**Supplemental Table 2b. Definition of *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) and *International Classification of Diseases, Tenth Revision, Procedure Coding System* (ICD-10-PCS) codes for any complication.**

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| General surgical complications |
| Category  | **Condition**  | **ICD-10-CM code** |
| Cardiovascular  |  |  |
| *Supraventricular Arrhythmia*  |  |  |
|  | Unspecified atrial fibrillation | I48.91 |
|  | Unspecified atrial flutter | I48.92 |
|  | Supraventricular tachycardia | I47.1 |
| *Myocardial Infarction*  |  |  |
|  | ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall | I21.09 |
|  | ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall | I21.19 |
|  | ST elevation (STEMI) myocardial infarction involving other sites | I21.29 |
|  | Other myocardial infarction type | I21.A9 |
|  | Non-ST elevation (NSTEMI) myocardial infarction | I21.4 |
|  | ST elevation (STEMI) myocardial infarction of unspecified site | I21.3 |
|  | Angina pectoris with documented spasm | I20.1 |
|  | Other forms of angina pectoris | I20.8 |
|  | Angina pectoris, unspecified | I20.9 |
|  | Acute coronary thrombosis not resulting in myocardial infarction | I24.0 |
| *Postoperative Stroke* |  |  |
|  | Nontraumatic subarachnoid hemorrhage, unspecified | I60.9 |
|  | Nontraumatic intracerebral hemorrhage, unspecified | I61.9 |
|  | Nontraumatic extradural hemorrhage | I62.1 |
|  | Nontraumatic subdural hemorrhage, unspecified | I62.00 |
|  | Nontraumatic intracranial hemorrhage, unspecified | I62.9 |
|  | Occlusion and stenosis of basilar artery | I65.1 |
|  | Cerebral infarction due to unspecified occlusion or stenosis of basilar artery | I63.22 |
|  | Occlusion and stenosis of unspecified carotid artery | I65.29 |
|  | Cerebral infarction due to embolism of unspecified carotid artery | I63.139 |
|  | Cerebral infarction due to unspecified occlusion or stenosis of unspecified carotid artery | I63.239 |
|  | Occlusion and stenosis of unspecified vertebral artery | I65.09 |
|  | Cerebral infarction due to thrombosis of unspecified vertebral artery | I63.019 |
|  | Cerebral infarction due to embolism of unspecified vertebral artery | I63.119 |
|  | Cerebral infarction due to unspecified occlusion or stenosis of unspecified vertebral artery | I63.219 |
|  | Occlusion and stenosis of other precerebral arteries | I65.8 |
|  | Cerebral infarction due to unspecified occlusion or stenosis of other cerebral artery | I63.59 |
|  | Occlusion and stenosis of unspecified precerebral artery | I65.9 |
|  | Cerebral infarction due to unspecified occlusion or stenosis of unspecified precerebral arteries | I63.20 |
|  | Occlusion and stenosis of unspecified middle cerebral artery | I66.09 |
|  | Occlusion and stenosis of unspecified anterior cerebral artery | I66.19 |
|  | Occlusion and stenosis of unspecified posterior cerebral artery | I66.29 |
|  | Cerebral infarction due to thrombosis of unspecified cerebral artery | I63.30 |
|  | Occlusion and stenosis of unspecified cerebral artery | I66.9 |
|  | Cerebral infarction due to embolism of unspecified cerebral artery | I63.40 |
|  | Cerebral infarction due to unspecified occlusion or stenosis of unspecified cerebral artery | I63.50 |
|  | Vertebro-basilar artery syndrome | G45.0 |
|  | Other transient cerebral ischemic attacks and related syndromes | G45.8 |
|  | Carotid artery syndrome (hemispheric) | G45.1 |
|  | Transient cerebral ischemic attack, unspecified | G45.9 |
|  | Other cerebrovascular vasospasm and vasoconstriction | I67.848 |
|  | Family history of stroke | Z82.3 |
|  | Intraoperative cerebrovascular infarction, during other surgery | I97.811 |
|  | Postprocedural cerebrovascular infarction, following other surgery | I97.821 |
|  | Personal history of transient ischemic attack (TIA), and cerebral infarction without residual deficits | Z86.73 |
| *Deep venous thrombosis*  |  |  |
|  | Phlebitis and thrombophlebitis of unspecified iliac vein | I80.219 |
|  | Acute embolism and thrombosis of unspecified deep veins of unspecified lower extremity | I82.409 |
|  | Acute embolism and thrombosis of unspecified deep veins of unspecified proximal lower extremity | I82.4Y9 |
|  | Acute embolism and thrombosis of unspecified iliac vein | I82.429 |
|  | Acute embolism and thrombosis of unspecified popliteal vein | I82.439 |
|  | Acute embolism and thrombosis of unspecified tibial vein | I82.449 |
|  | Acute embolism and thrombosis of other specified deep vein of unspecified lower extremity | I82.499 |
|  | Acute embolism and thrombosis of unspecified deep veins of unspecified distal lower | I82.4Z9 |
|  | Phlebitis and thrombophlebitis of unspecified femoral vein | I80.10 |
|  | Phlebitis and thrombophlebitis of unspecified deep vessels of unspecified lower extremity | I80.209 |
|  | Phlebitis and thrombophlebitis of lower extremities, unspecified | I80.3 |
|  | Phlebitis and thrombophlebitis of unspecified site | I80.9 |
|  | Acute embolism and thrombosis of inferior vena cava | I82.220 |
|  | Chronic embolism and thrombosis of inferior vena cava | I82.221 |
|  | Acute embolism and thrombosis of superficial veins of unspecified upper extremity | I82.619 |
|  | Acute embolism and thrombosis of deep veins of unspecified upper extremity | I82.629 |
|  | Acute embolism and thrombosis of unspecified veins of unspecified upper extremity | I82.609 |
|  | Acute embolism and thrombosis of unspecified axillary vein | I82.A19 |
|  | Acute embolism and thrombosis of unspecified subclavian vein | I82.B19 |
|  | Acute embolism and thrombosis of unspecified internal jugular vein | I82.C19 |
|  | Acute embolism and thrombosis of other thoracic veins | I82.290 |
|  | Acute embolism and thrombosis of other specified veins | I82.890 |
|  | Chronic embolism and thrombosis of unspecified vein | I82.91 |
| *Pulmonary Embolism* |  |  |
|  | Septic pulmonary embolism without acute cor pulmonale | I26.90 |
|  | Other pulmonary embolism without acute cor pulmonale | I26.99 |
|  | Air embolism following infusion, transfusion and therapeutic injection, initial encounter | T80.0XXA |
|  | Complication of other artery following a procedure, not elsewhere classified, initial encounter | T81.718A |
|  | Complication of vein following a procedure, not elsewhere classified, initial encounter | T81.72XA |
|  | Embolism due to cardiac prosthetic devices, implants and grafts, initial encounter | T82.817A |
|  | Embolism due to vascular prosthetic devices, implants and grafts, initial encounter | T82.818A |
|  | Saddle embolus of pulmonary artery without acute cor pulmonale | I26.92 |
| Pulmonary |  |  |
| *Pneumonia* |  |  |
|  | Pneumonia, unspecified organism | J18.9 |
|  | Lobar pneumonia, unspecified organism | J18.1 |
|  | Pneumonia due to Streptococcus pneumoniae | J13 |
|  | Pneumonia due to other specified bacteria | J15.8 |
|  | Pneumonia due to Escherichia coli | J15.5 |
|  | Pneumonia due to other Gram-negative bacteria | J15.6 |
|  | Legionnaires' disease | A48.1 |
|  | Pneumonia due to other streptococci | J15.4 |
|  | Pneumonia due to streptococcus, group B | J15.3 |
|  | Unspecified bacterial pneumonia | J15.9 |
|  | Pneumonia due to Klebsiella pneumoniae | J15.0 |
|  | Pneumonia due to Pseudomonas | J15.1 |
|  | Pneumonia due to Hemophilus influenzae | J14 |
|  | Pneumonia due to Methicillin susceptible Staphylococcus aureus | J15.211 |
|  | Pneumonia due to other staphylococcus | J15.29 |
|  | Ventilator associated pneumonia | J95.851 |
| *Postoperative Acute Respiratory Insufficiency* |  |  |
|  | Acute postprocedural respiratory failure | J95.821 |
|  | Acute respiratory failure, unspecified whether with hypoxia or hypercapnia | J96.00 |
|  | Acute pulmonary insufficiency following thoracic surgery | J95.1 |
|  | Acute pulmonary insufficiency following nonthoracic surgery | J95.2 |
|  | Chronic pulmonary insufficiency following surgery | J95.3 |
|  | Acute and chronic postprocedural respiratory failure | J95.822 |
|  | Acute and chronic respiratory failure, unspecified whether with hypoxia or hypercapnia | J96.20 |
| *Postoperative Acute Pneumothorax* |  |  |
|  | Postprocedural pneumothorax | J95.811 |
| *Postoperative Pulmonary Edema* |  |  |
|  | Acute pulmonary edema | J81.0 |
| *Pulmonary Collapse* |  |  |
|  | Atelectasis | J98.11 |
|  |  Other pulmonary collapse | J98.19 |
| *Empyema With and Without Fistula* |  |  |
|  | Pyothorax with fistula | J86.0 |
|  | Pyothorax without fistula | J86.9 |
| *Mechanical Ventilation* |  |  |
|  | Respiratory Ventilation, Less than 24 Consecutive Hours | 5A1935Z |
|  | Respiratory Ventilation, 24-96 Consecutive Hours | 5A1945Z |
|  | Respiratory Ventilation, Greater than 96 Consecutive Hours | 5A1955Z |
| *Noninvasive Ventilation* |  |  |
|  | Assistance with Respiratory Ventilation, Less than 24 Consecutive Hours, Continuous Positive Airway Pressure | 5A09357 |
|  | Assistance with Respiratory Ventilation, 24-96 Consecutive Hours, Continuous Positive Airway | 5A09457 |
|  | Assistance with Respiratory Ventilation, Greater than 96 Consecutive Hours, Continuous Positive Airway Pressure | 5A09557 |
| *Tracheostomy* |  |  |
|  | Bypass Trachea to Cutaneous with Tracheostomy Device, Open Approach | 0B110F4 |
|  | Bypass Trachea to Cutaneous, Open Approach | 0B110Z4 |
|  | Bypass Trachea to Cutaneous with Tracheostomy Device, Percutaneous Approach | 0B113F4 |
|  | Bypass Trachea to Cutaneous, Percutaneous Approach | 0B113Z4 |
|  | Bypass Trachea to Cutaneous with Tracheostomy Device, Percutaneous Endoscopic Approach | 0B114F4 |
|  | Bypass Trachea to Cutaneous, Percutaneous Endoscopic Approach | 0B114Z4 |
| Infectious  |  |  |
| *Sepsis/Shock* |  |  |
|  | Streptococcal sepsis, unspecified | A40.9 |
|  | Sepsis due to unspecified staphylococcus | A41.2 |
|  | Sepsis due to Methicillin susceptible Staphylococcus aureus | A41.01 |
|  | Sepsis due to Methicillin resistant Staphylococcus aureus | A41.02 |
|  | Sepsis due to other specified staphylococcus | A41.1 |
|  | Sepsis due to Streptococcus pneumoniae | A40.3 |
|  | Sepsis due to anaerobes | A41.4 |
|  | Gram-negative sepsis, unspecified | A41.50 |
|  | Sepsis due to Hemophilus influenzae | A41.3 |
|  | Sepsis due to Escherichia coli [E. coli] | A41.51 |
|  | Sepsis due to Pseudomonas | A41.52 |
|  | Sepsis due to Serratia | A41.53 |
|  | Other Gram-negative sepsis | A41.59 |
|  | Other specified sepsis | A41.89 |
|  | Sepsis, unspecified organism | A41.9 |
|  | Unspecified infection due to central venous catheter, initial encounter | T80.219A |
|  | Bloodstream infection due to central venous catheter, initial encounter | T80.211A |
|  | Local infection due to central venous catheter, initial encounter | T80.212A |
|  | Acute infection following transfusion, infusion, or injection of blood and blood products, initial encounter | T80.22XA |
|  | Infection following other infusion, transfusion and therapeutic injection, initial encounter | T80.29XA |
|  | Postprocedural shock unspecified, initial encounter | T81.10XA |
|  | Postprocedural cardiogenic shock, initial encounter | T81.11XA |
|  | Postprocedural septic shock, initial encounter | T81.12XA |
|  | Other postprocedural shock, initial encounter | T81.19XA |
|  | Severe sepsis, without septic shock | R65.20 |
| *Urinary Tract Infection* |  |  |
|  | Urinary tract infection, site not specified | N39.0 |
|  | Renal tubulo-interstitial disease, unspecified | N15.9 |
| *Wound infection* |  |  |
|  | Postprocedural retroperitoneal abscess | K68.11 |
| Gastrointestinal Complication |  |  |
| *Digestive System Complication* |  |  |
|  | Retained cholelithiasis following cholecystectomy | K91.86 |
|  | Postprocedural intestinal obstruction, unspecified as to partial versus complete | K91.30 |
|  | Postprocedural partial intestinal obstruction | K91.31 |
|  | Postprocedural complete intestinal obstruction | K91.32 |
|  | Other intraoperative complications of digestive system | K91.81 |
|  | Postprocedural hepatic failure | K91.82 |
|  | Postprocedural hepatorenal syndrome | K91.83 |
|  | Other postprocedural complications and disorders of digestive system | K91.89 |
| Intraoperative Complications |  |  |
| *Accidental Puncture or Laceration, Complicating Surgery* |  |  |
|  | Accidental puncture and laceration of the spleen during a procedure on the spleen | D78.11 |
|  | Accidental puncture and laceration of the spleen during other procedure | D78.12 |
|  | Accidental puncture and laceration of an endocrine system organ or structure during an endocrine system procedure | E36.11 |
|  | Accidental puncture and laceration of an endocrine system organ or structure during other procedure | E36.12 |
|  | Accidental puncture and laceration of other nervous system organ or structure during a nervous system procedure | G97.48 |
|  | Accidental puncture and laceration of unspecified eye and adnexa during an ophthalmic procedure | H59.219 |
|  | Accidental puncture and laceration of unspecified eye and adnexa during other procedure | H59.229 |
|  | Accidental puncture and laceration of the ear and mastoid process during a procedure on the ear and mastoid process | H95.31 |
|  | Accidental puncture and laceration of the ear and mastoid process during other procedure | H95.32 |
|  | Accidental puncture and laceration of a circulatory system organ or structure during a circulatory system procedure | I97.51 |
|  | Accidental puncture and laceration of a circulatory system organ or structure during other procedure | I97.52 |
|  | Accidental puncture and laceration of a respiratory system organ or structure during a respiratory system procedure | J95.71 |
|  | Accidental puncture and laceration of a respiratory system organ or structure during other procedure | J95.72 |
|  | Accidental puncture and laceration of a digestive system organ or structure during a digestive system procedure | K91.71 |
|  | Accidental puncture and laceration of a digestive system organ or structure during other procedure | K91.72 |
|  | Accidental puncture and laceration of skin and subcutaneous tissue during a dermatologic procedure | L76.11 |
|  | Accidental puncture and laceration of skin and subcutaneous tissue during a dermatologic procedure | L76.12 |
|  | Accidental puncture and laceration of a musculoskeletal structure during a musculoskeletal system procedure | M96.820 |
|  | Accidental puncture and laceration of a musculoskeletal structure during other procedure | M96.821 |
|  | Accidental puncture and laceration of a genitourinary system organ or structure during a genitourinary system procedure | N99.71 |
|  | Accidental puncture and laceration of a genitourinary system organ or structure during other procedure | N99.72 |
|  | Other specified complications of surgical and medical care, not elsewhere classified, initial encounter | T88.8XXA |
| *Bleeding Complication Procedure* |  |  |
|  | Intraoperative hemorrhage and hematoma of the spleen complicating a procedure on the spleen | D78.01 |
|  | Intraoperative hemorrhage and hematoma of the spleen complicating other procedure | D78.02 |
|  | Postprocedural hemorrhage of the spleen following a procedure on the spleen | D78.21 |
|  | Postprocedural hemorrhage of the spleen following other procedure | D78.22 |
|  | Intraoperative hemorrhage and hematoma of an endocrine system organ or structure complicating an endocrine system procedure | E36.01 |
|  | Intraoperative hemorrhage and hematoma of an endocrine system organ or structure complicating other procedure | E36.02 |
|  | Postprocedural hemorrhage of an endocrine system organ or structure following an endocrine system procedure | E89.810 |
|  | Postprocedural hemorrhage of an endocrine system organ or structure following other procedure | E89.811 |
|  | Intraoperative hemorrhage and hematoma of a nervous system organ or structure complicating a nervous system procedure | G97.31 |
|  | Intraoperative hemorrhage and hematoma of a nervous system organ or structure complicating other procedure | G97.32 |
|  | Intraoperative hemorrhage and hematoma of right eye and adnexa complicating an ophthalmic procedure | H59.111 |
|  | Intraoperative hemorrhage and hematoma of left eye and adnexa complicating an ophthalmic procedure | H59.112 |
|  | Intraoperative hemorrhage and hematoma of eye and adnexa complicating an ophthalmic procedure, bilateral | H59.113 |
|  | Intraoperative hemorrhage and hematoma of unspecified eye and adnexa complicating an ophthalmic procedure | H59.119 |
|  | Intraoperative hemorrhage and hematoma of right eye and adnexa complicating other procedure | H59.121 |
|  | Intraoperative hemorrhage and hematoma of left eye and adnexa complicating other procedure | H59.122 |
|  | Postprocedural hemorrhage of right eye and adnexa following an ophthalmic procedure | H59.311 |
|  | Postprocedural hemorrhage of left eye and adnexa following an ophthalmic procedure | H59.312 |
|  | Postprocedural hemorrhage of eye and adnexa following an ophthalmic procedure, bilateral | H59.313 |
|  | Postprocedural hemorrhage of unspecified eye and adnexa following an ophthalmic procedure | H59.319 |
|  | Postprocedural hemorrhage of right eye and adnexa following other procedure | H59.321 |
|  | Postprocedural hemorrhage of left eye and adnexa following other procedure | H59.322 |
|  | Postprocedural hemorrhage of eye and adnexa following other procedure, bilateral | H59.323 |
|  | Postprocedural hemorrhage of unspecified eye and adnexa following other procedure | H59.329 |
|  | Intraoperative hemorrhage and hematoma of ear and mastoid process complicating a procedure on the ear and mastoid process | H95.21 |
|  | Intraoperative hemorrhage and hematoma of ear and mastoid process complicating other procedure | H95.22 |
|  | Postprocedural hemorrhage of ear and mastoid process following a procedure on the ear and mastoid process | H95.41 |
|  | Postprocedural hemorrhage of ear and mastoid process following other procedure | H95.42 |
|  |  Intraoperative hemorrhage and hematoma of a circulatory system organ or structure complicating a cardiac catheterization | I97.410 |
|  | Intraoperative hemorrhage and hematoma of a circulatory system organ or structure complicating a cardiac bypass | I97.411 |
|  | Intraoperative hemorrhage and hematoma of a circulatory system organ or structure complicating other circulatory system procedure | I97.418 |
|  | Intraoperative hemorrhage and hematoma of a circulatory system organ or structure complicating other procedure | I97.42 |
|  | Postprocedural hemorrhage of a circulatory system organ or structure following a cardiac catheterization | I97.610 |
|  | Postprocedural hemorrhage of a circulatory system organ or structure following cardiac bypass | I97.611 |
|  |  Postprocedural hemorrhage of a circulatory system organ or structure following other circulatory system procedure | I97.618 |
|  | Postprocedural hemorrhage of a circulatory system organ or structure following other procedure | I97.620 |
|  | Intraoperative hemorrhage and hematoma of a respiratory system organ or structure complicating a respiratory system procedure | J95.61 |
|  | Intraoperative hemorrhage and hematoma of a respiratory system organ or structure complicating other procedure | J95.62 |
|  | Postprocedural hemorrhage of a respiratory system organ or structure following a respiratory system procedure | J95.830 |
|  | Postprocedural hemorrhage of a respiratory system organ or structure following other procedure | J95.831 |
|  | Intraoperative hemorrhage and hematoma of a digestive system organ or structure complicating a digestive system procedure | K91.61 |
|  | Intraoperative hemorrhage and hematoma of a digestive system organ or structure complicating other procedure | K91.62 |
|  | Postprocedural hemorrhage of a digestive system organ or structure following a digestive system procedure | K91.840 |
|  | Postprocedural hemorrhage of a digestive system organ or structure following other procedure | K91.841 |
|  | Intraoperative hemorrhage and hematoma of skin and subcutaneous tissue complicating a dermatologic procedure | L76.01 |
|  | Intraoperative hemorrhage and hematoma of skin and subcutaneous tissue complicating other procedure | L76.02 |
|  | Postprocedural hemorrhage of skin and subcutaneous tissue following a dermatologic procedure | L76.21 |
|  | Postprocedural hemorrhage of skin and subcutaneous tissue following other procedure | L76.22 |
|  | Intraoperative hemorrhage and hematoma of a musculoskeletal structure complicating a musculoskeletal system procedure | M96.810 |
|  | Intraoperative hemorrhage and hematoma of a musculoskeletal structure complicating other procedure | M96.811 |
|  | Postprocedural hemorrhage of a musculoskeletal structure following a musculoskeletal system procedure | M96.830 |
|  | Postprocedural hemorrhage of a musculoskeletal structure following other procedure | M96.831 |
|  | Intraoperative hemorrhage and hematoma of a genitourinary system organ or structure complicating a genitourinary system procedure | N99.61 |
|  | Intraoperative hemorrhage and hematoma of a genitourinary system organ or structure complicating other procedure | N99.62 |
|  | Postprocedural hemorrhage of a genitourinary system organ or structure following a genitourinary system procedure | N99.820 |
|  | Postprocedural hemorrhage of a genitourinary system organ or structure following other procedure | N99.821 |
|  |  |  |