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

|  |  |  |
| --- | --- | --- |
|  | **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, 038.91 \*Sepsis 995.911. \*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, 038.2pneumonia 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, 997.2Myocardial 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)-- 444.89Anastomotic leak of biliary tree-- 576.8, E878.2Infections, 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.