

# Postoperative Respiratory Failure Rate

## Technical Specifications

### Patient Safety Indicators 11 (PSI 11)

AHRQ Quality Indicators™, Version 5.0

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Provider-Level Indicator

Type of Score: Rate

### Description

Postoperative respiratory failure (secondary diagnosis), prolonged mechanical ventilation, or reintubation cases per 1,000 elective surgical discharges for patients ages 18 years and older. Excludes cases with principal diagnosis for acute respiratory failure; cases with secondary diagnosis for acute respiratory failure present on admission; cases in which tracheostomy is the only operating room procedure or in which tracheostomy occurs before the first operating room procedure; cases with neuromuscular disorders, laryngeal or pharyngeal surgery, craniofacial anomalies that had a procedure for the face, esophageal resection, lung cancer, or degenerative neurological disorders; cases with a procedure on the nose, mouth, or pharynx; cases with respiratory or circulatory diseases; and obstetric discharges.

*[NOTE: The software provides the rate per hospital discharge. However, common practice reports the measure as per 1,000 discharges. The user must multiply the rate obtained from the software by 1,000 to report events per 1,000 hospital discharges.]*

### Numerator

Discharges, among cases meeting the inclusion and exclusion rules for the denominator, with either:

- any secondary ICD-9-CM diagnosis code for acute respiratory failure; or
- any-listed ICD-9-CM procedure codes for a mechanical ventilation for 96 consecutive hours or more that occurs zero or more days after the first major operating room procedure code (based on days from admission to procedure); or
- any-listed ICD-9-CM procedure codes for a mechanical ventilation for less than 96 consecutive hours (or undetermined) that occurs two or more days after the first major operating room procedure code (based on days from admission to procedure); or
- any-listed ICD-9-CM procedure codes for a reintubation that occurs one or more days after the first major operating room procedure code (based on days from admission to procedure)

**ICD-9-CM Acute respiratory failure diagnosis codes:**

51851 AC RESP FLR FOL TRMA/SRG (begin 2011)      51853 AC/CHR RSP FLR FOL TR/SG (begin 2011)

51881 ACUTE RESPIRATORY FAILURE (drop 2011) 51884 ACUTE & CHRONC RESP FAIL (drop 2011)

**ICD-9-CM Mechanical ventilation for 96 consecutive hours or more procedure code:**

9672 CONT INV MEC CEN 96+ HRS

**ICD-9-CM Mechanical ventilation for less than 96 consecutive hours (or undetermined) procedure codes:**

9670 CONV INV MEC VEN-UNSP DUR 9671 CONT INV MEC VEN <96 HRS

**ICD-9-CM Reintubation procedure code:**

9604 INSERT ENDOTRACHEAL TUBE

## Denominator

Elective surgical discharges, for patients ages 18 years and older, with any-listed ICD-9-CM procedure codes for an operating room procedure. Elective surgical discharges are defined by specific DRG or MS-DRG codes with admission type recorded as elective (SID ATYPE=3).

See *Patient Safety Indicators Appendices*:

- Appendix A – Operating Room Procedure Codes
- Appendix D – Surgical Discharge DRGs
- Appendix E – Surgical Discharge MS-DRGs

Exclude cases:

- with a principal ICD-9-CM diagnosis code (or secondary diagnosis present on admission) for acute respiratory failure (see above)
- where the only operating room procedure is tracheostomy
- where a procedure for tracheostomy occurs before the first operating room procedure<sup>†</sup>
- with any-listed ICD-9-CM diagnosis codes for neuromuscular disorder
- with any-listed ICD-9-CM procedure codes for laryngeal or pharyngeal, nose, mouth or pharynx surgery
- with any-listed ICD-9-CM procedure codes involving the face and any-listed ICD-9-CM diagnosis codes for craniofacial anomalies
- with any-listed ICD-9-CM procedure codes for esophageal resection
- with any-listed ICD-9-CM procedure codes for lung cancer
- any-listed ICD-9-CM diagnosis codes for degenerative neurological disorder
- MDC 4 (diseases/disorders of respiratory system)
- MDC 5 (diseases/disorders of circulatory system)
- MDC 14 (pregnancy, childbirth, and puerperium)
- with missing gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing), or principal diagnosis (DX1=missing)

**ICD-9-CM Tracheostomy procedure codes:**

311 TEMPORARY TRACHEOSTOMY 3129 OTHER PERM TRACHEOSTOMY  
3121 MEDIASTINAL TRACHEOSTOMY 3174 REVISION OF TRACHEOSTOMY

**ICD-9-CM Neuromuscular disorder diagnosis codes:**

3570 AC INFECT POLYNEURITIS 35921 MYOTONIC MUSCULAR DYSTROPHY  
35800 MYSTHNA GRVS W/O AC EXAC 35922 MYOTONIA CONGENITA

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<sup>†</sup> If day of procedure is not available in the input data file, the rate may be slightly lower than if the information was available.

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35801	MYASTHNA GRAVS W AC EXAC	35923	MYOTONIC CHONDRODYSTRPHY
3581	MYASTHENIA IN OTH DIS	35929	OTHER UNSPECIFIED MYOTONIC DISORDER
3582	TOXIC MYONEURAL DISORDER	3593	FAMIL PERIODIC PARALYSIS
35830	LAMBERT-EATON SYNDROME, UNSPECIFIED	3594	TOXIC MYOPATHY
35831	LAMBERT-EATON SYNDROME IN NEOPLASTIC DISEASE	3595	MYOPATHY IN ENDOCRIN DIS
35839	LAMBERT-EATON SYNDROME IN OTHER DISEASES CLASSIFIED ELSEWHERE	3596	INFL MYOPATHY IN OTH DIS
3588	MYONEURAL DISORDERS NEC	35971	INCLUSION BODY MYOSITIS
3589	MYONEURAL DISORDERS NOS	35979	INFLM/IMMUNE MYOPATH NEC
3590	CONG HERED MUSC DYSTRPHY	35981	CRITICAL ILLNESS MYOPATHY
3591	HERED PROG MUSC DYSTRPHY	35989	MYOPATHIES NEC
3592	MYOTONIC DISORDERS	3599	MYOPATHY NOS

**ICD-9-CM Laryngeal, pharyngeal, nose, mouth and pharynx surgery procedure codes:**

253	COMPLETE GLOSSECTOMY	2731	LOC EXC BONY PALATE LES
254	RADICAL GLOSSECTOMY	2732	WIDE EXC BONY PALATE LES
2991	DILATION OF PHARYNX	2742	WIDE EXCISION OF LIP LES
3009	OT EXCIS DESTRUC LESION OF LARYNX	2743	EXCISION OF LIP LES NEC
3021	EPIGLOTTIDECTOMY	2749	EXCISION OF MOUTH NEC
3022	VOCAL CORDECTOMY	2753	CLOSURE OF MOUTH FISTULA
3029	OTHER PARTIAL LARYNGECTOMY	2754	REPAIR OF CLEFT LIP
303	COMPLETE LARYNGECTOMY	2755	FULL-THICK GRFT TO MOUTH
304	RADICAL LARYNGECTOMY	2756	SKIN GRAFT TO MOUTH NEC
313	OTHER INCISION OF LARYNX OR TRACHEA	2757	PEDICLE ATTACH TO MOUTH
315	LOC EXCIS DESTRUC LESION TRACHEA	2759	MOUTH REPAIR NEC
3169	OTHER REPAIR OF LARYNX	2761	SUTURE OF PALATE LACERAT
3173	CLOSURE OF OTHER FISTULA OF TRACHEA	2762	CLEFT PALATE CORRECTION
3175	RECONSTR TRACHEA ARTIFICIAL LARYNX	2763	REVIS CLEFT PALAT REPAIR
3179	OTHER REPAIR PLASTIC OPERAT TRACHEA	2764	INSERT PALATAL IMPLANT (Begin 2004)
3198	OTHER OPERATIONS ON LARYNX	2769	OTH PLASTIC REPAIR PALAT
3199	OTHER OPERATIONS ON TRACHEA	2771	INCISION OF UVULA
214	RESECTION OF NOSE	2772	EXCISION OF UVULA
2161	DIATHER/CRYO TURBINECTOM	2773	REPAIR OF UVULA
2162	TURBINATE FRACTURE	2779	OTHER UVULA OPERATIONS
2169	TURBINECTOMY NEC	2792	MOUTH INCISION NOS
2172	OPEN REDUCTION NASAL FX	2799	ORAL CAVITY OPS NEC
2199	NASAL OPERATION NEC	280	PERITONSILLAR I & D
2231	RADICAL MAXILLARY ANTROT	284	EXCISION OF TONSIL TAG
2239	EXT MAXILLARY ANTROT NEC	285	EXCISION LINGUAL TONSIL
2241	FRONTAL SINUSOTOMY	2891	INCIS TO REMOV TONSIL FB
2242	FRONTAL SINUSECTOMY	2892	EXCIS TONSIL/ADENOID LES
2250	SINUSOTOMY NOS	2899	TONSIL/ADENOID OPS NEC
2251	ETHMOIDOTOMY	290	PHARYNGOTOMY
2252	SPHENOIDOTOMY	292	EXC BRANCHIAL CLEFT CYST
2253	MULTIPLE SINUS INCISION	293	DESTRUCT PHARYNGEAL LES
2260	SINUSECTOMY NOS	2931	CRICOPHARYNGEAL MYOTOMY
2261	C-LUC EXC MAX SINUS LES	2932	PHARYNGEAL DIVERTICULE
2262	EXC MAX SINUS LESION NEC	2933	PHARYNGECTOMY
2263	ETHMOIDECTOMY	2939	EXCIS/DESTR LES PHAR NEC
2264	SPHENOIDECTOMY	294	PLASTIC OP ON PHARYNX
2271	NASAL SINUS FISTULA CLOS	2951	SUTURE OF PHARYNGEAL LAC
2279	NASAL SINUS REPAIR NEC	2952	CLOS BRANCH CLEFT FISTUL
229	OTHER NASAL SINUS OPS	2953	CLOS PHARYNX FISTULA NEC
251	DESTRUCTION TONGUE LES	2954	LYSIS PHARYNGEAL ADHES

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252	PARTIAL GLOSSECTOMY	2959	PHARYNGEAL REPAIR NEC
2559	REPAIR OF TONGUE NEC	2992	DIVIS GLOSSOPHARYNG NERV
2594	OTHER GLOSSOTOMY	2999	PHARYNGEAL OPERATION NEC
2599	TONGUE OPERATION NEC	310	INJECTION OF LARYNX
2621	SALIVARY CYST MARSUPIAL	3161	SUTURE LACERATION LARYNX
2629	SALIV LESION EXCIS NEC	3162	CLOSURE FISTULA LARYNX
2630	SIALOADENECTOMY NOS	3163	REVISION LARYNGOSTOMY
2631	PARTIAL SIALOADENECTOMY	3164	REPAIR LARYNGEAL FRACTURE
2632	COMPLETE SIALOADENECTOMY	3171	SUTURE LACERATION TRACHEA
2641	SUTURE OF SALIV GLND LAC	3172	CLOSURE FISTULA TRACHEA
2642	SALIVARY FISTULA CLOSURE	3191	DIVISION OF LARYNGEAL NERVE
2649	SALIVARY REPAIR NEC	3192	LYSIS ADHESIONS TRACEA LARYNX
2699	SALIVARY OPERATION NEC	3193	REPLAC LARYNGEAL TRACH STENT
270	DRAIN FACE & MOUTH FLOOR	3194	INJECT LOCAL THERAP SUBST
271	INCISION OF PALATE	3195	TRACHEOESOPH FISTULIZATION

**ICD-9-CM Face procedure codes:**

252	PARTIAL GLOSSECTOMY	7669	OTHER FACIAL BONE REPAIR
2559	OTHER REPAIR AND PLASTIC OPERATIONS ON TONGUE	7670	REDUC FACIAL FRACTURE
2732	WIDE EXCISION OR DESTRUCTION OF LESION OR TISSUE OF BONY PALATE	7671	CL REDUC MALAR ZYGO FX
2762	CORRECTION OF CLEFT PALATE	7672	OP REDUC MALAR ZYGO FX
2763	REVISION OF CLEFT PALATE REPAIR	7673	CL REDUC MAXILL FX
2769	OTHER PLASTIC REPAIR OF PALATE	7674	OP REDUC MAXILL FX
2931	CRICOPHARYNGEAL MYOTOMY	7675	CL REDUC MANDIBULAR FX
7631	PARTIAL MANDIBULECTOMY	7676	OP REDUC MANDIBULAR FX
7639	PARTIAL OSTECTOMY FAC BONE	7677	OP REDUC ALVEOLAR FX
7641	TOTAL MANDIBULECT SYN RECONST	7678	CL REDUC ALVEOLAR FX
7642	TOTAL MANDIBULECT	7679	OT OPEN REDUC FACAL FX
7643	RECONSTRUCT MANDIBLE	7691	BONE GRAFT TO FACIAL BONE
7644	TOTAL OSECTOMY OF OTHER FAC	7692	INSERT SYNTH IMPLAN FACIAL
7645	TOT OSTECTOMY FAC BONE	7693	CL REDUCT TM DISLOC
7646	OTHER RECONSTR OTH FAC BONE	7694	OP REDUCT TM DISLOC
7661	CL OSTEOPLASTY MAND RAMUS	7695	OTH MANIP TM JOINT
7662	OP OSTEOPLASTY MAND RAMUS	7696	INJ THERAP SUBST TMJ
7663	OSTEOPLASTY MAND BODY	7697	REMOV INTERNAL FIX FACIAL
7664	OTH ORTH SURG MANDIBLE	7698	FACIAL BONE OPERATIONS
7665	SEGMEN OSTEOPLASTY MAXILLA	7699	OT FACIAL BONE OPERAT
7666	TOTAL OSTEOPLASTY MAXILLA		

**ICD-9-CM Craniofacial anomalies diagnosis codes:**

74483	MACROSTOMIA	7483	CONGENITAL ANOMALIES OF SKULL AND FACE BONES
74484	MICROSTOMIA	7560	TRACHEOMALACIA AND CONGENITAL TRACHEAL STENOSIS
7449	UNSPECIFIED ANOMALIES OF FACE AND NECK		

**ICD-9-CM Esophageal resection procedure codes:**

4210	ESOPHOAGASTOMY	4256	THORAC ESOPHAGOCOLOS NEC
4211	ESOPHOAGASTOMY	4258	THORAC INTERPOSITION NEC
4212	ESOPHOAGASTOMY	4259	THORAC ESOPHAG ANAST NEC
4219	ESOPHOAGASTOMY	426	STERN ESOPHAG ANAST
424	ESOPHAGECTOMY	4261	STERN ESOPHAGUESOPHAGOST
4240	ESOPHAGECTOMY NOS	4262	STERN ESOPHAGOGASTROSTOM
4241	PARTIAL ESOPHAGECTOMY	4263	STERN SM BOWEL INTERPOS
4242	TOTAL ESOPHAGECTOMY	4264	STERN ESOPHAGOENTER NEC
425	THORAC ESOPHAG ANAST	4265	STERN LG BOWEL INTERPOS
4251	THORAC ESOPHAGUESOPHAGOS	4266	STERN ESOPHAGOCOLOS NEC
4252	THORAC ESOPHAGOGASTROST	4268	STERN INTERPOSITION NEC

4253	THORAC SM BOWEL INTERPOS	4269	STERN ESOPHAG ANAST NEC
4254	THORAC ESOPHAGOENTER NEC	4399	TOTAL GASTRECTOMY NEC
4255	THORAC LG BOWEL INTERPOS		

**ICD-9-CM Lung cancer procedure codes:**

3230	THORACOSCOPIC SURGERY	3249	LOBECTOMY OF LUNG NEC
3239	OTH SEG LUNG RESECT NOS	3250	THORACOSCOPIC SURGERY
3241	THORACOSCOPIC SURGERY	3259	OTHER PNEUMONECTOMY NOS

**ICD-9-CM Degenerative neurological disorder diagnosis codes:**

2900	SENILE DEMENTIA UNCOMP	29410	DEMENTIA IN OTH DISEASES W0 BEHAVRAL OCT00-
29010	PRESENILE DEMENTIA	29411	DEMENTIA IN OTH DISEASES WBEHAVIORAL OCT00-
29011	PRESENILE DELIRIUM	2948	ORGANIC BRAIN SYND NEC
29012	PRESENILE DELUSION	2949	ORGANIC BRAIN SYND NOS
29013	PRESENILE DEPRESSION	3100	FRONTAL LOBE SYNDROME
29020	SENILE DELUSION	3102	POSTCONCUSSION SYNDROME
29021	SENILE DEPRESSIVE	3108	NONPSYCHOT BRAIN SYN NEC
2903	SENILE DELIRIUM	31081	PSEDOBULBAR AFFECT
29040	ARTERIOSCLER DEMENT NOS	31089	OTHER SPECIFIED NONPSYCHOTIC MENTAL DISORDER
29041	ARTERIOSCLER DELIRIUM	3109	NONPSYCHOT BRAIN SYN NOS
29042	ARTERIOSCLER DELUSION	3310	ALZHEIMERS DISEASE
29043	ARTERIOSCLER DEPRESSIVE	3311	FRONTOTEMPORAL DEMENTIA
2908	SENILE PSYCHOSIS NEC	33111	PICKS DISEASE
2909	SENILE PSYCHOT COND NOS	33119	OTHER FRONTOTEMPORAL DEMENTIA
2930	ACUTE DELIRIUM	3312	SENILE DEGENERAT BRAIN
2931	SUBACUTE DELIRIUM	3316	CORTICOBASAL DEGENERATION
2940	AMNESTIC SYNDROME	33182	DEMENTIA WITH LEWY BODIES
2941	DEMENTIA IN OTH DISEASES	34882	BRAIN DEATH