter- 996.64 51. \*Infection of central venous catheter - 999.31 52. \*Infectious complication of medical care not otherwise classified 999.3 | DX1-DX25 |
| Cardiovascular Complication | Stroke--433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91, 436. 997.02, 997.1, 997.2  Myocardial infarction--410.0 to 410.9,  Percutaneous coronary intervention: 36.06 and 36.07;  coronary artery bypass grafting: 36.10 to 36.19 | DX1-DX25 and PR1-PR15 |
| Post LT Complication | HAT (hepatic artery thrombosis)-- 444.89  Anastomotic leak of biliary tree-- 576.8, E878.2  Infections, surgical wound--998.59 | DX1-DX25 and ECODE1-ECODE4 |
| Iatrogenic Pulmonary Embolism and Infarction | 415.11 | DX1-DX25 |
| Iatrogenic Pneumothorax | 512.1 | DX1-DX25 |
| Pulmonary Insufficiency Following Surgery | 518.51, 518.52, 518.53 | DX1-DX25 |
| Unspecified Intestinal Obstruction | 560.9 | DX1-DX25 |
| Perforation of the Intestine | 569.83 | DX1-DX25 |
| Respiratory Complications | 997.31, 997.32, 997.39 | DX1-DX25 |
| Digestive System Complications | 997.49 | DX1-DX25 |
| Urinary Complications | 997.5 |  |
| Postoperative Shock | 998.01, 998.02, 998.09 | DX1-DX25 |
| Hemorrhage Complicating a Procedure | 998.11 | DX1-DX25 |
| Hematoma | 998.12 | DX1-DX25 |
| Seroma Complicating a Procedure | 998.13 | DX1-DX25 |
| Accidental Laceration During a Procedure | 998.2 | DX1-DX25 |
| Disruption of Wound | 998.30 | DX1-DX25 |
| Disruption of Internal Operation Wound | 998.31 | DX1-DX25 |
| Disruption of External Operation Wound | 998.32 | DX1-DX25 |

**Appendix 2.** Checking the balance of covariates in the propensity matched sample.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **No Morbid Obesity**  **n=143 (%)** | | | | **Morbid Obesity**  **n=143 (%)** | | | | **p-value** | |
| **Age** (mean, SD) | 53.91 | 9.51 | | | 53.68 | | 8.80 | | 0.8229 | |
| **Gender** |  |  | | |  | |  | | 0.5287 | |
| **Male** | 80 | 55.94% | | | 75 | | 52.45% | |  | |
| **Female** | 63 | 44.06% | | | 68 | | 47.55% | |  | |
| **Race** |  |  | | |  | |  | | 0.1663 | |
| **White** | 101 | 70.63% | | | 107 | | 74.83% | |  | |
| **Black** | <10 | 6.29% | | | <10 | | 4.90% | |  | |
| **Hispanic** | 24 | 16.78% | | | 25 | | 17.48% | |  | |
| **Other** | <10 | 6.29% | | | <10 | | 2.80% | |  | |
| **Income** |  |  | | |  | |  | | 0.2585 | |
| **Low** | 41 | 28.67% | | | 48 | | 33.57% | |  | |
| **Moderate** | 42 | 29.37% | | | 34 | | 23.78% | |  | |
| **High** | 34 | 23.78% | | | 28 | | 19.58% | |  | |
| **Very High** | 26 | 18.18% | | | 33 | | 23.08% | |  | |
| **Insurance** |  |  | | |  | |  | | 0.4774 | |
| **Medicare** | 45 | 31.47% | | | 48 | | 33.57% | |  | |
| **Medicaid** | 21 | 14.69% | | | 12 | | 8.39% | |  | |
| **Private** | 70 | 48.95% | | | 79 | | 55.24% | |  | |
| **Other** | <10 | 4.90% | | | <10 | | 2.80% | |  | |
| **Type of hospital** |  |  | | |  | |  | | 1.0000 | |
| **Rural / Urban Non-Teaching** | <10 | 0.70% | | | <10 | | 0.70% | |  | |
| **Urban Teaching** | 142 | 99.30% | | | 142 | | 99.30% | |  | |
| **Hospital size** |  |  | | |  | |  | | 0.5485 | |
| **Small/Medium** | 18 | 12.59% | | | 15 | | 10.49% | |  | |
| **Large** | 125 | 87.41% | | | 128 | | 89.51% | |  | |
| **Hospital region** |  |  | | |  | |  | | 0.6712 | |
| **Northeast** | 21 | 14.69% | | | 22 | | 15.38% | |  | |
| **Midwest** | 22 | 15.38% | | | 26 | | 18.18% | |  | |
| **South** | 57 | 39.86% | | | 61 | | 42.66% | |  | |
| **West** | 43 | 30.07% | | | 34 | | 23.78% | |  | |
| **Admission Day** |  |  | | |  | |  | | 0.5465 | |
| **Week Day** | 111 | 77.62% | | | 115 | | 80.42% | |  | |
| **Weekend** | 32 | 22.38% | | | 28 | | 19.58% | |  | |
| **Comorbid conditions** |  |  | | |  | |  | |  | |
| **AIDS** | 0 | 0.00% | | | 0 | | 0.00% | | --1 | |
| **Alcohol** | 24 | 16.78% | | | 20 | | 13.99% | | 0.5050 | |
| **Anemia** | 18 | 12.59% | | | 24 | | 16.78% | | 0.2888 | |
| **Rheumatoid arthritis/collagen vascular disease** | <10 | 0.70% | | | <10 | | 0.70% | | 1.0000 | |
| **Chronic blood loss** | <10 | 1.40% | | | <10 | | 0.70% | | 0.5637 | |
| **CHF** | <10 | 3.50% | | | <10 | | 3.50% | | 1.0000 | |
| **Chronic lung disease** | 10 | 6.99% | | | 13 | | 9.09% | | 0.5127 | |
| **Coagulopathy** | 77 | 53.85% | | | 69 | | 48.25% | | 0.3096 | |
| **Depression** | 14 | 9.79% | | | 14 | | 9.79% | | 1.0000 | |
| **Diabetes mellitus** | 44 | 30.77% | | | 45 | | 31.47% | | 0.9013 | |
| **Diabetes with chronic complications** | 15 | 10.49% | | | <10 | | 6.29% | | 0.2008 | |
| **Drug abuse** | <10 | 0.70% | | | <10 | | 1.40% | | 0.5637 | |
| **Hypertension** | 82 | 57.34% | | | 73 | | 51.05% | | 0.2492 | |
| **Hypothyroidism** | 18 | 12.59% | | | 16 | | 11.19% | | 0.6831 | |
| **Lymphoma** | 0 | 0.00% | | | 0 | | 0.00% | | --1 | |
| **Fluid and electrolyte disorders** | 79 | 55.24% | | | 69 | | 48.25% | | 0.2513 | |
| **Metastatic cancer** | 0 | 0.00% | | | 0 | | 0.00% | | --1 | |
| **Neurological disease** | <10 | 2.10% | | | <10 | | 1.40% | | 0.6547 | |
| **Paralysis** | <10 | 0.70% | | | <10 | | 0.70% | | 1.0000 | |
| **Peripheral vascular disease** | <10 | 4.20% | | | <10 | | 1.40% | | 0.1573 | |
| **Psychoses** | <10 | 1.40% | | | <10 | | 4.20% | | 0.1573 | |
| **Pulmonary circulation disorders** | 12 | 8.39% | | | 13 | | 9.09% | | 0.7815 | |
| **Renal failure** | 32 | 22.38% | | | 29 | | 20.28% | | 0.6473 | |
| **Solid tumor without metastasis** | 24 | 16.78% | | | 28 | | 19.58% | | 0.5553 | |
| **Peptic ulcer disease** | <10 | 0.70% | | | <10 | | 0.70% | | --1 | |
| **Valvular disease** | <10 | 6.29% | | | <10 | | 5.59% | | 0.7815 | |
| **Weight Loss** | 27 | 18.88% | | | 24 | | 16.78% | | 0.6310 | |
| **Complications in the matched sample** |  | | |  | | | |  | |  |
| **Post LT Infection** | 57 | | 39.86% | 55 | | 38.46% | | 0.8208 | |  |
| **Cardiovascular Complication** | <10 | | 4.20% | <10 | | 3.50% | | 0.7630 | |  |
| **Post LT Complication** | 37 | | 25.87% | 26 | | 18.18% | | 0.0934 | |  |
| **Hepatic artery thrombosis** | 33 | | 23.08% | 21 | | 14.69% | | 0.0704 | |  |
| **H/O exploratory laparotomy** | 0 | | 0.00% | <10 | | 0.70% | | --1 | |  |
| **Anastomotic leak of biliary tree** | <10 | | 5.59% | <10 | | 5.59% | | 1.0000 | |  |
| **Infections, surgical wound** | 12 | | 8.39% | <10 | | 4.20% | | 0.1573 | |  |

1 No discordant pairs.