**Supplementary Table 1.** Criteria for selecting admissions from the Premier Healthcare Database. Sample restricted to hospitals providing laboratory data to Premier from July 2010-June 2015.

|  |  |
| --- | --- |
| ***Inclusions*** | **Count** |
| Admission with PDX POA in pneumonia(480-488, 507.0,) or PDX sepsis/respiratory failure plus SDX POA pneumonia | 515,684 |
| ***Exclusions*** | **Count** |
| Missing patient’s cost | 90 |
| Discharged prior to July 2010, or after June 2015 | 44,193 |
| Age < 18 | 69,274 |
| Gender unknown | 23 |
| Outpatients | 76,676 |
| Transfer from acute care or admission source unknown | 33,013 |
| Still patients or transfer to acute care or discharged status unknown | 6,130 |
| DX in cystic fibrosis | 367 |
| LOS < 2 | 11,616 |
| Ineligible Medicare severity diagnosis related group | 5,774 |
| Ineligible attending physician's’ specialty | 646 |
| SDX POA Ventilator associated pneumonia | 130 |
| Tracheostomy charged on day 0/1 | 6,357 |
| SDX codes in Respirator depend status and mechanical ventilator charged on first hospital day | 1,657 |
| No chest x-ray or CT charged on day 0/1 | 16,711 |
| No anti-microbial treatments on day 0/1, (Note: 385 admissions with positive viral test but did not got initial antimicrobial treatments are not excluded ) | 16,544 |
| Positive urine cultures (drawn on first 3 days) | 21,120 |
| POA secondary diagnosis in cellulitis | 4,370 |
| Positive blood culture with POA secondary diagnosis in abscess or CLABSI | 215 |
| POA secondary diagnosis in cholecystitis, appendicitis, diverticulitis, perforated diverticulum, peritonitis, post-op anastomotic leaks or abdominal surgical site infections | 8,633 |
| Extra admissions (beyond randomly selected 1 per patient) | 25,872 |
| **Total exclusions** | **323,539** |
| **Final Study sample** | **166,273** |

Abbreviations: CLABSI, DX, SDX, POA - present on admission

**Supplementary Table 2**. ICD 9 codes used to define organ failure scores.

|  |  |
| --- | --- |
| Respiratory failure |  |
| 518.81 | Acute respiratory failure |
| 518.82 | Other pulmonary insufficiency, not elsewhere classified |
| 786.09 | Other respiratory abnormalities |
| 967.0 | Poisoning by barbiturates |
| 967.1 | Poisoning by chloral hydrate group |
| 967.2 | Poisoning by paraldehyde |
| Cardiovascular failure |  |
| 427.5 | Cardiac arrest |
| 458.21 | Hypotension of hemodialysis |
| 458.29 | Other iatrogenic hypotension |
| 785.50 | Shock unspecified |
| 785.51 | Cardiogenic shock |
| 785.52 | Septic shock |
| 785.59 | Other shock without trauma |
| Renal failure |  |
| 580.0 | Acute glomerulonephritis with lesion of proliferative glomerulonephritis |
| 584.7 | Acute kidney failure with lesion of renal medullary [papillary] necrosis |
| 584.8 | Acute kidney failure with other specified pathological lesion in kidney |
| 584.9 | Acute kidney failure, unspecified |
| 585.x | Chronic kidney disease |
| Hepatic failure |  |
| 570 | Acute and subacute necrosis of liver |
| 572.2 | Hepatic encephalopathy |
| 572.3 | Portal hypertension |
| 573.4 | Hepatorenal syndrome |
| Metabolic failure |  |
| 276.2 | Acidosis |
| Neurologic failure |  |
| 293.0 | Delirium due to conditions classified elsewhere |
| 293.1 | Subacute delirium |
| 293.89 | Other specified transient mental disorders due to conditions classified elsewhere, other |
| 348.1 | Anoxic brain damage |
| 348.30 | Encephalopathy, unspecified |
| 348.31 | Metabolic encephalopathy |
| 348.39 | Other encephalopathy |
| 780.01 | Coma |
| 780.09 | Other alteration of consciousness |

**Supplementary Table 3.** Gamma generalized linear mixed model of the relationship between hospital costs and the use and results of antiviral testing. Costs were inflation-adjusted to 2015 annual costs by using the medical care component of the consumer price index and are adjusted for basic demographics, insurance status, hospital location (urban vs. rural), Census Bureau major geographic region, various comorbidities, and markers of severity on admission.

|  |  |  |  |
| --- | --- | --- | --- |
| Outcome: Hospital costs | | | |
| Effect | Factor level or increment | Mean multiplier(95%CI) | P-value |
| Viral test | 1:Negative | 1.02(1, 1.03) | 0.0435 |
| 2:Positive | 0.98(0.95, 1.01) |
| 0:No test | Reference |
| Age | Per year | 1(1, 1) | <.0001 |
| Male |  | 1(0.99, 1.01) | 0.8434 |
| Race | Black | 0.95(0.94, 0.97) | 0.0002 |
| Hispanic | 0.95(0.88, 1.02) |
| Others | 0.99(0.97, 1.02) |
| Unknown | 0.97(0.8, 1.16) |
| White | Reference |
| Insurance status | Commercial Indemnity | 1.02(0.98, 1.07) | <.0001 |
| Managed Care | 1.04(1.01, 1.08) |
| Medicaid | 1.09(1.06, 1.13) |
| Medicare | 1.06(1.03, 1.09) |
| Others | Reference |
| Teaching Hospital |  | 1(0.92, 1.09) | 0.9251 |
| Urban Hospital |  | 1.04(0.94, 1.14) | 0.4489 |
| Bed size | 201 - 400 Beds | 1.02(0.94, 1.11) | 0.174 |
| ≥ 401 Beds | 1.1(0.99, 1.21) |
| ≤ 200 Beds | Reference |
| Hospital region | Midwest | 0.63(0.56, 0.72) | <.0001 |
| Northeast | 0.78(0.68, 0.89) |
| South | 0.65(0.58, 0.74) |
| West | Reference |
| Combined comorbidities |  | 1.09(1.09, 1.09) | <.0001 |
| Organ failure score |  | 1.1(1.09, 1.11) | <.0001 |
| Chronic pulmonary disease |  | 1.01(0.99, 1.02) | 0.2614 |
| Pulmonary circulation disease |  | 1.18(1.16, 1.21) | <.0001 |
| Congestive heart failure |  | 1(0.98, 1.02) | 0.9589 |
| DIABETES |  | 1.02(1.01, 1.03) | 0.0013 |
| Cancer |  | 0.96(0.94, 0.98) | <.0001 |
| Paralysis |  | 1.28(1.24, 1.32) | <.0001 |
| Obesity |  | 1.1(1.08, 1.12) | <.0001 |
| Liver disease |  | 1.04(1.01, 1.08) | 0.0195 |
| Peripheral vascular disease |  | 0.93(0.91, 0.95) | <.0001 |
| Admit from SNF |  | 1.01(0.98, 1.03) | 0.5425 |
| Dialysis |  | 0.99(0.96, 1.02) | 0.38 |
| Previous admission (w/in 6m |  | 1.05(1.03, 1.07) | <.0001 |
| ICU |  | 1.49(1.46, 1.51) | <.0001 |
| Invasive mechanical ventilation |  | 1.43(1.4, 1.47) | <.0001 |
| Vasopressor |  | 1.08(1.05, 1.11) | <.0001 |
| Oral medication |  | 0.98(0.96, 0.99) | 0.0002 |

Supplementary Table 4. Gamma generalized linear mixed model of the relationship between mortality and the use and results of antiviral testing, adjusted for basic demographics, insurance status, hospital location (urban vs. rural), Census Bureau major geographic region, various comorbidities, and markers of severity on admission.

|  |  |  |  |
| --- | --- | --- | --- |
| Outcome: Length of stay | | | |
| Effect | Factor level or increment | Mean multiplier(95%CI) | P-value |
| Viral test | 1:Negative | 1.01(1, 1.02) | 0.2797 |
| 2:Positive | 1.00 (0.97, 1.02) |
| 0:No test | Reference |
| Age | Per year | 1(1, 1) | 0.0002 |
| Male |  | 0.98(0.98, 0.99) | <.0001 |
| Race | Black | 0.98(0.97, 1) | 0.1339 |
| Hispanic | 0.99(0.94, 1.05) |
| Others | 1.01(0.99, 1.02) |
| Unknown | 0.95(0.83, 1.08) |
| White | Reference |
| Insurance status | Commercial Indemnity | 0.99(0.97, 1.02) | <.0001 |
| Managed Care | 1.01(0.99, 1.03) |
| Medicaid | 1.08(1.06, 1.11) |
| Medicare | 1.04(1.02, 1.06) |
| Others | Reference |
| Teaching Hospital |  | 1.04(0.98, 1.1) | 0.1644 |
| Urban Hospital |  | 1.04(0.98, 1.11) | 0.1734 |
| Bed size | 201 - 400 Beds | 1.13(1.07, 1.19) | <.0001 |
| ≥ 401 Beds | 1.17(1.09, 1.25) |
| ≤ 200 Beds | Reference |
| Hospital region | Midwest | 0.87(0.81, 0.93) | <.0001 |
| Northeast | 1.04(0.96, 1.13) |
| South | 0.95(0.89, 1.02) |
| West | Reference |
| Combined comorbidities |  | 1.08(1.08, 1.08) | <.0001 |
| Organ failure score |  | 1.05(1.05, 1.06) | <.0001 |
| Chronic pulmonary disease |  | 1(0.99, 1.01) | 0.5902 |
| Pulmonary circulation disease |  | 1.14(1.12, 1.15) | <.0001 |
| Congestive heart failure |  | 0.98(0.97, 0.99) | <.0001 |
| DIABETES |  | 1(0.99, 1.01) | 0.8846 |
| Cancer |  | 0.91(0.9, 0.92) | <.0001 |
| Paralysis |  | 1.26(1.24, 1.29) | <.0001 |
| Obesity |  | 1.07(1.06, 1.08) | <.0001 |
| Liver disease |  | 1.03(1, 1.05) | 0.0206 |
| Peripheral vascular disease |  | 0.93(0.92, 0.95) | <.0001 |
| Admit from SNF |  | 1.02(1.01, 1.04) | 0.0035 |
| Dialysis |  | 0.91(0.89, 0.93) | <.0001 |
| Previous admission (w/in 6m |  | 1.05(1.03, 1.06) | <.0001 |
| ICU |  | 1.22(1.21, 1.23) | <.0001 |
| IMV |  | 1.22(1.2, 1.24) | <.0001 |
| Vasopressor |  | 0.99(0.97, 1.01) | 0.154 |
| Oral medication |  | 0.96(0.95, 0.97) | <.0001 |