

**STS General Thoracic Surgery Executive Summary**  
**Jan 2002 – Dec 2017 Procedures**  
**All Patients**

Table 1: Number of Operations submitted, Discharge Mortality, Operative Mortality, by year

Table 2: Operative Mortality, by Primary Procedure





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**Table 1: Number of Operations submitted, discharge mortality, and operative mortality, by year**

	Last Year Jan 2017 - Dec 2017	STS Last 3 Years Jan 2015 - Dec 2017	All Years Jan 2002 - Dec 2017
<b>Number of Operations</b>	44,175	132,493	549,466
<b>Discharge Mortality</b>			
Number of Mortalities	620	1,977	9,854
Number Eligible	44,175	132,493	492,934
Mortality Percent	1.4%	1.5%	2.0%
<b>Operative Mortality</b>			
Number of Mortalities	912	2,811	13,567
Number Eligible	42,586	127,431	442,900
Mortality Percent	2.1%	2.2%	3.1%



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**Table 2: Primary Procedures Operative Mortality, All Available Records, Jan 2002 - Dec 2017**

Primary Procedure by Organ System	Incidence #	STS Operative Mortality	
		# / Eligible	%
<b>PRIMARY PROCEDURES</b>			
<b>CHEST WALL (v2.07)</b>			
Chest Wall Biopsy	342	3/223	1.3%
Rib Resection (single)	462	5/334	1.5%
First/Cervical Rib Resection	165	0/126	0.0%
Chest Wall Resection	1,121	14/809	1.7%
Chest Wall Reconstruction	182	0/155	0.0%
Thoracoplasty	46	2/26	7.7%
Pectus Repair	182	0/126	0.0%
Sternectomy, complete	27	1/19	5.3%
Sternectomy, partial	110	1/77	1.3%
Muscle Flap	112	5/60	8.3%
Other Chest Wall Repair	1,534	14/993	1.4%
<b>MEDIASTINUM/NECK (v2.07)</b>			
Mediastinal LN Biopsy	2,480	18/1,476	1.2%
Mediastinoscopy	9,965	73/7,424	1.0%
Anterior Mediastinotomy	577	5/448	1.1%
Extended Cervical Mediastinoscopy	78	0/62	0.0%
Mediastinal Lymph Node Dissection	489	2/229	0.9%
Mediastinal Lymph Node Sampling	854	5/594	0.8%
Biopsy, Mediastinal Mass	849	10/583	1.7%
Resection, Mediastinal Mass	1,842	9/1,403	0.6%
Thymectomy	1,409	0/1,099	0.0%
Sympathectomy	1,857	3/1,279	0.2%
Thoracic duct ligation	258	4/188	2.1%
Other Mediastinal/Neck procedure	2,060	41/1,453	2.8%
<b>TRACHEOBRONCHIAL (v2.07)</b>			
Flexible Bronchoscopy	6,416	124/4,222	2.9%
Rigid Bronchoscopy	1,442	34/1,376	2.5%
Removal of Foreign Body (Tracheobronchial)	197	4/176	2.3%
Endobronchial ablation, Laser / PDT	1,424	35/1,335	2.6%
Endobronchial Ablation, Mechanical	348	7/334	2.1%
Tracheal/Bronchial Stent	1,091	54/1,027	5.3%



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Primary Procedure by Organ System	Incidence #	STS Operative Mortality	
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<b>TRACHEOBRONCHIAL (v2.07) - continued</b>			
Tracheostomy	3,210	344/2,594	13.3%
Tracheal Repair	107	7/98	7.1%
Tracheal Stricture Resection	378	2/356	0.6%
Tracheal Tumor Resection	116	0/104	0.0%
Carinal Resection (no lung resection)	11	0/10	0.0%
Bronchotomy	10	0/8	0.0%
Bronchial Repair	121	8/106	7.5%
Bronchoplasty	49	1/43	2.3%
Sleeve Bronchial Resection			
TE Fistula Repair	91	5/80	6.3%
Other Tracheobronchial procedure	1,962	42/1,704	2.5%
<b>PULMONARY (v2.07)</b>			
Wedge Resection, single	12,723	238/8,973	2.7%
Wedge Resection, multiple	7,970	286/5,940	4.8%
Segmentectomy	1,850	27/1,375	2.0%
Lobectomy	18,952	262/13,816	1.9%
Sleeve Lobectomy	382	7/352	2.0%
Bilobectomy	1,013	32/701	4.6%
Pneumonectomy, standard	1,129	48/812	5.9%
Pneumonectomy, Carinal	41	1/31	3.2%
Completion pneumonectomy	245	19/173	11.0%
Extrapleural pneumonectomy	211	13/141	9.2%
Pneumonectomy, intrapericardial	322	10/238	4.2%
Lung Volume Reduction	325	18/231	7.8%
Bullectomy / repair	1,043	15/798	1.9%
Hydatid Cyst Resection	2	0/2	0.0%
Single Lung Transplant	370	20/344	5.8%
Double Lung Transplant	629	32/588	5.4%
Lung Donor Harvest	16	4/14	28.6%
Other Lung procedure	1,416	51/949	5.4%
<b>ESOPHAGOGASTRIC (v2.07)</b>			
Esophagoscopy, flexible	4,256	39/3,258	1.2%
Esophagoscopy, rigid	91	3/83	3.6%



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**Table 2: Primary Procedures Operative Mortality, All Available Records, Jan 2002 - Dec 2017 - continued**

Primary Procedure by Organ System	Incidence #	STS	
		Operative Mortality # / Eligible	%
<b>ESOPHAGOGASTRIC (v2.07) - continued</b>			
Removal of Foreign Body (Esophagogastric)	163	4/131	3.1%
Dilation of Esophagus	3,523	36/3,301	1.1%
Esophageal Tumor Ablation, Laser / PDT	235	4/202	2.0%
Stent Placement	554	45/502	9.0%
Cervical esophagostomy	81	7/60	11.7%
Anterior Thoracic Esophagostomy	10	0/5	0.0%
Zenker's Diverticulum Repair	231	1/204	0.5%
Myotomy, cricopharyngeal	66	0/51	0.0%
Myotomy, esophageal (long)	209	0/155	0.0%
Myotomy, cardia (short)	494	1/439	0.2%
Resection, intrathoracic diverticulum	85	0/68	0.0%
Resection, esophagus (esophagectomy)	4,393	127/3,628	3.5%
Resection, esophageal wall lesion	102	0/85	0.0%
Repair, perforation of esophagus - Iatrogenic	146	8/120	6.7%
Repair, perforation of esophagus - Malignant	5	0/4	0.0%
Repair, perforation of esophagus - Other	255	20/215	9.3%
Fundoplication, circumferentia	1,448	8/1,104	0.7%
Fundoplication, partial	418	3/363	0.8%
Gastroplasty	162	1/149	0.7%
Pyloroplasty	18	0/16	0.0%
Pyloromyotomy	8	0/8	0.0%
Gastrectomy	209	6/170	3.5%
Gastrostomy	381	32/339	9.4%
Jejunostomy	363	20/292	6.8%
Conduit, gastric	34	2/27	7.4%
Conduit, colon	26	0/20	0.0%
Conduit, jejunum	4	0/3	0.0%
Conduit, other	2	0/2	0.0%
Anastomosis, neck	16	2/13	15.4%
Anastomosis, Chest	7	0/5	0.0%
Other Esophageal procedure	692	19/543	3.5%
Other GI procedure	785	23/602	3.8%
<b>CARDIAC/PERICARDIUM/GREAT VESSELS (v2.07)</b>			
Pericardial Window	2,735	191/1,703	11.2%



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**Table 2: Primary Procedures Operative Mortality, All Available Records, Jan 2002 - Dec 2017 - continued**

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		# / Eligible	Operative Mortality %
<b>CARDIAC/PERICARDIUM/GREAT VESSELS (v2.07) - continued</b>			
Pericardiectomy	209	9/150	6.0%
Repair Cardiac Laceration	33	5/27	18.5%
Other Pericardial Procedure	356	12/301	4.0%
Repair / Reconstruction, thoracic aorta	142	7/101	6.9%
Repair / Reconstruction, abd aorta	371	4/31	12.9%
Repair / Reconstruction, SVC	16	0/12	0.0%
Repair / Reconstruction, IVC	16	3/16	18.8%
Repair / Reconstruction, pulmonary artery	26	6/26	23.1%
Repair / Reconstruction, pulmonary vein(s)	5	1/5	20.0%
Repair / Reconstruction, left atrium	6	1/6	16.7%
Repair / Reconstruction, Subclavian Artery	20	2/16	12.5%
Cardiopulmonary Bypass	15	0/7	0.0%
Other Cardiac procedure	917	23/458	5.0%
<b>DIAPHRAGM (v2.07)</b>			
Plication of Diaphragm	191	2/160	1.3%
Diaphragmatic Hernia Repair, acute	122	4/90	4.4%
Diaphragmatic Hernia Repair, chronic	456	2/371	0.5%
Resection of Diaphragm	50	2/34	5.9%
Reconstruction of Diaphragm	43	0/28	0.0%
Other Diaphragm procedure	107	1/65	1.5%
<b>PLEURA (v2.07)</b>			
Pleural Drainage Procedure - Open	2,946	193/2,115	9.1%
Pleural Drainage Procedure - Closed	2,314	222/1,590	14.0%
Pleural Biopsy	2,022	73/1,434	5.1%
Pleurodesis	4,014	272/2,950	9.2%
Pleurectomy	506	13/371	3.5%
Decortication	5,692	229/4,193	5.5%
Clagett Procedure	140	7/126	5.6%
Other Pleural procedure	964	41/749	5.5%
<b>AIR LEAK CONTROL MEASURES (v2.07)</b>			
Fibrin Glue	16	0/15	0.0%
Pericardial Strips	13	0/5	0.0%



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<b>AIR LEAK CONTROL MEASURES (v2.07) - continued</b>			
Lung Sealant	15	0/10	0.0%
Pleural Tent	16	0/10	0.0%
Other Air Leak Control Measures	79	2/53	3.8%
<b>TRACHEA, BRONCHI AND LARYNX (v2.081, v2.2 and v2.3)</b>			
Tracheostomy, planned (31600) v2.2, v2.3	38	2/38	5.3%
Rigid Stent Removal v2.3	3	0/3	0.0%
Tracheostomy replacement (tube change) prior to est. of fistula tract (31502) v2.3	5	2/5	40.0%
Unlisted procedure, trachea, bronchi (31899) v2.081	2,443	243/1,974	12.3%
Tracheostomy revision simple, without flap (31613) v2.3			
Bronchogenic cyst removal v2.3	12	0/10	0.0%
Tracheal stenosis excision and anastomosis; cervicothoracic (31781)	149	2/143	1.4%
Bronchial laceration suture v2.3	3	0/3	0.0%
Tracheal tumor or carcinoma excision; cervical (31785)	138	2/127	1.6%
Bronchial sleeve resection v2.3	35	0/34	0.0%
Tracheal tumor or carcinoma excision; thoracic (31786)	151	3/141	2.1%
Bronchoplasty, graft repair (31770) v2.3	8	1/8	12.5%
Tracheal wound or injury suture repair; cervical (31800)	54	3/48	6.3%
Bronchoplasty; excision stenosis and anastomosis (31775)	86	4/65	6.2%
Tracheal wound or injury suture repair; intrathoracic (31805)	88	7/78	9.0%
Bronchopleural fistula closure (32906) v2.3	92	5/89	5.6%
Tracheoplasty; cervical (31750)	237	12/131	9.2%
Carinal reconstruction (31766)	25	1/23	4.3%
Tracheoplasty; intrathoracic (31760)	290	8/285	2.8%
Laryngectomy, partial (31370) v2.2, v2.3	5	0/4	0.0%
Tracheostomy revision complex, with flap (31614) v2.3	14	2/13	15.4%
Tracheal stenosis excision and anastomosis; cervical (31780)	813	6/792	0.8%
Tracheostomy mediastinal v2.3	9	0/8	0.0%
<b>BRONCHOSCOPY (v2.081, v2.2, v2.3)</b>			
Bronchoscopy, diagnostic, with or without cell washing (31622)	4,741	129/2,321	5.6%
Bronchoscopy, each additional major bronchus stented (31637)	13	1/8	12.5%
Bronchoscopy, navigational (31627) v2.2, v2.3	29	3/26	11.5%
Bronchoscopy, with bronchial alveolar lavage (BAL) (31624)	909	40/534	7.5%



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<b>BRONCHOSCOPY (v2.081, v2.2, v2.3) - continued</b>			
Bronchoscopy, with bronchial or endobronchial biopsy(s), single or multiple sites (31625)	1,583	34/402	8.5%
Bronchoscopy, with brushing or protected brushings (31623)	329	3/89	3.4%
Bronchoscopy, with destruction of tumor or relief of stenosis by any method other than excision (e.g., laser therapy) (31641)	1,737	71/851	8.3%
Bronchoscopy, with excision of tumor (31640)	444	23/228	10.1%
Bronchoscopy, with placement of bronchial stent(s) (includes tracheal/bronchial dilation as required), initial bronchus (31636)	529	38/318	11.9%
Bronchoscopy, with placement of catheter(s) for intracavitary radioelement application (31643)	64	1/13	7.7%
Bronchoscopy, with placement of Fiducial markers (31626) v2.2, v2.3	1	0/1	0.0%
Bronchoscopy, with placement of tracheal stent(s) (includes tracheal/bronchial dilation as required) (31631)	643	33/372	8.9%
Bronchoscopy, with removal of foreign body (31635)	379	15/214	7.0%
Bronchoscopy, with revision of tracheal or bronchial stent inserted at previous session (31638)	267	5/152	3.3%
Bronchoscopy, with therapeutic aspiration of tracheobronchial tree, initial (drainage of lung abscess) (31645)	163	4/104	3.8%
Bronchoscopy, with therapeutic aspiration of tracheobronchial tree, subsequent (31646)	43	1/36	2.8%
Bronchoscopy, with tracheal/bronchial dilation or closed reduction of fracture (31630)	1,568	14/509	2.8%
Bronchoscopy, with transbronchial lung biopsy(s), each additional lobe (31632)	55	1/16	6.3%
Bronchoscopy, with transbronchial lung biopsy(s), single lobe (31628)	599	8/130	6.2%
Bronchoscopy, with transbronchial needle aspiration biopsy(s) (31629)	1,363	7/192	3.6%
Bronchoscopy, with transbronchial needle aspiration biopsy(s), each additional lobe (31633)	161	1/21	4.8%
Endobronchial ultrasound (EBUS) during bronchoscopy diagnostic or therapeutic intervention(s) (31620)	1,510	10/202	5.0%
Tracheobronchoscopy through established tracheostomy incision (31615)	128	5/75	6.7%
<b>PLEURAL SPACE AND LUNG (v2.081, v2.2 and v2.3)</b>			
Thoracoscopy, diagnostic lungs and pleural space, without biopsy (32601)	1,561	85/1,286	6.6%
Thoracoscopy, surgical; with pleurodesis (e.g., mechanical or chemical) (32650)	6,644	474/5,309	8.9%





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<b>PLEURAL SPACE AND LUNG (v2.081, v2.2 and v2.3) - continued</b>			
Thoracoscopy, surgical; with removal of intrapleural foreign body or fibrin deposit (32653)	854	40/719	5.6%
Thoracoscopy, diagnostic; with biopsy(ies) of lung infiltrate(s) (eg wedge), unilateral (32607) v2.2, v2.3	574	16/503	3.2%
Thoracoscopy, diagnostic; with biopsy(ies) of lung nodule(s) or mass(es) (eg incisional), unilateral (32608) v2.2, v2.3	381	5/360	1.4%
Thoracoscopy, diagnostic; with biopsy(ies) of pleura (32609) v2.2, v2.3	180	9/162	5.6%
Thoracostomy; with rib resection for empyema (32035)	212	18/179	10.1%
Thoracostomy; with open flap drainage for empyema (32036)	390	26/329	7.9%
Thoracotomy with biopsy(ies) lung infiltrate(s) (eg wedge), unilateral (32096)	144	10/126	7.9%
Thoracotomy with biopsy(ies) lung nodule(s) or masses (eg incisional), unilateral (32097)	92	2/81	2.5%
Thoracotomy with biopsy(ies) of pleura (32098)	68	3/60	5.0%
Thoracotomy with cardiac massage (32160)	11	6/10	60.0%
Pleural scarification for repeat pneumothorax (32215)	101	4/66	6.1%
Insertion indwelling tunneled pleural catheter (32550)	3,082	345/2,179	15.8%
Repair lung hernia through chest wall (32800)	107	0/96	0.0%
Closure of chest wall following open flap drainage for empyema (Clagett type procedure) (32810)	126	3/102	2.9%
Total lung lavage (for alveolar proteinosis) (32997)	65	1/51	2.0%
Radio-frequency ablation (RFA) lung tumor (32998)	115	1/87	1.1%
Unlisted procedure, lung (32999)	750	31/422	7.3%
Thoracoscopy, surgical; with partial pulmonary decortication (32651)	8,259	444/7,487	5.9%
Thoracoscopy, surgical; with total pulmonary decortication (32652)	15,206	616/14,200	4.3%
Thoracoscopy, surgical; with control of traumatic hemorrhage (32654)	1,132	56/1,040	5.4%
Thoracoscopy, surgical; with excision-plication of bullae, including any pleural procedure (32655)	8,346	81/7,842	1.0%
Thoracoscopy, surgical; with parietal pleurectomy (32656)	2,069	75/1,958	3.8%
Thoracoscopy, surgical; with lobectomy (32663)	52,120	446/49,191	0.9%
Thoracoscopy with therapeutic wedge resection (eg mass or nodule, initial, unilateral) (32666) v2.2, v2.3	31,996	244/30,031	0.8%
Thoracoscopy with therapeutic wedge resection(eg mass or nodule) each additional resection, ipsilateral (32667) v2.2, v2.3	1,547	20/1,399	1.4%
Thoracoscopy with diagnostic wedge resection followed by anatomic lung resection (32668) v2.2, v2.3	863	15/808	1.9%



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<b>PLEURAL SPACE AND LUNG - continued</b>			
Thoracoscopy with removal of a single lung segment (segmentectomy) (32669) v2.2, v2.3	5,708	39/5,481	0.7%
Thoracoscopy with removal of two lobes (bilobectomy) (32670) v2.2, v2.3	929	16/885	1.8%
Thoracoscopy with removal of lung, pneumonectomy (32671) v2.2, v2.3	332	17/315	5.4%
Thoracoscopy with resection-plication for emphysematous lung (bullous or non-bullous) for lung volume reduction- LVRS, unilateral including any pleural procedure (32672) v2.2, v2.3	680	18/651	2.8%
Thoracotomy with therapeutic wedge resection (eg mass nodule) initial (32505) v2.2, v2.3	5,207	71/4,987	1.4%
Thoracotomy with therapeutic wedge resection (eg mass nodule) each additional resection, ipsilateral (+32506) v2.2, v2.3	634	13/574	2.3%
Thoracotomy with diagnostic wedge resection followed by anatomic lung resection (+32507) v2.2, v2.3	238	5/220	2.3%
Thoracotomy, limited, for biopsy of lung or pleura (i.e.; open lung biopsy) (32095) v2.081	867	91/586	15.5%
Thoracotomy, with exploration (32100)	3,044	160/2,587	6.2%
Thoracotomy, major; with control of traumatic hemorrhage and/or repair of lung tear (32110)	1,043	171/963	17.8%
Thoracotomy, major; for postoperative complications (32120)	1,580	49/1,451	3.4%
Thoracotomy, major; with cyst(s) removal, with or without a pleural procedure (32140)	272	1/232	0.4%
Thoracotomy, major; with excision-plication of bullae, with or without any pleural procedure (32141)	712	24/647	3.7%
Thoracotomy, major; with removal of intrapleural foreign body or hematoma (32150)	1,162	81/1,052	7.7%
Thoracotomy with open intrapleural pneumolysis (32124) v2.3	122	6/120	5.0%
Decortication, pulmonary, total (32220)	9,245	416/8,241	5.0%
Decortication, pulmonary, partial (32225)	2,613	129/2,286	5.6%
Pleurectomy, parietal (32310)	463	15/437	3.4%
Decortication and parietal pleurectomy (32320)	1,978	95/1,819	5.2%
Thoracotomy, with biopsy of pleura (32098) (v2.081, v2.2)	126	8/84	9.5%
Removal of lung, total pneumonectomy; (32440)	4,008	221/3,710	6.0%
Removal of lung, sleeve (carinal) pneumonectomy (32442)	148	9/136	6.6%
Removal of lung, total pneumonectomy; extrapleural (32445)	626	49/583	8.4%
Removal of lung, single lobe (lobectomy) (32480)	32,986	630/30,060	2.1%



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<b>PLEURAL SPACE AND LUNG - continued</b>			
Removal of lung, two lobes (bilobectomy) (32482)	3,077	106/2,833	3.7%
Removal of lung, single segment (segmentectomy) (32484)	2,987	48/2,790	1.7%
Removal of lung, sleeve lobectomy (32486)	1,660	26/1,581	1.6%
Removal of lung, completion pneumonectomy (32488)	766	59/707	8.3%
Removal of lung, excision-plication of emphysematous lung(s) for lung volume reduction (LVRS) (32491)	420	17/394	4.3%
Resection and repair of portion of bronchus (bronchoplasty) when performed at time of lobectomy or segmentectomy (32501)	55	2/55	3.6%
Resection of apical lung tumor (e.g., Pancoast tumor), including chest wall resection, without chest wall reconstruction(s) (32503)	463	14/433	3.2%
Resection of apical lung tumor (e.g., Pancoast tumor), including chest wall resection, with chest wall reconstruction (32504)	320	8/301	2.7%
Removal of lung, wedge resection, single or multiple(32500) v2.081	4,256	129/3,461	3.7%
Extrapleural enucleation of empyema(empyemectomy) (32540) v2.081	129	5/117	4.3%
Thoracoscopy, diagnostic lungs and pleural space, with biopsy (32602) v2.081	4,674	208/3,589	5.8%
Thoracoscopy, diagnostic pericardial sac, without biopsy (32603) v2.081	23	0/14	0.0%
Thoracoscopy, surgical; with wedge resection of lung, single or multiple (32657) v2.081	17,871	358/14,973	2.4%
<b>LUNG OTHER (v2.081, v2.2 and v2.3)</b>			
Open closure of major bronchial fistula (32815)	469	36/436	8.3%
Thoracoplasty with closure of bronchopleural fistula (32906)	206	14/190	7.4%
Single lung transplant (32851)	1,274	59/1,257	4.7%
Single lung transplant with CPB (32852)	462	34/462	7.4%
Double lung transplant (32853)	1,957	55/1,921	2.9%
Double lung transplant with CPB (32854)	2,593	161/2,579	6.2%
<b>MEDIASTINUM AND DIAPHRAGM (v2.081, v2.2 and v2.3)</b>			
Thoracoscopy, diagnostic; mediastinal space, with biopsy (32606)	893	13/679	1.9%
Mediastinotomy with exploration or biopsy; cervical approach (39000)	1,118	8/252	3.2%
Mediastinotomy with exploration or biopsy; transthoracic approach (39010)	788	11/455	2.4%
Mediastinoscopy, with or without biopsy (39400)	10,542	58/1,986	2.9%
Unlisted procedure, mediastinum (39499)	570	10/253	4.0%
Unlisted procedure, diaphragm (39599)	727	12/696	1.7%



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		# / Eligible	%
<b>MEDIASTINUM AND DIAPHRAGM (v2.081, v2.2 and v2.3) - continued</b>			
Thoracoscopy, surgical; with excision of mediastinal cyst, tumor, or mass (32662)	4,946	22/4,552	0.5%
Thoracoscopy, diagnostic mediastinal space, without biopsy (32605) v2.081	74	2/60	3.3%
Thoracoscopy with mediastinal and regional lymphadenectomy (+32674) v2.2, v2.3	412	0/370	0.0%
Thoracic lymphadenectomy, regional, including mediastinal and peritracheal nodes (38746)	965	4/615	0.7%
Mediastinal cyst, excision, open, Transthoracic approach (39200)	608	6/520	1.2%
Mediastinal tumor, excision, open, Transthoracic approach (39220)	3,260	29/2,966	1.0%
Thoracoscopy with resection of thymus, unilateral or bilateral (32673) v2.2, v2.3	2,010	6/1,937	0.3%
Thymectomy, transcervical approach (60520)	487	3/412	0.7%
Thymectomy, transthoracic approach (60521)	2,878	11/2,671	0.4%
Thymectomy, transthoracic approach, with radical mediastinal dissection (60522)	1,429	10/1,349	0.7%
VATS thymectomy (605XX) v2.081	402	0/362	0.0%
Diaphragm, laceration repair, any approach (39501)	173	13/166	7.8%
Repair of paraesophageal hiatus hernia, transabdominal with or without fundoplasty (39502) v2.081	1,019	17/934	1.8%
Diaphragmatic hernia repair (other than neonatal), traumatic; acute (39540)	408	6/379	1.6%
Diaphragmatic hernia repair (other than neonatal), traumatic; chronic (39541)	1,078	11/1,028	1.1%
Diaphragm Imbrication (i.e., plication) (39545)	1,820	14/1,725	0.8%
Diaphragm; resection with simple repair (e.g., primary suture) (39560)	310	6/294	2.0%
Diaphragm; resection with complex repair (e.g., prosthetic material, local muscle flap) (39561)	295	3/284	1.1%
<b>ESOPHAGOSCOPY (v2.081, v2.2, v2.3)</b>			
Esophagoscopy (43200)	1,150	25/528	4.7%
Esophagoscopy with biopsy (43202)	646	9/108	8.3%
Esophagoscopy with removal of foreign body (43215)	378	13/209	6.2%
Esophagoscopy with insertion of stent (43219)	815	52/512	10.2%
Esophagoscopy with balloon dilation (43220)	704	2/111	1.8%
Esophagoscopy with insertion of guide wire followed by dilation over guide wire (43226)	1,904	10/342	2.9%
Esophagoscopy with ablation of tumor (43228)	379	2/96	2.1%



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<b>ESOPHAGOSCOPY (v2.081, v2.2, v2.3) - continued</b>			
Esophagoscopy with endoscopic ultrasound examination (EUS) (43231)	62	1/5	20.0%
Esophagoscopy with transendoscopic ultrasound-guided fine needle aspiration (43232)	26	0/4	0.0%
Upper gastrointestinal endoscopy, diagnostic (43235)	1,517	22/455	4.8%
Upper gastrointestinal endoscopy with endoscopic ultrasound examination limited to the esophagus (43237)	90	0/3	0.0%
Upper gastrointestinal endoscopy with transendoscopic ultrasound-guided FNA (43238)	43	0/5	0.0%
Upper gastrointestinal endoscopy with biopsy (43239)	2,585	3/136	2.2%
Upper gastrointestinal endoscopy with dilation of gastric outlet for obstruction (43245)	326	4/104	3.8%
Upper gastrointestinal endoscopy with directed placement of percutaneous gastrostomy tube (43246)	636	47/535	8.8%
Upper gastrointestinal endoscopy with removal of foreign body (43247)	314	6/165	3.6%
Upper gastrointestinal endoscopy with insertion of guide wire followed by dilation of esophagus (43248)	3,329	16/528	3.0%
Upper gastrointestinal endoscopy with balloon dilation of esophagus (43249)	726	3/91	3.3%
Upper gastrointestinal endoscopy with transendoscopic stent placement (43256)	627	46/406	11.3%
Upper gastrointestinal endoscopy with ablation of tumor (43258)	360	4/94	4.3%
<b>ESOPHAGUS RESECTION (v2.081, v2.2 and v2.3)</b>			
Transhiatal-Total esophagectomy, without thoracotomy, with cervical esophagogastrostomy (43107)	3,703	105/3,599	2.9%
Three hole-Total esophagectomy with thoracotomy; with cervical esophagogastrostomy (43112)	1,760	78/1,654	4.7%
Ivor Lewis-Partial esophagectomy, distal two-thirds, with thoracotomy and separate abdominal incision (43117)	5,931	211/5,660	3.7%
Thoracoabdominal-Partial esophagectomy, thoracoabdominal approach (43122)	578	19/546	3.5%
Minimally invasive three hole esophagectomy v2.2, v2.3	1,024	31/988	3.1%
Minimally invasive esophagectomy, Ivor Lewis approach	3,767	82/3,690	2.2%
Minimally invasive esophagectomy, Abdominal and neck approach	724	28/665	4.2%
Total esophagectomy without thoracotomy; with colon interposition or small intestine reconstruction (43108)	88	7/88	8.0%



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<b>ESOPHAGUS RESECTION (v2.081, v2.2 and v2.3) - continued</b>			
Total esophagectomy with thoracotomy; with colon interposition or small intestine reconstruction (43113)	83	6/78	7.7%
Partial esophagectomy, cervical, with free intestinal graft, including microvascular anastomosis (43116)	17	2/15	13.3%
Partial esophagectomy, with thoracotomy and separate abdominal incision with colon interposition or small intestine (43118)	86	5/77	6.5%
Partial esophagectomy, distal two-thirds, with thoracotomy only (43121)	130	7/117	6.0%
Partial esophagectomy, thoracoabdominal with colon interposition or small intestine (43123)	89	2/84	2.4%
Total or partial esophagectomy, without reconstruction with cervical esophagostomy (43124)	441	35/408	8.6%
Conduit revision s/p esophagectomy v2.3	72	4/70	5.7%
<b>ESOPHAGUS OTHER PROCEDURES (v2.081, v2.2 and v2.3)</b>			
Cricopharyngeal myotomy (43030)	157	0/119	0.0%
Diverticulectomy of hypopharynx or esophagus, with or without myotomy; cervical approach (43130)	278	6/247	2.4%
Esophagostomy, fistulization of esophagus, external; cervical approach (43352)	104	8/94	8.5%
Closure of esophagostomy or fistula; cervical approach (43420)	62	2/48	4.2%
Excision esophageal lesion with primary repair, cervical approach (43100) v2.2, v2.3	4	0/3	0.0%
Trans oral fundoplication v2.3			
Unlisted laparoscopy, esophagus (43289) v2.2, v2.3	179	2/163	1.2%
Unlisted procedure, esophagus (43499)	1,204	19/959	2.0%
Per oral endoscopic myotomy (POEM) v2.3	457	0/420	0.0%
Laparoscopy, surgical with repair of paraesophageal hernia (fundoplasty) without mesh (43281) v2.2, v2.3	6,908	55/6,086	0.9%
Laparoscopy, surgical with repair of paraesophageal hernia (fundoplasty) with mesh (43282) v2.2, v2.3	3,315	23/2,937	0.8%
Laparoscopy, surgical, esophageal lengthening procedure (Collis) (43283) Secondary Procedure code v2.2, v2.3	20	0/19	0.0%
Laparoscopy, surgical, esophagogastric fundoplasty (e.g., Nissen, Toupet procedures) (43280)	7,246	20/6,323	0.3%



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<b>ESOPHAGUS OTHER PROCEDURES (v2.081, v2.2 and v2.3) - continued</b>			
Laparoscopic esophageal myotomy (Heller Myotomy, with or without fundoplication ) (43279) v2.2, v2.3	3,986	8/3,665	0.2%
Thoracoscopy, surgical; with esophagomyotomy (Heller type) (32665) - v2.081	255	4/225	1.8%
Nissen fundoplasty- laparotomy (includes partial fundoplication/ wrap) (43327) v2.2, v2.3	285	2/260	0.8%
Transthoracic Fundoplication- open thoracotomy (includes Belsey/ Nissen) (43328) v2.2, v2.3	461	5/451	1.1%
Repair, paraesophageal hiatal hernia via laparotomy without mesh (43332) v2.2, v2.3	884	15/872	1.7%
Repair, paraesophageal hiatal hernia via laparotomy with mesh (43333) v2.2, v2.3	199	4/192	2.1%
Repair, paraesophageal hiatal hernia via thoracotomy without mesh (43334) v2.2, v2.3	887	12/876	1.4%
Repair, paraesophageal hiatal hernia via thoracotomy with mesh (43335) v2.2, v2.3	209	1/206	0.5%
Repair, paraesophageal hiatal hernia via thoracoabdominal approach without mesh (43336) v2.2, v2.3	209	1/206	0.5%
Repair, paraesophageal hiatal hernia via thoracoabdominal approach with mesh (43337) v2.2, v2.3	143	4/142	2.8%
Esophageal lengthening procedure - open (Collis) Secondary Procedure code (43338) v2.2, v2.3	60	0/60	0.0%
Diverticulectomy of esophagus, with or without myotomy; thoracic approach (43135)	16	0/15	0.0%
Excision Esophageal lesion with primary repair, thoracic approach (eg: leiomyoma) (43101) v2.2, v2.3	580	9/546	1.6%
Esophagoplasty with repair of TEF, cervical approach (43305) v2.2, v2.3	331	0/318	0.0%
Esophagoplasty with repair TEF, thoracic approach (43312) v2.2, v2.3	58	5/56	8.9%
Esophagomyotomy (Heller type); thoracic approach (43331) v2.2, v2.3	128	6/125	4.8%
Esophagogastric fundoplasty (e.g., Nissen, Belsey IV, Hill procedures) (43324) v2.081	177	2/167	1.2%
Esophagogastric fundoplasty; with gastroplasty (e.g., Collis) (43326) v2.081	694	3/542	0.6%
Esophagomyotomy (Heller type); thoracic approach (43331) v2.081	569	5/513	1.0%
Gastrointestinal reconstruction for previous esophagectomy with stomach (43360)	284	5/239	2.1%
Gastrointestinal reconstruction for previous esophagectomy with colon interposition or small intestine (43361)	231	2/224	0.9%
	230	9/219	4.1%





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<b>ESOPHAGUS OTHER PROCEDURES (v2.081, v2.2 and v2.3) - continued</b>			
Ligation or stapling at gastroesophageal junction for esophageal perforation (43405)	168	14/163	8.6%
Suture of esophageal wound or injury; cervical approach (43410)	189	11/178	6.2%
Suture of esophageal wound or injury; transthoracic or transabdominal approach (43415)	1,060	72/1,000	7.2%
Free jejunum transfer with microvascular anastomosis (43496)	15	0/15	0.0%
Total gastrectomy with esophagoenterostomy (43620)	65	6/58	10.3%
Total gastrectomy with Roux-en-Y reconstruction (43621)	630	12/621	1.9%
<b>CHEST WALL AND NECK (v2.081, v2.2 and v2.3)</b>			
Excision tumor, soft tissue of neck or thorax; subcutaneous (21555)	239	2/71	2.8%
Excision tumor, soft tissue of neck or thorax; deep, subfascial, intramuscular (21556)	401	6/213	2.8%
Excision of rib, partial (21600)	386	5/284	1.8%
Excision first and/or cervical rib (21615)	320	0/231	0.0%
Excision first and/or cervical rib; with sympathectomy (21616)	21	0/19	0.0%
Division of scalenus anticus; without resection of cervical rib (21700)	7	0/6	0.0%
Division of scalenus anticus; with resection of cervical rib (21705)	31	0/28	0.0%
Open treatment of sternum fracture with or without skeletal fixation (21825)	95	0/71	0.0%
Hyoid myotomy and suspension (21685) secondary procedure code	1	0/1	0.0%
Removal of sternal wire(s) v2.3	4	0/2	0.0%
Unlisted procedure, neck or thorax (21899)	2,905	54/1,550	3.5%
Major reconstruction, chest wall (posttraumatic) (32820)	332	2/312	0.6%
Muscle flap, neck (15732)	43	4/36	11.1%
Muscle flap; trunk (i.e., intercostal, pectoralis or serratus muscle) (15734)	412	10/374	2.7%
Excision of chest wall tumor including ribs (19260)	1,081	10/924	1.1%
Excision of chest wall tumor involving ribs, with reconstruction (19271)	1,886	16/1,772	0.9%
Radical resection of tumor (e.g., malignant neoplasm), soft tissue of neck or thorax (21557)	294	8/253	3.2%
Radical resection of sternum (21630)	257	10/238	4.2%
Radical resection of sternum; with mediastinal lymphadenectomy (21632)	42	2/40	5.0%
Reconstructive repair of pectus excavatum or carinatum; open (21740)	853	3/782	0.4%
Reconstructive repair of pectus, minimally invasive approach (Nuss procedure), without thoracoscopy (21742)	125	0/91	0.0%





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<b>CHEST WALL AND NECK (v2.081, v2.2 and v2.3) - continued</b> Reconstructive repair of pectus, minimally invasive approach (Nuss procedure), with thoracoscopy (21743)	857	1/835	0.1%
<b>MISCELLANEOUS (v2.081, v2.2 and v2.3)</b> Thoracoscopy, diagnostic pericardial sac, with biopsy (32604)	88	2/69	2.9%
Thoracoscopy, surgical; with removal of clot or foreign body from pericardial sac (32658)	84	1/71	1.4%
Thoracoscopy, surgical; with creation of pericardial window or partial resection of pericardial sac for drainage (32659)	704	50/593	8.4%
Tube pericardiostomy (33015)	91	8/60	13.3%
Pericardial window (33025)	3,283	284/2,459	11.5%
Thoracoscopy, surgical; with thoracic sympathectomy (32664)	993	1/230	0.4%
Removal substernal thyroid, cervical approach (60271)	107	0/81	0.0%
Application of wound vac (97605, 97606) v2.2, v2.3	26	0/25	0.0%
Stereotactic radiosurgery (SRS) and stereotactic body radiotherapy (SBRT) surgeon participation (32701) v2.2, v2.3			
Other Minor Procedure v2.2, v2.3	39	2/35	5.7%
Thoracoscopy, surgical; with total pericardiectomy (32660)	112	7/104	6.7%
Thoracoscopy, surgical; with excision of pericardial cyst, tumor, or mass (32661)	424	1/378	0.3%
Ligation thoracic duct (38381)	996	17/911	1.9%
Intraoperative jejunostomy (44015)	1,353	91/1,238	7.4%
Omental flap (49904)	67	7/61	11.5%
Transthoracic thyroidectomy (60270)	215	3/197	1.5%
SVC resection and reconstruction (34502)	31	0/27	0.0%
Other	7,389	211/5,499	3.8%
<b>MISSING DATA</b> [Missing data]	3,828	34/1,491	2.3%