The Epidemiology of Respiratory Failure in the US 2002-2017: a Serial Cross-Sectional Study

Online Supplement

Jordan A. Kempker, MD, MSc

M. Katrina Abril, MD

Yunyun Chen, MSPH

Michael R. Kramer, PhD

Lance A. Waller, PhD

Greg S. Martin, MD, MSc

Contents

[eTable S1. ICD-9-CM Codes Utilized in Case Definitions for Respiratory Failure and Mechanical Ventilation 2](#_Toc38537135)

e[Table S2. ICD-9CM to ICD-10CM Crosswalk (1) 2](#_Toc38537136)

e[Table S3. ICD-10-CM Codes Utilized in Case Definitions for Respiratory Failure and Mechanical Ventilation 3](#_Toc38537137)

e[Table S4. Annual Case Volume by Case Definitions 5](#_Toc38537138)

e[Table S5a. Annual Epidemiology of Respiratory Failure by Case Definitions 2002-2009 6](#_Toc38537139)

e[Table S5b. Annual Epidemiology of Respiratory Failure by Case Definitions 2010-2017 8](#_Toc38537140)

[Below analyses only utilize principle case definition 10](#_Toc38537141)

e[Table S6. Demographic Characteristics of Patients with Acute Respiratory With Invasive Mechanical Ventilation 11](#_Toc38537142)

e[Table S7. Clinical Characteristics of Patients with Acute Respiratory With Mechanical Ventilation 12](#_Toc38537143)

e[Table S8. Hospital Characteristics of Patients with Acute Respiratory With Mechanical Ventilation 15](#_Toc38537144)

e[Table S9. Outcomes of Patients with Acute Respiratory With Mechanical Ventilation 16](#_Toc38537145)

e[Table S10. Most Frequent Primary Diagnosis Classes for Acute Respiratory Failure with Mechanical Ventilation 17](#_Toc38537146)

## eTable 1. ICD-9-CM Codes Utilized in Case Definitions for Respiratory Failure and Mechanical Ventilation

|  |  |
| --- | --- |
| **ICD-9CM Code** | **Description** |
| **Diagnosis Codes** |  |
| 799.1 | Respiratory arrest |
| 518.51 | Pulmonary insufficiency following trauma and surgery |
| 518.51 | Acute respiratory failure following trauma and surgery |
| 518.52 | Other pulmonary insufficiency, not elsewhere classified, following trauma and surgery |
| 518.53 | Acute and chronic respiratory failure following trauma and surgery |
| 518.81 | Acute respiratory failure |
| 518.82 | Other pulmonary insufficiency not elsewhere classified |
| 518.83 | Chronic respiratory failure |
| 518.84 | Acute and chronic respiratory failure |
| **Procedure Codes** |  |
| 96.04 | Insertion of endotracheal tube |
| 96.70 | Continuous mechanical ventilation of unspecified duration |
| 96.71 | Continuous mechanical ventilation of < 96 h consecutively |
| 96.72 | Continuous mechanical ventilation for > 96 h consecutively |
| 93.9 | Non-invasive mechanical ventilation |
| 31.1 | Temporary tracheostomy |
| 39.65 | Extracorporeal membrane oxygenation |

ICD-9CM = International Classification of Diseases, 9th Edition, Clinical Modification

1 In 2012 the 518.5 was replaced by three codes (518.51, 518.52, 518.53). For consistency across years of the study period, these three subcodes were combined and counted as 518.5.

## eTable 2. ICD-9CM to ICD-10CM Crosswalk (1)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Diagnosis Codes** | |  | **Procedure Codes** | |
| **ICD9CM** | **ICD10CM** |  | **ICD9CM** | **ICD10CM** |
| 518.51 | J958.21 |  | 31.1 | 0B110F4 |
| 518.51 | J96.00 |  | 31.1 | 0B110Z4 |
| 518.52 | J95.1 |  | 31.1 | 0B113F4 |
| 518.52 | J95.2 |  | 31.1 | 0B113Z4 |
| 518.52 | J95.3 |  | 31.1 | 0B114F4 |
| 518.53 | J958.22 |  | 31.1 | 0B114Z4 |
| 518.53 | J96.20 |  | 39.65 | 5A15223 |
| 518.81 | J96.00 |  | 93.90 | 5A09357 |
| 518.81 | J96.90 |  | 93.90 | 5A09457 |
| 518.82 | J80 |  | 93.90 | 5A09557 |
| 518.83 | J96.10 |  | 96.04 | 0BH17EZ |
| 518.84 | J96.20 |  | 96.04 | 0BH18EZ |
| 799.1 | R09.2 |  | 96.70 | 5A1935Z |
|  |  |  | 96.70 | 5A1945Z |
|  |  |  | 96.70 | 5A1955Z |
|  |  |  | 96.71 | 5A1935Z |
|  |  |  | 96.71 | 5A1945Z |
|  |  |  | 96.72 | 5A1955Z |

## eTable 3. ICD-10-CM Codes Utilized in Case Definitions for Respiratory Failure and Mechanical Ventilation

|  |  |
| --- | --- |
| **ICD-9CM Code** | **Description** |
| **Diagnosis Codes** |  |
| J95.1 | Acute pulmonary insufficiency following thoracic surgery |
| J95.2 | Acute pulmonary insufficiency following nonthoracic surgery |
| J95.3 | Chronic pulmonary insufficiency following surgery |
| J95.821 | Acute postprocedural respiratory failure |
| J95.822 | Acute and chronic postprocedural respiratory failure |
| J96.00 | Acute respiratory failure unspecified whether with hypoxia or hypercapnia |
| J96.01 | Acute respiratory failure with hypoxia |
| J96.02 | Acute respiratory failure with hypercapnia |
| J96.20 | Acute and chronic respiratory failure,, unspecified whether with hypoxia or hypercapnia |
| J96.21 | Acute and chronic respiratory failure with hypoxia |
| J96.22 | Acute and chronic respiratory failure with hypercapnia |
| J96.90 | Respiratory failure unspecified whether with hypoxia or hypercapnia |
| J96.91 | Respiratory failure with hypoxia |
| J96.92 | Respiratory failure with hypercapnia |
| J80 | Acute respiratory distress syndrome |
| J96.10 | Chronic respiratory failure, unspecified whether with hypoxia or hypercapnia |
| J96.11 | Chronic respiratory failure with hypoxia |
| J96.12 | Chronic respiratory failure with hypercapnia |
| R09.2 | Respiratory Arrest |
| **Procedure Codes** |  |
| Tracheostomy |  |
| 0B110F4 | Bypass Trachea to Cutaneous with Tracheostomy Device, Open Approach |
| 0B110Z4 | Bypass Trachea to Cutaneous, Open Approach |
| 0B113F4 | Bypass Trachea to Cutaneous with Tracheostomy Device, Percutaneous Approach |
| 0B113Z4 | Bypass Trachea to Cutaneous, Percutaneous Approach |
| 0B114F4 | Bypass Trachea to Cutaneous with Tracheostomy Device, Percutaneous Endoscopic Approach |
| 0B114Z4 | Bypass Trachea to Cutaneous, Percutaneous Endoscopic Approach |
| ECMO |  |
| 5A15223 | Extracorporeal Membrane Oxygenation, Continuous (Code Deleted 2018-09-30) |
| Non-invasive Mechanical Ventilation |  |
| 5A09357 | Assistance with Respiratory Ventilation, Less than 24 Consecutive Hours, Continuous Positive Airway Pressure |
| 5A09457 | Assistance with Respiratory Ventilation, 24-96 Consecutive Hours, Continuous Positive Airway Pressure |
| 5A09557 | Assistance with Respiratory Ventilation, Greater than 96 Consecutive Hours, Continuous Positive Airway Pressure |
| Invasive Mechanical Ventilation |  |
| 0BH17EZ | Insertion of Endotracheal Airway into Trachea, Via Natural or Artificial Opening |
| 0BH18EZ | Insertion of Endotracheal Airway into Trachea, Via Natural or Artificial Opening Endoscopic |
| 5A1935Z | Respiratory Ventilation, Less than 24 Consecutive Hours |
| 5A1945Z | Respiratory Ventilation, 24-96 Consecutive Hours |
| 5A1955Z | Respiratory Ventilation, Greater than 96 Consecutive Hours |

## 

## eTable 4. Annual Case Volume by Case Definitions

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2016** | **2017** |
| **Any Diagnosis for Respiratory Failure** | | | | | | | | | | | | | | |
| 921352 | 1012294 | 1035893 | 1103836 | 1183196 | 1292870 | 1508868 | 1621123 | 1700318 | 1952047 | 2009670 | 2201479 | 2411341 | 2930688 | 3213030 |
| **Any procedural code for Invasive Mechanical Ventilation** | | | | | | | | | | | | | | |
| 720003 | 746126 | 761295 | 755512 | 790589 | 817079 | 839988 | 857353 | 875427 | 875398 | 870070 | 888835 | 894185 | 896054 | 903745 |
| **Noninvasive Mechanical Ventilation** | | | | | | | | | | | | | | |
| 87147 | 112632 | 155593 | 150469 | 185123 | 232674 | 272910 | 286986 | 356124 | 410394 | 425755 | 475645 | 518860 | 489710 | 555605 |
| **Any Diagnosis Code + Any Procedural Code for Invasive or Noninvasive Mechanical Ventilation** | | | | | | | | | | | | | | |
| 534170 | 575280 | 603444 | 623110 | 671608 | 734986 | 799679 | 841813 | 887610 | 980273 | 955550 | 1016770 | 1065860 | 1093074 | 1146195 |

Abbreviations = IMV = invasive mechanical ventilation

## eTable 5a. Annual Epidemiology of Respiratory Failure by Case Definitions 2002-2009

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2002** | | | **2003** | | | **2004** | | | **2005** | | | **2006** | | | **2007** | | | **2008** | | | **2009** | | |
|  | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** |
| **Any Diagnosis for Respiratory Failure** | | | | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population[[1]](#footnote-1) | **429.2** | 406.9 | 451.4 | **466.5** | 444.1 | 488.8 | **471.9** | 449.1 | 494.8 | **497.2** | 469.0 | 525.5 | **526.7** | 497.1 | 556.4 | **569.0** | 540.7 | 597.4 | **656.1** | 617.5 | 694.6 | **696.8** | 656.5 | 737.2 |
| Hospital[[2]](#footnote-2) | **31.5** | 30.3 | 32.6 | **34.2** | 33.0 | 35.3 | **34.7** | 33.5 | 35.9 | **36.9** | 35.6 | 38.2 | **38.7** | 37.2 | 40.3 | **42.2** | 40.7 | 43.7 | **48.9** | 47.0 | 50.8 | **53.3** | 51.3 | 55.4 |
| MV, % |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive | **53.0** | 51.6 | 54.4 | **51.1** | 49.6 | 52.5 | **50.6** | 49.1 | 52.0 | **49.1** | 47.7 | 50.5 | **48.3** | 46.9 | 49.7 | **47.0** | 45.5 | 48.5 | **42.4** | 40.9 | 43.8 | **41.1** | 39.6 | 42.5 |
| Noninvasive | **3.1** | 2.7 | 3.5 | **3.5** | 3.1 | 4.0 | **4.9** | 4.3 | 5.4 | **4.8** | 4.2 | 5.3 | **5.5** | 4.9 | 6.1 | **6.7** | 6.1 | 7.3 | **7.5** | 6.8 | 8.2 | **8.1** | 7.3 | 8.9 |
| Both | **1.9** | 1.6 | 2.1 | **2.2** | 1.9 | 2.5 | **2.8** | 2.4 | 3.2 | **2.6** | 2.3 | 2.9 | **3.0** | 2.5 | 3.4 | **3.2** | 2.8 | 3.5 | **3.2** | 2.7 | 3.6 | **2.7** | 2.4 | 3.1 |
| Neither | **42.0** | 40.6 | 43.4 | **43.2** | 41.6 | 44.8 | **41.7** | 40.2 | 43.3 | **43.6** | 42.0 | 45.1 | **43.2** | 41.6 | 44.9 | **43.2** | 41.5 | 44.8 | **47.0** | 45.2 | 48.8 | **48.1** | 46.2 | 49.9 |
| Tracheostomy, % | **6.0** | 5.6 | 6.4 | **6.2** | 5.7 | 6.7 | **6.0** | 5.6 | 6.5 | **5.6** | 5.2 | 6.0 | **5.6** | 5.2 | 6.0 | **5.4** | 5.0 | 5.8 | **4.8** | 4.4 | 5.2 | **4.5** | 4.2 | 4.9 |
| ECMO, % | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.1 | **0.0** | 0.0 | 0.1 |
| Mortality, % | **28.3** | 27.6 | 28.9 | **26.9** | 26.2 | 27.6 | **25.8** | 25.2 | 26.5 | **25.3** | 24.6 | 25.9 | **24.6** | 24.0 | 25.3 | **22.9** | 22.3 | 23.4 | **21.7** | 21.1 | 22.3 | **19.8** | 19.2 | 20.4 |
| **Any procedural code for Invasive Mechanical Ventilation** | | | | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population | **335.4** | 318.5 | 352.3 | **343.8** | 325.9 | 361.7 | **346.8** | 328.4 | 365.3 | **340.3** | 323.5 | 357.2 | **352.0** | 334.7 | 369.2 | **359.6** | 340.2 | 379.1 | **365.2** | 344.9 | 385.6 | **368.5** | 350.2 | 386.8 |
| Hospital | **24.6** | 23.8 | 25.4 | **25.2** | 24.3 | 26.0 | **25.5** | 24.5 | 26.5 | **25.3** | 24.4 | 26.1 | **25.9** | 25.0 | 26.8 | **26.7** | 25.7 | 27.6 | **27.2** | 26.2 | 28.2 | **28.2** | 27.3 | 29.1 |
| MV, % |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive | **97.1** | 96.6 | 97.5 | **96.4** | 95.8 | 96.9 | **95.4** | 94.8 | 96.0 | **95.6** | 95.1 | 96.2 | **94.9** | 94.3 | 95.6 | **94.4** | 93.7 | 95.0 | **93.8** | 93.0 | 94.5 | **94.5** | 93.8 | 95.1 |
| Noninvasive | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Both | **2.9** | 2.5 | 3.4 | **3.6** | 3.1 | 4.2 | **4.6** | 4.0 | 5.2 | **4.4** | 3.8 | 4.9 | **5.1** | 4.4 | 5.7 | **5.6** | 5.0 | 6.3 | **6.2** | 5.5 | 7.0 | **5.5** | 4.9 | 6.2 |
| Neither | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Tracheostomy, % | **7.1** | 6.7 | 7.6 | **7.6** | 7.1 | 8.0 | **7.7** | 7.2 | 8.1 | **7.6** | 7.1 | 8.0 | **7.8** | 7.4 | 8.2 | **8.1** | 7.6 | 8.7 | **8.0** | 7.6 | 8.5 | **8.0** | 7.5 | 8.5 |
| ECMO, % | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.1 | **0.0** | 0.0 | 0.1 |
| Mortality, % | **36.5** | 35.8 | 37.2 | **35.4** | 34.7 | 36.2 | **34.3** | 33.6 | 35.0 | **34.4** | 33.7 | 35.1 | **33.9** | 33.2 | 34.6 | **32.5** | 31.9 | 33.1 | **32.8** | 32.1 | 33.4 | **31.2** | 30.7 | 31.8 |
| **Noninvasive Mechanical Ventilation** | | | | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population | **40.6** | 35.4 | 45.8 | **51.9** | 44.7 | 59.1 | **70.9** | 61.5 | 80.3 | **67.8** | 59.9 | 75.6 | **82.4** | 73.6 | 91.2 | **102.4** | 91.9 | 112.9 | **118.7** | 106.4 | 131.0 | **123.4** | 110.3 | 136.4 |
| Hospital | **3.0** | 2.6 | 3.4 | **3.8** | 3.3 | 4.3 | **5.2** | 4.5 | 5.9 | **5.0** | 4.5 | 5.6 | **6.1** | 5.4 | 6.7 | **7.6** | 6.9 | 8.3 | **8.8** | 7.9 | 9.7 | **9.4** | 8.5 | 10.4 |
| MV, % |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Noninvasive | **75.7** | 73.8 | 77.5 | **76.0** | 74.1 | 78.0 | **77.5** | 75.8 | 79.3 | **78.2** | 76.7 | 79.6 | **78.4** | 76.7 | 80.1 | **80.2** | 79.0 | 81.5 | **80.9** | 79.8 | 81.9 | **83.5** | 82.7 | 84.3 |
| Both | **24.3** | 22.5 | 26.2 | **24.0** | 22.0 | 25.9 | **22.5** | 20.7 | 24.2 | **21.8** | 20.4 | 23.3 | **21.6** | 19.9 | 23.3 | **19.8** | 18.5 | 21.0 | **19.1** | 18.1 | 20.2 | **16.5** | 15.7 | 17.3 |
| Neither | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Tracheostomy, % | **2.1** | 1.7 | 2.4 | **2.1** | 1.7 | 2.5 | **1.8** | 1.5 | 2.1 | **2.1** | 1.7 | 2.5 | **2.0** | 1.6 | 2.4 | **1.8** | 1.6 | 2.1 | **1.8** | 1.5 | 2.0 | **1.5** | 1.3 | 1.6 |
| ECMO, % | **NA** | NA | NA | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **NA** | NA | NA | **NA** | NA | NA | **0.0** | 0.0 | 0.0 |
| Mortality, % | **15.7** | 14.8 | 16.7 | **16.2** | 15.1 | 17.2 | **14.9** | 13.9 | 15.9 | **15.6** | 14.8 | 16.4 | **15.2** | 14.5 | 16.0 | **14.3** | 13.5 | 15.1 | **14.6** | 13.9 | 15.3 | **13.6** | 13.0 | 14.2 |
| **Any Diagnosis Code + Any Procedural Code for Invasive or Noninvasive Mechanical Ventilation** | | | | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population | **248.8** | 235.9 | 261.7 | **265.1** | 251.5 | 278.7 | **274.9** | 260.9 | 289.0 | **280.7** | 266.0 | 295.3 | **299.0** | 283.7 | 314.3 | **323.5** | 305.9 | 341.1 | **347.7** | 328.1 | 367.3 | **361.9** | 342.8 | 380.9 |
| Hospital | **18.2** | 17.6 | 18.9 | **19.4** | 18.7 | 20.1 | **20.2** | 19.5 | 20.9 | **20.8** | 20.2 | 21.5 | **22.0** | 21.2 | 22.8 | **24.0** | 23.1 | 24.9 | **25.9** | 24.9 | 26.9 | **27.7** | 26.7 | 28.7 |
| MV, % |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive | **91.4** | 90.4 | 92.4 | **89.9** | 88.7 | 91.1 | **86.8** | 85.4 | 88.2 | **87.0** | 85.6 | 88.3 | **85.1** | 83.7 | 86.5 | **82.7** | 81.2 | 84.2 | **79.9** | 78.2 | 81.6 | **79.1** | 77.3 | 80.8 |
| Noninvasive | **5.4** | 4.7 | 6.0 | **6.2** | 5.5 | 7.0 | **8.4** | 7.4 | 9.3 | **8.4** | 7.5 | 9.3 | **9.7** | 8.8 | 10.6 | **11.8** | 10.7 | 12.8 | **14.1** | 12.9 | 15.3 | **15.6** | 14.3 | 17.0 |
| Both | **3.2** | 2.7 | 3.7 | **3.9** | 3.3 | 4.4 | **4.9** | 4.2 | 5.5 | **4.6** | 4.0 | 5.2 | **5.2** | 4.5 | 5.9 | **5.6** | 5.0 | 6.2 | **5.9** | 5.3 | 6.6 | **5.3** | 4.7 | 5.8 |
| Neither | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Tracheostomy, % | **8.3** | 7.8 | 8.8 | **8.7** | 8.1 | 9.2 | **8.5** | 8.0 | 9.0 | **8.2** | 7.7 | 8.7 | **8.2** | 7.7 | 8.7 | **8.3** | 7.6 | 8.9 | **7.9** | 7.4 | 8.4 | **7.7** | 7.2 | 8.2 |
| ECMO, % | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.1 |
| Mortality, % | **33.6** | 32.9 | 34.2 | **32.5** | 31.8 | 33.2 | **31.2** | 30.6 | 31.9 | **31.1** | 30.5 | 31.7 | **30.7** | 30.1 | 31.3 | **28.9** | 28.3 | 29.5 | **28.9** | 28.3 | 29.6 | **27.4** | 26.9 | 27.9 |

Abbreviations: Est = point estimate; L95 = lower limit of 95% confidence interval; MV = mechanical ventilation; U95 = upper limit of 95% confidence interval

## eTable 5b. Annual Epidemiology of Respiratory Failure by Case Definitions 2010-2017

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | **2010** | | | **2011** | | | **2012** | | | **2013** | | | **2014** | | | **2016** | | | **2017** | | |
|  |  | | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** | **Est** | **L95** | **U95** |
|  | | **Any Diagnosis for Respiratory Failure** | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population[[3]](#footnote-3) |  | | **723.1** | 683.8 | 762.3 | **820.9** | 776.9 | 864.8 | **836.0** | 815.3 | 856.7 | **906.4** | 884.6 | 928.1 | **983.1** | 960.4 | 1005.9 | **1174.8** | 1149.4 | 1200.2 | **1274.7** | 1247.3 | 1302.0 |
| Hospital[[4]](#footnote-4) |  | | **56.8** | 54.8 | 58.8 | **64.8** | 62.3 | 67.3 | **68.6** | 67.3 | 69.9 | **77.2** | 75.9 | 78.6 | **85.4** | 84.0 | 86.9 | **102.8** | 100.6 | 105.0 | **112.7** | 110.3 | 115.1 |
| MV, % |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive |  | | **39.7** | 38.3 | 41.1 | **35.4** | 34.0 | 36.8 | **34.0** | 33.3 | 34.7 | **31.8** | 31.2 | 32.4 | **29.4** | 28.9 | 30.0 | **24.8** | 24.4 | 25.3 | **22.8** | 22.4 | 23.2 |
| Noninvasive |  | | **9.4** | 8.5 | 10.3 | **9.9** | 9.0 | 10.8 | **10.7** | 10.3 | 11.1 | **11.4** | 11.0 | 11.9 | **11.9** | 11.4 | 12.3 | **10.5** | 10.1 | 10.9 | **10.9** | 10.5 | 11.3 |
| Both |  | | **3.2** | 2.8 | 3.5 | **3.0** | 2.6 | 3.4 | **2.9** | 2.7 | 3.0 | **2.9** | 2.8 | 3.1 | **2.9** | 2.7 | 3.0 | **2.0** | 1.9 | 2.1 | **2.0** | 1.9 | 2.1 |
| Neither |  | | **47.8** | 46.0 | 49.6 | **51.7** | 49.9 | 53.4 | **52.5** | 51.7 | 53.2 | **53.8** | 53.1 | 54.6 | **55.8** | 55.1 | 56.5 | **62.7** | 62.1 | 63.3 | **64.3** | 63.7 | 64.9 |
| Tracheostomy, % |  | | **4.6** | 4.2 | 5.0 | **3.8** | 3.4 | 4.1 | **3.4** | 3.3 | 3.6 | **3.1** | 2.9 | 3.2 | **2.8** | 2.7 | 2.9 | **2.3** | 2.3 | 2.4 | **2.0** | 2.0 | 2.1 |
| ECMO, % |  | | **0.0** | 0.0 | 0.1 | **0.1** | 0.0 | 0.1 | **0.1** | 0.1 | 0.1 | **0.1** | 0.1 | 0.1 | **0.1** | 0.1 | 0.1 | **0.1** | 0.1 | 0.1 | **0.1** | 0.1 | 0.1 |
| Mortality, % |  | | **18.7** | 18.1 | 19.4 | **17.3** | 16.8 | 17.8 | **16.5** | 16.2 | 16.7 | **15.7** | 15.4 | 15.9 | **14.8** | 14.5 | 15.0 | **12.8** | 12.6 | 13.0 | **12.1** | 11.9 | 12.3 |
|  | | **Any procedural code for Invasive Mechanical Ventilation** | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population |  | | **372.3** | 352.3 | 392.2 | **368.1** | 347.4 | 388.8 | **361.9** | 352.4 | 371.4 | **365.9** | 356.7 | 375.1 | **364.6** | 355.9 | 373.3 | **359.2** | 350.6 | 367.8 | **358.5** | 349.7 | 367.3 |
| Hospital |  | | **29.2** | 28.2 | 30.2 | **29.0** | 28.0 | 30.1 | **29.7** | 29.1 | 30.3 | **31.2** | 30.6 | 31.7 | **31.7** | 31.1 | 32.2 | **31.4** | 30.7 | 32.2 | **31.7** | 30.9 | 32.5 |
| MV, % |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive |  | | **93.4** | 92.7 | 94.2 | **92.8** | 92.0 | 93.7 | **93.0** | 92.6 | 93.3 | **92.3** | 91.9 | 92.7 | **91.8** | 91.4 | 92.2 | **93.3** | 93.0 | 93.6 | **92.7** | 92.3 | 93.0 |
| Noninvasive |  | | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Both |  | | **6.6** | 5.8 | 7.3 | **7.2** | 6.3 | 8.0 | **7.0** | 6.7 | 7.4 | **7.7** | 7.3 | 8.1 | **8.2** | 7.8 | 8.6 | **6.7** | 6.4 | 7.0 | **7.3** | 7.0 | 7.7 |
| Neither |  | | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Tracheostomy, % |  | | **8.3** | 7.7 | 8.8 | **7.8** | 7.4 | 8.3 | **7.5** | 7.2 | 7.8 | **7.3** | 7.0 | 7.5 | **7.1** | 6.9 | 7.3 | **7.4** | 7.2 | 7.6 | **7.0** | 6.8 | 7.2 |
| ECMO, % |  | | **0.1** | 0.0 | 0.1 | **0.1** | 0.0 | 0.1 | **0.1** | 0.1 | 0.1 | **0.2** | 0.1 | 0.2 | **0.2** | 0.1 | 0.2 | **0.3** | 0.2 | 0.3 | **0.3** | 0.3 | 0.4 |
| Mortality, % |  | | **30.2** | 29.5 | 30.9 | **30.0** | 29.3 | 30.6 | **29.7** | 29.3 | 30.1 | **29.7** | 29.3 | 30.0 | **29.6** | 29.3 | 30.0 | **29.7** | 29.4 | 30.1 | **30.0** | 29.7 | 30.3 |
|  | | **Noninvasive Mechanical Ventilation** | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population |  | | **151.4** | 135.7 | 167.2 | **165.8** | 148.8 | 182.8 | **177.1** | 168.8 | 185.4 | **195.8** | 187.1 | 204.5 | **211.5** | 202.6 | 220.5 | **196.3** | 187.9 | 204.7 | **220.4** | 210.7 | 230.2 |
| Hospital |  | | **11.9** | 10.8 | 13.0 | **13.1** | 11.8 | 14.3 | **14.5** | 13.9 | 15.2 | **16.7** | 16.0 | 17.4 | **18.4** | 17.7 | 19.1 | **17.2** | 16.4 | 17.9 | **19.5** | 18.6 | 20.4 |
| MV, % |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive |  | | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Noninvasive |  | | **83.9** | 83.0 | 84.8 | **84.1** | 83.2 | 84.9 | **85.6** | 85.2 | 86.0 | **85.6** | 85.2 | 86.0 | **85.8** | 85.5 | 86.2 | **87.8** | 87.4 | 88.1 | **88.1** | 87.8 | 88.4 |
| Both |  | | **16.1** | 15.2 | 17.0 | **15.9** | 15.1 | 16.8 | **14.4** | 14.0 | 14.8 | **14.4** | 14.0 | 14.8 | **14.2** | 13.8 | 14.5 | **12.2** | 11.9 | 12.6 | **11.9** | 11.6 | 12.2 |
| Neither |  | | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Tracheostomy, % |  | | **1.3** | 1.2 | 1.5 | **1.4** | 1.2 | 1.5 | **1.2** | 1.1 | 1.3 | **1.1** | 1.1 | 1.2 | **1.0** | 0.9 | 1.1 | **0.8** | 0.7 | 0.9 | **0.8** | 0.7 | 0.8 |
| ECMO, % |  | | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 |
| Mortality, % |  | | **12.2** | 11.5 | 12.9 | **12.5** | 11.8 | 13.2 | **11.7** | 11.4 | 12.0 | **11.5** | 11.2 | 11.8 | **10.8** | 10.5 | 11.1 | **10.3** | 10.0 | 10.6 | **9.7** | 9.4 | 10.0 |
|  | | **Any Diagnosis Code + Any Procedural Code for Invasive or Noninvasive Mechanical Ventilation** | | | | | | | | | | | | | | | | | | | | | |
| Incidence |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Population |  | | **377.5** | 356.9 | 398.0 | **396.7** | 374.9 | 418.4 | **397.5** | 387.5 | 407.4 | **418.6** | 408.4 | 428.9 | **434.6** | 424.3 | 444.8 | **438.2** | 427.8 | 448.6 | **454.7** | 443.5 | 466.6 |
| Hospital |  | | **29.6** | 28.6 | 30.7 | **31.3** | 30.2 | 32.4 | **32.6** | 32.0 | 33.2 | **35.7** | 35.0 | 36.3 | **37.8** | 37.1 | 38.4 | **38.4** | 37.4 | 39.3 | **40.2** | 39.2 | 41.2 |
| MV, % |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invasive |  | | **76.0** | 74.1 | 77.9 | **73.3** | 71.2 | 75.4 | **71.5** | 70.4 | 72.5 | **68.9** | 67.9 | 69.9 | **66.6** | 65.6 | 67.6 | **66.6** | 65.6 | 67.5 | **63.8** | 62.8 | 64.8 |
| Noninvasive |  | | **18.0** | 16.5 | 19.4 | **20.4** | 18.9 | 22.0 | **22.5** | 21.7 | 23.3 | **24.8** | 23.9 | 25.6 | **26.9** | 26.1 | 27.7 | **28.2** | 27.3 | 29.0 | **30.6** | 29.8 | 31.5 |
| Both |  | | **6.0** | 5.4 | 6.6 | **6.3** | 5.6 | 7.0 | **6.0** | 5.8 | 6.3 | **6.4** | 6.1 | 6.6 | **6.5** | 6.3 | 6.8 | **5.3** | 5.1 | 5.5 | **5.6** | 5.3 | 5.8 |
| Neither |  | | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA | **NA** | NA | NA |
| Tracheostomy, % |  | | **7.7** | 7.1 | 8.2 | **7.0** | 6.5 | 7.5 | **6.5** | 6.2 | 6.8 | **6.0** | 5.8 | 6.3 | **5.7** | 5.5 | 5.9 | **5.8** | 5.6 | 6.0 | **5.2** | 5.1 | 5.4 |
| ECMO, % |  | | **0.0** | 0.0 | 0.1 | **0.1** | 0.0 | 0.1 | **0.1** | 0.1 | 0.1 | **0.1** | 0.1 | 0.2 | **0.1** | 0.1 | 0.2 | **0.2** | 0.2 | 0.3 | **0.2** | 0.2 | 0.3 |
| Mortality, % |  | | **26.0** | 25.3 | 26.7 | **25.4** | 24.8 | 26.0 | **24.8** | 24.5 | 25.1 | **24.4** | 24.0 | 24.7 | **23.9** | 23.6 | 24.2 | **23.6** | 23.3 | 24.0 | **23.2** | 22.9 | 23.5 |

Abbreviations: Est = point estimate; L95 = lower limit of 95% confidence interval; MV = mechanical ventilation; U95 = upper limit of 95% confidence interval

# Below analyses only utilize principle case definition

The principal case definition includes:

* Any discharge that has both a diagnosis code for respiratory failure)
  + ICD-9-CM = 799.1, 518.5, 518.51, 518.52, 518.53, 518.81, 518.82, 518.83, or 518.84
  + ICD-10-CM =

AND

* Any procedural code for mechanical ventilation
  + ICD-9-CM = 96.04, 96.70, 96.71, 96.72, or 93.90
  + ICD-10-CM = J95.1, J95.2, J95.3, J95.821, J95.822, J96.00, J96.01, J96.02, J96.20, J96.21, J96.22, J96.90, J96.91, J96.92, J80, J96.10, J96.11, J96.12 or R09.2

## eTable 6. Demographic Characteristics of Patients with Acute Respiratory With Invasive Mechanical Ventilation[[5]](#footnote-5)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2002** | | | **2003** | **2004** | **2005** | **2006** | | | **2007** | **2008** | **2009** | **2010** | | | **2011** | **2012** | **2013** | **2014** | | | **2016** | **2017** | | | |
|  | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **L95** | | **U95** |
| **Age, years** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
| < 18 | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | 0.0 | 0.0 | |
| 18-29 | **3.5** | 3.2 | 3.7 | **3.8** | **4.2** | **3.9** | **4.2** | 3.8 | 4.5 | **4.3** | **4.0** | **4.3** | **4.5** | 4.2 | 4.8 | **4.2** | **4.1** | **4.0** | **4.0** | 3.8 | 4.2 | **4.2** | **4.1** | 4.0 | 4.3 | |
| 30-39 | **5.2** | 4.8 | 5.5 | **5.3** | **5.2** | **5.0** | **4.9** | 4.6 | 5.2 | **5.0** | **4.8** | **5.0** | **4.9** | 4.7 | 5.2 | **4.7** | **4.8** | **4.7** | **4.9** | 4.8 | 5.0 | **4.9** | **4.8** | 4.7 | 5.0 | |
| 40-49 | **9.5** | 9.1 | 9.9 | **9.9** | **10.2** | **9.7** | **10.0** | 9.7 | 10.4 | **9.9** | **9.4** | **9.6** | **9.4** | 9.0 | 9.7 | **8.8** | **8.6** | **8.3** | **8.1** | 7.9 | 8.2 | **7.9** | **7.6** | 7.5 | 7.8 | |
| 50-59 | **14.5** | 14.1 | 14.8 | **15.0** | **15.6** | **15.8** | **16.7** | 16.3 | 17.2 | **16.7** | **17.1** | **17.8** | **17.8** | 17.4 | 18.2 | **17.8** | **18.1** | **17.9** | **18.4** | 18.2 | 18.7 | **17.7** | **17.2** | 17.0 | 17.4 | |
| 60-69 | **19.4** | 19.0 | 19.7 | **20.0** | **20.1** | **20.3** | **20.2** | 19.9 | 20.6 | **20.8** | **21.5** | **21.9** | **22.0** | 21.6 | 22.3 | **22.2** | **22.8** | **23.0** | **23.5** | 23.3 | 23.7 | **24.6** | **24.7** | 24.4 | 24.9 | |
| 70-79 | **26.5** | 25.9 | 27.0 | **25.3** | **24.5** | **24.0** | **23.2** | 22.8 | 23.7 | **22.6** | **22.3** | **21.6** | **21.5** | 21.0 | 21.9 | **21.8** | **21.5** | **22.2** | **21.9** | 21.7 | 22.2 | **22.2** | **23.1** | 22.8 | 23.3 | |
| >= 80 | **21.6** | 20.8 | 22.3 | **20.7** | **20.2** | **21.3** | **20.7** | 19.9 | 21.5 | **20.7** | **21.0** | **19.9** | **20.0** | 19.2 | 20.8 | **20.5** | **20.1** | **19.9** | **19.1** | 18.8 | 19.5 | **18.4** | **18.5** | 18.1 | 18.9 | |
| Missing | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | 0.0 | 0.0 | |
| **Female, %** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
| Female | **49.6** | 49.1 | 50.1 | **49.3** | **49.0** | **49.1** | **48.7** | 48.2 | 49.2 | **48.3** | **48.7** | **48.4** | **48.4** | 47.9 | 49.0 | **48.9** | **48.6** | **48.5** | **48.2** | 47.9 | 48.5 | **47.7** | **47.7** | 47.5 | 48.0 | |
| Missing | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | 0.0 | 0.0 | |
| **Expected Primary Payor** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
| Medicare | **61.6** | 60.5 | 62.7 | **61.0** | **59.4** | **61.3** | **60.1** | 59.0 | 61.2 | **59.5** | **59.4** | **58.8** | **58.5** | 57.3 | 59.8 | **60.8** | **61.8** | **62.2** | **61.4** | 60.9 | 62.0 | **60.9** | **61.6** | 61.1 | 62.2 | |
| Medicaid | **10.6** | 9.9 | 11.3 | **11.6** | **11.7** | **11.6** | **12.2** | 11.4 | 13.0 | **11.6** | **11.9** | **12.6** | **13.3** | 12.4 | 14.1 | **12.6** | **12.6** | **12.4** | **14.4** | 14.0 | 14.8 | **15.4** | **15.5** | 15.1 | 15.9 | |
| Private including HMO | **21.0** | 20.1 | 21.9 | **20.3** | **20.7** | **19.1** | **19.3** | 18.4 | 20.1 | **20.1** | **20.4** | **20.1** | **19.5** | 18.5 | 20.4 | **18.1** | **16.9** | **16.6** | **17.1** | 16.6 | 17.5 | **17.0** | **16.3** | 15.8 | 16.7 | |
| Self-pay | **4.1** | 3.6 | 4.7 | **4.1** | **5.0** | **4.9** | **4.9** | 4.4 | 5.4 | **5.1** | **4.8** | **5.3** | **5.2** | 4.7 | 5.8 | **5.1** | **5.3** | **5.2** | **4.2** | 4.0 | 4.4 | **3.7** | **3.7** | 3.5 | 4.0 | |
| No charge | **0.3** | 0.1 | 0.6 | **0.4** | **0.4** | **0.5** | **0.5** | 0.3 | 0.7 | **0.5** | **0.5** | **0.4** | **0.5** | 0.3 | 0.7 | **0.5** | **0.4** | **0.6** | **0.3** | 0.3 | 0.4 | **0.3** | **0.2** | 0.2 | 0.3 | |
| Other | **2.2** | 1.9 | 2.6 | **2.6** | **2.7** | **2.4** | **2.9** | 2.5 | 3.3 | **3.1** | **2.8** | **2.6** | **2.8** | 2.4 | 3.1 | **2.6** | **2.8** | **2.8** | **2.4** | 2.2 | 2.5 | **2.6** | **2.4** | 2.3 | 2.6 | |
| Missing | **0.1** | 0.0 | 0.1 | **0.1** | **0.1** | **0.1** | **0.1** | 0.0 | 0.2 | **0.1** | **0.1** | **0.1** | **0.2** | 0.1 | 0.3 | **0.2** | **0.1** | **0.1** | **0.1** | 0.1 | 0.2 | **0.1** | **0.2** | 0.1 | 0.2 | |
| **Race** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
| White | **53.2** | 49.9 | 56.4 | **53.4** | **52.2** | **56.1** | **52.3** | 48.8 | 55.8 | **51.3** | **57.7** | **59.8** | **62.2** | 59.2 | 65.2 | **63.5** | **66.0** | **66.0** | **66.0** | 64.9 | 67.2 | **64.9** | **64.5** | 63.3 | 65.6 | |
| Black | **12.6** | 10.7 | 14.5 | **12.3** | **13.0** | **9.6** | **11.9** | 10.3 | 13.6 | **11.8** | **11.8** | **12.8** | **15.5** | 13.6 | 17.3 | **14.9** | **15.3** | **15.3** | **15.8** | 15.0 | 16.5 | **16.6** | **17.2** | 16.3 | 18.0 | |
| Hispanic | **6.2** | 4.9 | 7.6 | **7.7** | **6.5** | **6.5** | **7.3** | 5.9 | 8.8 | **7.0** | **6.8** | **7.8** | **7.8** | 6.4 | 9.3 | **8.3** | **8.3** | **8.5** | **8.4** | 7.8 | 9.1 | **9.0** | **9.3** | 8.6 | 9.9 | |
| Asian or pacific islander | **1.7** | 1.2 | 2.2 | **2.0** | **1.9** | **1.6** | **1.9** | 1.3 | 2.4 | **1.9** | **2.3** | **2.4** | **2.1** | 1.7 | 2.5 | **2.0** | **2.3** | **2.5** | **2.4** | 2.2 | 2.7 | **2.6** | **2.7** | 2.4 | 2.9 | |
| Native American | **0.2** | 0.0 | 0.4 | **0.2** | **0.3** | **0.3** | **0.5** | 0.2 | 0.7 | **0.6** | **0.5** | **0.6** | **0.6** | 0.2 | 1.1 | **0.6** | **0.6** | **0.6** | **0.6** | 0.5 | 0.7 | **0.5** | **0.6** | 0.5 | 0.7 | |
| Other | **1.8** | 1.3 | 2.4 | **2.0** | **1.9** | **2.1** | **1.9** | 1.3 | 2.5 | **1.9** | **2.5** | **3.1** | **2.0** | 1.6 | 2.4 | **2.6** | **3.2** | **2.6** | **2.8** | 2.5 | 3.0 | **2.7** | **2.9** | 2.6 | 3.2 | |
| Missing | **24.3** | 20.5 | 28.0 | **22.3** | **24.2** | **23.9** | **24.1** | 20.1 | 28.2 | **25.4** | **18.4** | **13.4** | **9.7** | 7.0 | 12.4 | **8.0** | **4.3** | **4.5** | **4.0** | 3.2 | 4.8 | **3.6** | **2.9** | 2.4 | 3.5 | |

Abbreviations: Est = point estimate; L95 = lower limit of 95% confidence interval; HMO = health maintenance organization; U95 = upper limit of 95% confidence interval

## eTable 7. Clinical Characteristics of Patients with Acute Respiratory With Mechanical Ventilation[[6]](#footnote-6)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2002** | | | **2003** | **2004** | **2005** | **2006** | | | **2007** | **2008** | **2009** | **2010** | | | **2011** | **2012** | **2013** | **2014** | | | **2016** | **2017** | | |
|  | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **L95** | **U95** |
| **Risk of Mortality, %** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No class | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.1 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | 0.0 | 0.0 |
| Minor | **1.5** | 1.4 | 1.6 | **1.6** | **1.4** | **1.3** | **1.3** | 1.2 | 1.4 | **1.2** | **1.1** | **1.1** | **1.0** | 0.9 | 1.1 | **1.3** | **1.3** | **1.2** | **1.2** | 1.2 | 1.3 | **1.1** | **1.0** | 0.9 | 1.0 |
| Moderate | **8.2** | 7.9 | 8.6 | **8.2** | **8.4** | **8.0** | **8.0** | 7.7 | 8.3 | **7.5** | **6.2** | **5.7** | **5.5** | 5.2 | 5.7 | **5.4** | **5.6** | **5.4** | **5.0** | 4.9 | 5.2 | **4.3** | **4.0** | 3.9 | 4.1 |
| Major | **32.1** | 31.2 | 33.0 | **32.0** | **33.1** | **32.7** | **32.6** | 32.1 | 33.1 | **31.3** | **30.2** | **29.2** | **28.8** | 28.2 | 29.3 | **28.5** | **30.8** | **30.4** | **29.2** | 28.9 | 29.6 | **27.4** | **26.5** | 26.2 | 26.8 |
| Extreme | **53.0** | 51.3 | 54.6 | **53.0** | **57.0** | **58.0** | **58.1** | 57.3 | 58.9 | **60.0** | **62.5** | **64.0** | **64.8** | 64.0 | 65.5 | **64.8** | **62.3** | **63.0** | **64.5** | 64.1 | 64.9 | **67.2** | **68.6** | 68.1 | 69.0 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Illness Severity, %** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No class specified | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.1 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | 0.0 | 0.0 |
| Minor | **0.2** | 0.2 | 0.3 | **0.2** | **0.2** | **0.2** | **0.1** | 0.1 | 0.1 | **0.1** | **0.1** | **0.1** | **0.0** | 0.0 | 0.1 | **0.1** | **0.1** | **0.0** | **0.0** | 0.0 | 0.0 | **0.0** | **0.0** | 0.0 | 0.0 |
| Moderate | **3.0** | 2.8 | 3.2 | **2.9** | **2.7** | **2.5** | **2.6** | 2.4 | 2.7 | **2.4** | **2.2** | **2.1** | **2.0** | 1.8 | 2.1 | **2.2** | **3.2** | **3.1** | **2.9** | 2.8 | 3.0 | **2.9** | **2.6** | 2.5 | 2.7 |
| Major | **23.1** | 22.3 | 23.8 | **22.9** | **23.6** | **21.5** | **20.7** | 20.1 | 21.2 | **20.4** | **19.9** | **19.6** | **19.8** | 19.2 | 20.4 | **20.2** | **26.0** | **26.1** | **25.8** | 25.5 | 26.2 | **25.5** | **25.0** | 24.6 | 25.4 |
| Extreme | **68.6** | 66.7 | 70.5 | **68.8** | **73.5** | **75.8** | **76.6** | 76.0 | 77.3 | **77.1** | **77.8** | **78.2** | **78.1** | 77.4 | 78.8 | **77.5** | **70.8** | **70.8** | **71.2** | 70.8 | 71.6 | **71.6** | **72.4** | 71.9 | 72.8 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Elixhauser mortality score** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mean | **11.3** | 11.0 | 11.6 | **10.7** | **11.0** | **11.7** | **12.2** | 11.9 | 12.5 | **12.8** | **12.7** | **12.8** | **13.0** | 12.7 | 13.3 | **13.7** | **13.6** | **13.8** | **13.8** | 13.7 | 13.9 | **13.5** | **13.7** | 13.6 | 13.8 |
| **Elixhauser readmission score** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mean | **20.9** | 20.4 | 21.4 | **20.0** | **20.5** | **21.7** | **23.5** | 22.9 | 24.0 | **24.6** | **24.9** | **25.7** | **25.9** | 25.3 | 26.6 | **28.0** | **28.1** | **28.4** | **28.8** | 28.5 | 29.0 | **29.4** | **30.0** | 29.8 | 30.2 |
| **HIV/AIDS** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **0.4** | 0.3 | 0.5 | **0.3** | **0.4** | **0.3** | **0.4** | 0.3 | 0.5 | **0.3** | **0.3** | **0.4** | **0.4** | 0.3 | 0.4 | **0.3** | **0.3** | **0.3** | **0.3** | 0.2 | 0.3 | **0.3** | **0.3** | 0.3 | 0.4 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Alcohol abuse** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **6.7** | 6.3 | 7.0 | **6.3** | **6.9** | **7.3** | **8.0** | 7.6 | 8.4 | **7.8** | **7.5** | **7.9** | **8.1** | 7.7 | 8.5 | **8.4** | **8.7** | **8.6** | **8.7** | 8.5 | 8.9 | **8.6** | **8.0** | 7.8 | 8.2 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Deficiency anemias** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **13.7** | 12.7 | 14.7 | **14.6** | **14.9** | **14.8** | **17.4** | 16.2 | 18.7 | **20.2** | **24.4** | **26.1** | **25.8** | 24.4 | 27.1 | **29.3** | **29.0** | **28.4** | **28.8** | 28.2 | 29.3 | **29.4** | **28.5** | 28.0 | 29.0 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Rheumatoid arthritis** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **1.6** | 1.5 | 1.8 | **1.7** | **1.7** | **1.8** | **2.0** | 1.9 | 2.1 | **2.0** | **2.2** | **2.4** | **2.5** | 2.4 | 2.6 | **2.9** | **3.0** | **3.0** | **3.0** | 3.0 | 3.1 | **3.1** | **3.2** | 3.1 | 3.3 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Blood loss anemia** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **2.1** | 2.0 | 2.3 | **2.1** | **2.3** | **2.3** | **2.5** | 2.4 | 2.7 | **2.5** | **1.8** | **1.8** | **1.6** | 1.5 | 1.8 | **1.6** | **1.5** | **1.3** | **1.3** | 1.2 | 1.4 | **1.3** | **1.2** | 1.1 | 1.2 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Congestive heart failure** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **24.3** | 23.4 | 25.3 | **24.4** | **26.6** | **29.4** | **30.2** | 29.4 | 31.0 | **29.2** | **26.2** | **25.9** | **25.6** | 24.8 | 26.4 | **27.2** | **26.7** | **27.1** | **27.3** | 27.0 | 27.7 | **28.1** | **30.2** | 29.9 | 30.6 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Pulmonary disease** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **35.3** | 34.0 | 36.6 | **34.9** | **37.4** | **38.9** | **39.1** | 38.2 | 40.0 | **38.3** | **36.3** | **36.5** | **35.3** | 34.2 | 36.4 | **38.0** | **38.6** | **39.2** | **39.3** | 38.8 | 39.8 | **40.3** | **40.6** | 40.1 | 41.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Coagulopathy** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **9.2** | 8.7 | 9.7 | **9.9** | **10.5** | **10.8** | **11.4** | 10.8 | 11.9 | **12.1** | **12.0** | **13.0** | **13.9** | 13.1 | 14.6 | **14.8** | **15.2** | **15.2** | **14.9** | 14.7 | 15.2 | **16.3** | **16.3** | 16.0 | 16.6 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Depression** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **4.4** | 4.1 | 4.7 | **4.8** | **5.4** | **5.8** | **6.5** | 6.1 | 7.0 | **7.4** | **8.7** | **9.4** | **10.0** | 9.5 | 10.5 | **11.8** | **11.8** | **11.9** | **12.6** | 12.3 | 12.8 | **13.8** | **13.9** | 13.6 | 14.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Diabetes without complications** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **16.9** | 16.1 | 17.7 | **17.0** | **18.2** | **17.8** | **19.6** | 18.8 | 20.4 | **21.2** | **22.9** | **24.4** | **23.8** | 23.0 | 24.6 | **25.7** | **26.3** | **26.4** | **26.3** | 25.9 | 26.6 | **16.3** | **11.5** | 11.2 | 11.7 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Diabetes with complications** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **4.3** | 4.0 | 4.5 | **4.1** | **4.3** | **4.4** | **5.0** | 4.7 | 5.3 | **5.3** | **5.6** | **5.8** | **5.9** | 5.5 | 6.2 | **6.8** | **6.8** | **7.3** | **7.8** | 7.6 | 8.0 | **18.9** | **24.8** | 24.4 | 25.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Drug abuse** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **3.4** | 3.1 | 3.6 | **3.7** | **4.2** | **4.6** | **5.2** | 4.9 | 5.5 | **5.2** | **4.7** | **5.0** | **5.3** | 4.9 | 5.7 | **5.8** | **6.3** | **6.5** | **7.0** | 6.8 | 7.2 | **6.6** | **6.9** | 6.7 | 7.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Hypertension** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **26.2** | 25.1 | 27.4 | **36.3** | **38.8** | **39.4** | **44.2** | 42.8 | 45.5 | **44.9** | **49.9** | **51.9** | **52.6** | 51.2 | 54.0 | **57.2** | **58.8** | **59.6** | **60.6** | 60.1 | 61.1 | **63.3** | **59.1** | 58.7 | 59.5 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Hypothyroidism** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **5.4** | 5.0 | 5.8 | **5.4** | **5.7** | **6.2** | **6.8** | 6.4 | 7.2 | **7.7** | **9.2** | **9.8** | **10.4** | 9.9 | 10.9 | **11.9** | **12.3** | **12.6** | **13.0** | 12.8 | 13.2 | **13.3** | **13.1** | 12.8 | 13.3 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Liver disease** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **3.0** | 2.8 | 3.2 | **3.3** | **3.6** | **3.5** | **3.9** | 3.7 | 4.1 | **4.0** | **4.0** | **4.5** | **4.5** | 4.2 | 4.8 | **5.1** | **5.2** | **5.2** | **5.5** | 5.3 | 5.6 | **6.8** | **6.7** | 6.6 | 6.9 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Lymphoma** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **1.1** | 1.0 | 1.1 | **1.0** | **1.0** | **1.2** | **1.1** | 1.0 | 1.1 | **1.1** | **1.2** | **1.2** | **1.2** | 1.1 | 1.2 | **1.2** | **1.1** | **1.2** | **1.2** | 1.2 | 1.3 | **1.1** | **1.1** | 1.0 | 1.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Fluid and electrolyte disorders** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **40.2** | 38.6 | 41.8 | **40.5** | **44.1** | **46.8** | **48.3** | 47.0 | 49.5 | **50.9** | **53.3** | **54.0** | **55.1** | 53.8 | 56.4 | **57.7** | **58.8** | **60.0** | **61.5** | 61.0 | 62.0 | **62.2** | **63.1** | 62.6 | 63.7 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Metastatic cancer** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **3.4** | 3.2 | 3.6 | **3.5** | **3.5** | **3.7** | **3.7** | 3.5 | 3.8 | **4.0** | **4.0** | **3.7** | **3.8** | 3.5 | 4.0 | **3.8** | **3.7** | **3.6** | **3.5** | 3.4 | 3.6 | **3.5** | **3.5** | 3.4 | 3.6 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Other neurological disorders** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **14.2** | 13.6 | 14.8 | **10.0** | **10.8** | **11.1** | **12.3** | 11.9 | 12.7 | **12.8** | **12.8** | **13.2** | **13.4** | 12.9 | 13.9 | **14.6** | **15.2** | **15.2** | **15.4** | 15.2 | 15.7 | **16.6** | **16.5** | 16.3 | 16.7 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Obesity** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **4.7** | 4.4 | 5.0 | **5.0** | **5.4** | **5.9** | **7.1** | 6.6 | 7.6 | **8.4** | **11.5** | **13.2** | **13.4** | 12.7 | 14.0 | **17.0** | **18.0** | **19.0** | **20.5** | 20.2 | 20.9 | **22.1** | **22.7** | 22.4 | 23.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Paralysis** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **4.3** | 3.9 | 4.6 | **3.6** | **3.6** | **3.5** | **4.2** | 3.9 | 4.4 | **4.6** | **5.8** | **5.8** | **6.2** | 6.0 | 6.5 | **6.2** | **6.3** | **6.2** | **6.4** | 6.2 | 6.5 | **7.8** | **7.9** | 7.8 | 8.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Peripheral vascular disease** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **4.8** | 4.4 | 5.1 | **4.6** | **4.7** | **4.7** | **5.4** | 5.0 | 5.8 | **6.6** | **8.0** | **8.2** | **8.0** | 7.5 | 8.4 | **9.4** | **9.5** | **9.9** | **10.0** | 9.7 | 10.3 | **9.9** | **8.7** | 8.5 | 8.9 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Psychoses** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **3.8** | 3.5 | 4.0 | **3.8** | **4.4** | **4.4** | **5.1** | 4.8 | 5.3 | **5.5** | **6.1** | **6.7** | **7.0** | 6.7 | 7.2 | **7.3** | **7.7** | **7.6** | **7.8** | 7.6 | 7.9 | **6.0** | **6.0** | 5.9 | 6.1 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Pulmonary circulation disorders** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **2.9** | 2.6 | 3.1 | **2.8** | **2.9** | **3.1** | **3.6** | 3.4 | 3.9 | **5.9** | **7.1** | **7.4** | **7.5** | 7.2 | 7.9 | **8.4** | **8.6** | **8.6** | **8.9** | 8.7 | 9.1 | **2.8** | **2.8** | 2.7 | 2.9 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Renal failure** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **10.5** | 9.9 | 11.0 | **10.6** | **11.5** | **13.3** | **18.5** | 17.9 | 19.1 | **19.3** | **18.6** | **19.5** | **20.1** | 19.4 | 20.8 | **22.3** | **22.4** | **23.1** | **23.7** | 23.4 | 24.1 | **25.4** | **26.0** | 25.6 | 26.3 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Solid tumor without metastasis** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **5.8** | 5.5 | 6.1 | **2.4** | **2.5** | **2.6** | **2.6** | 2.5 | 2.7 | **2.8** | **3.0** | **3.0** | **3.0** | 2.9 | 3.1 | **3.1** | **3.0** | **3.1** | **3.1** | 3.0 | 3.2 | **3.1** | **3.1** | 3.0 | 3.2 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Peptic ulcer disease** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **1.0** | 0.9 | 1.1 | **0.1** | **0.0** | **0.0** | **0.0** | 0.0 | 0.1 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.1 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.1 | **1.6** | **1.5** | 1.5 | 1.6 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Valvular disease** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **5.1** | 4.8 | 5.5 | **5.2** | **5.5** | **6.5** | **7.0** | 6.6 | 7.5 | **7.1** | **5.9** | **5.8** | **5.7** | 5.3 | 6.1 | **6.5** | **6.5** | **6.7** | **6.8** | 6.6 | 7.0 | **6.9** | **6.8** | 6.7 | 7.0 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Weight loss** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Present | **8.8** | 8.0 | 9.7 | **8.4** | **9.5** | **10.1** | **10.3** | 9.4 | 11.3 | **12.0** | **14.6** | **15.3** | **16.3** | 15.1 | 17.4 | **18.3** | **17.1** | **16.9** | **16.4** | 16.0 | 16.9 | **14.9** | **15.5** | 15.1 | 16.0 |
| Missing | **5.1** | 2.8 | 7.5 | **5.2** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |

Abbreviations: Est = point estimate; L95 = lower limit of 95% confidence interval; U95 = upper limit of 95% confidence interval

## eTable 8. Hospital Characteristics of Patients with Acute Respiratory With Mechanical Ventilation[[7]](#footnote-7)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2002** | | | **2003** | **2004** | **2005** | **2006** | | | **2007** | **2008** | **2009** | **2010** | | | **2011** | **2012** | **2013** | **2014** | | | **2016** | **2017** | | |
|  | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **L95** | **U95** |
| **Region** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Northeast | **21.0** | 19.0 | 23.1 | **22.4** | **21.1** | **21.4** | **21.0** | 19.1 | 22.9 | **20.2** | **18.9** | **20.2** | **20.3** | 18.1 | 22.6 | **20.2** | **19.3** | **19.0** | **18.5** | 17.6 | 19.4 | **18.1** | **17.6** | 16.7 | 18.6 |
| Midwest | **21.3** | 19.0 | 23.7 | **20.4** | **21.5** | **20.8** | **20.5** | 18.4 | 22.5 | **21.3** | **21.0** | **20.5** | **21.0** | 18.6 | 23.4 | **20.4** | **19.5** | **19.4** | **20.1** | 19.1 | 21.1 | **19.4** | **19.9** | 18.9 | 20.9 |
| South | **39.2** | 36.6 | 41.7 | **37.7** | **38.9** | **38.7** | **38.0** | 35.5 | 40.6 | **38.6** | **40.1** | **38.0** | **40.0** | 37.3 | 42.6 | **38.4** | **40.6** | **41.2** | **41.3** | 40.1 | 42.4 | **42.0** | **42.3** | 41.1 | 43.6 |
| West | **18.5** | 16.6 | 20.4 | **19.6** | **18.6** | **19.0** | **20.5** | 18.5 | 22.5 | **20.0** | **19.9** | **21.3** | **18.7** | 16.8 | 20.6 | **21.0** | **20.6** | **20.3** | **20.1** | 19.2 | 21.1 | **20.5** | **20.2** | 19.2 | 21.1 |
| **Urban/Rural** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rural | **9.8** | 8.6 | 11.0 | **9.8** | **8.0** | **9.2** | **7.9** | 6.8 | 9.0 | **8.4** | **8.3** | **8.0** | **9.2** | 7.6 | 10.7 | **8.2** | **8.4** | **8.7** | **7.2** | 6.6 | 7.8 | **7.3** | **7.5** | 6.9 | 8.1 |
| Urban non-teaching | **47.0** | 44.4 | 49.5 | **45.3** | **46.9** | **50.5** | **42.7** | 40.2 | 45.1 | **44.0** | **44.6** | **43.9** | **42.0** | 39.4 | 44.6 | **43.1** | **40.3** | **39.9** | **27.9** | 26.9 | 28.8 | **27.7** | **23.7** | 22.7 | 24.7 |
| Urban - teaching | **43.2** | 40.6 | 45.9 | **44.9** | **45.2** | **40.4** | **49.1** | 46.6 | 51.7 | **47.4** | **47.0** | **46.5** | **47.5** | 44.5 | 50.5 | **47.1** | **51.2** | **51.4** | **65.0** | 63.9 | 66.0 | **65.0** | **68.8** | 67.7 | 69.9 |
| Missing | **NA** | NA | NA | **0.0** | **NA** | **NA** | **0.2** | 0.0 | 0.6 | **0.2** | **0.1** | **1.6** | **1.4** | 0.2 | 2.5 | **1.4** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Ownership** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Government, nonfederal | **11.0** | 8.3 | 13.6 | **12.8** | **12.8** | **12.6** | **11.6** | 8.8 | 14.5 | **11.7** | **12.8** | **11.5** | **13.0** | 9.6 | 16.4 | **9.2** | **11.2** | **11.1** | **11.4** | 10.8 | 12.0 | **11.0** | **11.2** | 10.5 | 12.0 |
| Private, not-profit | **74.7** | 71.3 | 78.1 | **72.4** | **72.3** | **71.7** | **73.2** | 69.4 | 76.9 | **71.9** | **73.2** | **72.1** | **72.4** | 68.4 | 76.5 | **75.1** | **73.7** | **73.6** | **73.7** | 72.7 | 74.6 | **72.2** | **72.2** | 71.1 | 73.3 |
| Private, invest-own | **13.8** | 11.6 | 16.0 | **13.2** | **13.0** | **14.8** | **13.7** | 11.2 | 16.1 | **14.5** | **14.0** | **14.8** | **13.2** | 10.9 | 15.4 | **14.2** | **15.1** | **15.3** | **14.9** | 14.1 | 15.8 | **16.9** | **16.5** | 15.6 | 17.5 |
| Missing | **0.5** | 0.0 | 1.2 | **1.5** | **1.9** | **0.8** | **1.6** | 0.3 | 2.8 | **1.9** | **0.1** | **1.6** | **1.4** | 0.2 | 2.5 | **1.4** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |
| **Bedsize** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Small | **9.2** | 7.8 | 10.5 | **9.1** | **9.1** | **8.2** | **10.2** | 8.7 | 11.6 | **8.7** | **8.8** | **8.2** | **9.5** | 8.1 | 10.8 | **8.9** | **11.2** | **11.2** | **16.3** | 15.4 | 17.2 | **16.0** | **17.3** | 16.3 | 18.2 |
| Medium | **25.3** | 23.4 | 27.3 | **25.8** | **24.8** | **26.0** | **26.3** | 24.3 | 28.4 | **25.4** | **23.4** | **24.2** | **22.8** | 20.8 | 24.8 | **24.0** | **26.7** | **26.9** | **29.6** | 28.5 | 30.6 | **30.4** | **31.0** | 30.0 | 32.1 |
| Large | **65.5** | 63.2 | 67.8 | **65.1** | **66.1** | **65.8** | **63.3** | 60.9 | 65.7 | **65.7** | **67.8** | **66.1** | **66.3** | 63.9 | 68.8 | **65.7** | **62.1** | **62.0** | **54.1** | 53.0 | 55.3 | **53.6** | **51.7** | 50.4 | 52.9 |
| Missing | **NA** | NA | NA | **0.0** | **NA** | **NA** | **0.2** | 0.0 | 0.6 | **0.2** | **0.1** | **1.6** | **1.4** | 0.2 | 2.5 | **1.4** | **NA** | **NA** | **NA** | NA | NA | **NA** | **NA** | NA | NA |

Abbreviations: Est = point estimate; L95 = lower limit of 95% confidence interval; U95 = upper limit of 95% confidence interval

## eTable 9. Outcomes of Patients with Acute Respiratory With Mechanical Ventilation[[8]](#footnote-8)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2002** |  |  | **2003** | **2004** | **2005** | **2006** | | | **2007** | **2008** | **2009** | **2010** | | | **2011** | **2012** | **2013** | **2014** | | | **2016** | **2017** | | |
|  | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **Est** | **Est** | **L95** | **U95** | **Est** | **Est** | **L95** | **U95** |
| **Died** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Died | **33.5** | 32.9 | 34.2 | **32.5** | **31.2** | **31.1** | **30.7** | 30.1 | 31.3 | **28.9** | **28.9** | **27.4** | **26.0** | 25.3 | 26.7 | **25.4** | **24.8** | **24.4** | **23.9** | 23.6 | 24.2 | **23.6** | **23.2** | 22.9 | 23.5 |
| Missing | **0.1** | 0.0 | 0.2 | **0.1** | **0.1** | **0.1** | **0.0** | 0.0 | 0.1 | **0.0** | **0.0** | **0.0** | **0.1** | 0.0 | 0.1 | **0.1** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.1** | **0.1** | 0.0 | 0.2 |
| **Discharge location** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Routine | **23.5** | 22.8 | 24.3 | **24.0** | **22.3** | **22.1** | **21.9** | 21.0 | 22.8 | **22.1** | **21.6** | **22.5** | **22.7** | 21.9 | 23.5 | **22.2** | **23.7** | **23.6** | **24.0** | 23.6 | 24.4 | **24.2** | **24.3** | 23.9 | 24.7 |
| Transfer to short-term | **5.8** | 5.4 | 6.2 | **5.6** | **5.3** | **5.2** | **5.0** | 4.6 | 5.4 | **5.4** | **5.4** | **5.1** | **5.0** | 4.7 | 5.4 | **5.0** | **4.9** | **4.9** | **4.8** | 4.6 | 4.9 | **4.7** | **4.8** | 4.6 | 5.0 |
| Transfer to intermediate | **27.4** | 26.6 | 28.2 | **27.4** | **30.0** | **30.2** | **31.0** | 30.0 | 31.9 | **32.1** | **31.6** | **32.4** | **33.0** | 32.2 | 33.9 | **34.2** | **33.1** | **33.1** | **33.0** | 32.6 | 33.4 | **32.6** | **32.1** | 31.8 | 32.5 |
| Home health care | **8.4** | 7.9 | 8.9 | **8.8** | **10.1** | **10.3** | **10.4** | 9.9 | 10.9 | **10.5** | **11.3** | **11.5** | **11.9** | 11.4 | 12.5 | **12.1** | **12.3** | **12.9** | **13.1** | 12.8 | 13.3 | **13.3** | **13.9** | 13.6 | 14.2 |
| AMA | **0.7** | 0.6 | 0.8 | **0.7** | **0.8** | **0.8** | **0.9** | 0.8 | 0.9 | **0.9** | **0.8** | **0.9** | **0.9** | 0.8 | 0.9 | **0.9** | **1.0** | **1.0** | **1.1** | 1.0 | 1.1 | **1.4** | **1.5** | 1.5 | 1.6 |
| Died in hospital | **33.5** | 32.9 | 34.2 | **32.5** | **31.2** | **31.1** | **30.7** | 30.1 | 31.3 | **28.9** | **28.9** | **27.4** | **26.0** | 25.3 | 26.7 | **25.4** | **24.8** | **24.4** | **23.9** | 23.6 | 24.2 | **23.6** | **23.2** | 22.9 | 23.5 |
| Alive, destination unknown | **0.1** | 0.0 | 0.1 | **0.2** | **0.1** | **0.1** | **0.1** | 0.1 | 0.2 | **0.1** | **0.2** | **0.2** | **0.4** | 0.0 | 0.8 | **0.1** | **0.2** | **0.2** | **0.1** | 0.1 | 0.1 | **0.0** | **0.0** | 0.0 | 0.0 |
| Missing | **0.1** | 0.0 | 0.2 | **0.1** | **0.1** | **0.1** | **0.0** | 0.0 | 0.1 | **0.0** | **0.0** | **0.0** | **0.0** | 0.0 | 0.1 | **0.1** | **0.0** | **0.0** | **0.0** | 0.0 | 0.0 | **0.1** | **0.1** | 0.0 | 0.2 |
| **Length of stay, Mean** | **14.6** | 14.2 | 14.9 | **14.4** | **14.2** | **13.8** | **13.8** | 13.5 | 14.1 | **13.7** | **13.4** | **12.9** | **12.7** | 12.2 | 13.1 | **11.8** | **11.6** | **11.3** | **11.2** | 11.0 | 11.3 | **10.9** | **10.5** | 10.4 | 10.7 |
| **Hospital charges, Thousands of Dollars, Mean** | **86.3** | 81.5 | 91.2 | 95.0 | 95.2 | 100.4 | 105.1 | 100.5 | 109.7 | 117.8 | 122.7 | 127.7 | **129.9** | 121.8 | 138.0 | **135.9** | **136.5** | **139.4** | **143.2** | 138.9 | 147.5 | **155.8** | **158.4** | 153.7 | 163.2 |

Abbreviations: AMA = against medical advice; Est = point estimate; L95 = lower limit of 95% confidence interval; U95 = upper limit of 95% confidence interval

## eTable 10. Most Frequent Primary Diagnosis Classes for Acute Respiratory Failure with Mechanical Ventilation

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Diagnosis** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2016** | **2017** |
| Respiratory failure; insufficiency; arrest (adult) | 20.8 | 21.4 | 22.3 | 27.3 | 29.3 | 26.9 | 25.2 | 21.8 | 19.8 | 19.6 | 19.4 | 19.1 | 18.5 | 17.2 | 17.3 |
| Pneumonia (except that caused by tuberculosis or transmitted disease) | 8.2 | 7.9 | 6.6 | 5.7 | 5.0 | 4.6 | 4.8 | 5.6 | 5.2 | 5.3 | 5.0 | 5.0 | 4.5 | 3.6 | 2.4 |
| Congestive heart failure; nonhypertensive | 6.4 | 5.9 | 5.9 | 4.2 | 2.9 | 2.9 | 3.0 | 3.6 | 3.9 | 4.3 | 4.5 | 4.8 | 5.4 | 6.3 | 6.6 |
| Acute myocardial infarction | 5.8 | 5.3 | 4.8 | 4.1 | 3.4 | 3.3 | 3.3 | 3.3 | 3.0 | 3.2 | 3.2 | 3.1 | 3.1 | 3.3 | 3.2 |
| Acute cerebrovascular disease | 4.2 | 4.5 | 4.5 | 4.0 | 3.9 | 3.8 | 3.7 | 3.7 | 4.0 | 3.4 | 3.6 | 3.5 | 3.5 | 2.0 | 1.8 |
| Septicemia (except in labor) | 4.2 | 4.4 | 6.7 | 9.2 | 11.3 | 14.0 | 15.3 | 15.8 | 16.6 | 18.2 | 18.9 | 20.5 | 22.1 | 24.6 | 25.2 |
| Chronic obstructive pulmonary disease and bronchiectasis | 3.4 | 3.2 | 2.5 | 2.4 | 2.1 | 2.0 | 2.3 | 2.5 | 2.7 | 2.8 | 2.8 | 3.0 | 2.9 | 3.8 | 4.9 |
| Aspiration pneumonitis; food/vomitus | 3.0 | 2.9 | 2.3 | 2.1 | 1.8 | 1.7 | 2.0 | 2.0 | 2.0 | 2.1 | 1.9 | 1.8 | 1.7 | NA | NA |
| Intracranial injury | 2.0 | 2.3 | 2.8 | 2.1 | 2.4 | 2.5 | 2.2 | 2.3 | 2.8 | 2.2 | 2.3 | 2.2 | 2.2 | NA | NA |
| Poisoning by other medications and drugs | 1.6 | 1.7 | 1.9 | 2.0 | 2.1 | 1.5 | NA | NA | NA | NA | 1.6 | NA | NA | 2.4 | 2.5 |
| Complication of device; implant or graft | NA | NA | NA | NA | NA | NA | NA | 1.6 | 1.5 | 1.6 | NA | 1.4 | 1.5 | NA | NA |
| Poisoning by psychotropic agents | NA | NA | NA | NA | NA | NA | 1.5 | NA | NA | NA | NA | NA | NA | NA | NA |
| Viral Infection | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 1.9 | 1.9 |
| Suicidal ideation/attempt/intentional-self harm | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 1.6 | 1.6 |

1. Population incidence estimates reported as estimated cases per 100,000 persons ≥ 18 years of age. [↑](#footnote-ref-1)
2. Hospital incidence reported as estimated cases per 1,000 hospital discharges ≥ 18 years of age [↑](#footnote-ref-2)
3. Population incidence estimates reported as estimated cases per 100,000 persons ≥ 18 years of age. [↑](#footnote-ref-3)
4. Hospital incidence reported as estimated cases per 1,000 hospital discharges ≥ 18 years of age [↑](#footnote-ref-4)
5. 95% confidence intervals are reported every 3-4 years to save space. [↑](#footnote-ref-5)
6. 95% confidence intervals are reported every 3-4 years to save space. [↑](#footnote-ref-6)
7. 95% confidence intervals are reported every 3-4 years to save space. [↑](#footnote-ref-7)
8. 95% confidence intervals are reported every 3-4 years to save space. [↑](#footnote-ref-8)