

Supplementary Table 1: Definitions of PTCs, as defined by the TQIP database user manual and National Trauma Dataset (NTDS) standards. As definitions varied slightly over the investigative timeframe, we include definitions for 2007 and 2017 for comparative purposes. CHF: Chronic Heart Failure, HR: Heart Rate, RR: Respiratory Rate, WBC: White blood cell count

* The 2007 NTDS standard replaced with 2015 NTDS standard, as 2007 definitions are not available online.

Hospital Complication	Definition 2007	Definition 2017
Acute renal failure	Creatine ≥ 3.5 mg/dl or BUN ≥ 100 mg/dl	SCr) 3 times baseline OR Increase in SCr to ≥ 4.0 mg/dl (≥ 353.6 $\mu\text{mol/l}$) OR Initiation of renal replacement therapy OR , In patients < 18 years, decrease in eGFR to <35 ml/min per 1.73 m ² OR Urine output <0.3 ml/kg/h for > 24 hours OR Anuria for > 12 hours
ARDS (Acute Respiratory Distress Syndrome)	PaO ₂ /fI _O ₂ ≥ 200 , decreased compliance, diffuse pulmonary infiltrates associated with normal capillary wedge pressure in an appropriate setting. "Decreased compliance" is defined as abnormal per criteria established by institution.	Timing: Within 1 week of known clinical insult or new or worsening respiratory symptoms. Chest imaging: Bilateral opacities – not fully explained by effusions, lobar/lung collapse, or nodules Origin of edema: Respiratory failure not fully explained by cardiac failure of fluid overload. Need objective assessment (e.g., echocardiography) to exclude hydrostatic edema if no risk factor present Oxygenation: (at a minimum) 200 < PaO ₂ /FiO ₂ ≤ 300 With PEEP or CPAP ≥ 5 cmH ₂ O
Cardiac arrest with CPR	Sudden cessation of cardiac activity <i>after arrival</i> in ED, resulting in deprivation of sufficient oxygen to maintain viability of heart and brain.	Cardiac arrest is the sudden cessation of cardiac activity after hospital arrival. The patient becomes unresponsive with no normal breathing and no signs of circulation.

		<p>If corrective measures are not taken rapidly, this condition progresses to sudden death. Cardiac Arrest must be documented in the patient's medical record, and must have occurred during the patient's initial stay at your hospital.</p> <p>EXCLUDE patients who are receiving CPR on arrival to your hospital.</p> <p>INCLUDE patients who have had an episode of cardiac arrest evaluated by hospital personnel, and received compressions or defibrillation or cardioversion or cardiac pacing to restore circulation.</p>
<p>Deep surgical site infection*</p>	<p>A deep incisional SSI must meet one of the following criteria:</p> <p>Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure and involves deep soft tissues (e.g., fascial and muscle layers) of the incision; AND patient has at least one of the following:</p> <ul style="list-style-type: none"> • Purulent drainage from the deep incision but not from the organ/space component of the surgical site of the following: • A deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured when the patient has at least one of the following signs or symptoms: fever (>38C,) or localized pain or tenderness. A culture negative finding does not meet this criterion. • An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination. • Diagnosis of a deep incisional SSI by a surgeon or attending physician. NOTE: There are two specific types of deep incisional SSIs: <ul style="list-style-type: none"> • Deep Incisional Primary (DIP): a deep incisional SSI that is identified in a primary incision in 	<p>Infection occurs within 30 or 90 days after the NHSN operative procedure (where day 1 = the procedure date) According to list in Table 2</p> <p>AND involves deep soft tissues of the incision (e.g., fascial and muscle layers)</p> <p>AND patient has at least one of the following:</p> <ol style="list-style-type: none"> a. purulent drainage from the deep incision. b. a deep incision that spontaneously dehisces, or is deliberately opened or aspirated by a surgeon, attending physician** or other designee and organism is identified by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment (e.g., not Active Surveillance Culture/Testing (ASC/AST) or culture or non-culture based microbiologic testing method is not performed <p>AND patient has at least one of the following signs or symptoms: fever (>38°C); localized pain or tenderness. A culture or non-culture based test that has a negative finding</p>

	<p>a patient that has had an operation with one or more incisions (e.g., C- section incision or chest incision for CBGB)</p> <ul style="list-style-type: none"> • Deep Incisional Secondary (DIS): a deep incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision (e.g., donor site [leg] incision for CBGB.) 	
Deep Vein Thrombosis (DVT)/thrombophlebitis:	Venous thrombosis proximal to or involving popliteal vein confirmed by autopsy, venogram, duplex scan or non-invasive vascular evaluation.	The formation, development, or existence of a blood clot or thrombus within the vascular system, which may be coupled with inflammation. The patient must be treated with anticoagulation therapy and/or placement of a vena cava filter or clipping of the vena cava. A diagnosis of DVT must be documented in the patient's medical record. This diagnosis may be confirmed by a venogram, ultrasound, or CT, and must have occurred during the patient's initial stay at your hospital.
Myocardial infarction	Acute, irreversible myocardial injury and necrosis documented by increased CK-MB isoenzyme and serial T wave, S-T segment; or Q wave ECG changes; or a diagnostic radionuclide scan.	<p>An acute myocardial infarction must be noted with documentation of any of the following:</p> <p>Documentation of ECG changes indicative of acute MI (one or more of the following three):</p> <ol style="list-style-type: none"> 1. ST elevation >1 mm in two or more contiguous leads 2. New left bundle branch block 3. New q-wave in two or more contiguous leads <p>OR</p> <p>New elevation in troponin greater than three times upper level of the reference range in the setting of suspected myocardial ischemia</p> <p>OR</p> <p>Physician diagnosis of myocardial infarction</p> <p>Must have occurred during the patient's initial stay at your hospital.</p>

Organ/space surgical site infection (SSI)*	<p>An infection that occurs within 30 days after an operation and infection involves any part of the anatomy (e.g., organs or spaces) other than the incision, which was opened or manipulated during a procedure; and at least one of the following, including:</p> <p>Purulent drainage from a drain that is placed through a stab wound or puncture into the organ/space.</p> <ul style="list-style-type: none"> ○ Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space. ○ An abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination ○ Diagnosis of an organ/space SSI by a surgeon or attending physician 	<p>Infection occurs within 30 or 90 days after the NHSN operative procedure (where day 1 = the procedure date) according to the list in Table 2</p> <p>AND</p> <p>infection involves any part of the body deeper than the fascial/muscle layers, that is opened or manipulated during the operative procedure</p> <p>AND</p> <p>patient has at least one of the following:</p> <ol style="list-style-type: none"> a. purulent drainage from a drain that is placed into the organ/space (e.g., closed suction drainage system, open drain, T-tube drain, CT guided drainage) b. organisms are identified from an aseptically-obtained fluid or tissue in the organ/space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment (e.g., not Active Surveillance Culture/Testing (ASC/AST). c. an abscess or other evidence of infection involving the organ/space that is detected on gross anatomical or histopathologic exam, or imaging test <p>AND</p> <p>meets at least one criterion for a specific organ/space infection site listed in Table 3. These criteria are found in the Surveillance Definitions for Specific Types of Infections chapter.</p>
Pneumonia	<p>Presence of fever, leukocytosis, gram stain of sputum with a predominant organism and white blood cells, chest radiograph with a pneumonic infiltrate and culture of sputum demonstrating a pathogen.</p>	Retired
Pulmonary embolism	<p>Embolus to the lungs documented by arteriography, nuclear scan or autopsy</p>	<p>A lodging of a blood clot in a pulmonary artery with subsequent obstruction of blood supply to the lung parenchyma. The blood clots usually originate from the deep leg veins or the pelvic venous system. Consider the condition present if the patient has a V-Q scan interpreted as high probability of pulmonary embolism or a positive pulmonary arteriogram or positive CT angiogram and/or a diagnosis of PE is documented in the patient's</p>

		medical record. Must have occurred during the patient's initial stay at your hospital.
Stroke/CVA	Following injury, patient develops an embolic, thrombotic, or hemorrhagic vascular accident or stroke with motor, sensory, or cognitive dysfunction (e.g., hemiplegia, hemiparesis, aphasia, sensory deficit, impaired memory) that persists for 24 or more hours.	<p>A focal or global neurological deficit of rapid onset and NOT present on admission. The patient must have at least one of the following symptoms:</p> <ul style="list-style-type: none"> • Change in level of consciousness • Hemiplegia • Hemiparesis • Numbness or sensory loss affecting on side of the body • Dysphasia or aphasia • Hemianopia • Amaurosis fugax • Other neurological signs or symptoms consistent with stroke <p>AND: Duration of neurological deficit ≥ 24 h</p> <ul style="list-style-type: none"> • OR: Duration of deficit < 24 h, if neuroimaging (MR, CT, or cerebral angiography) documents a new hemorrhage or infarct consistent with stroke, or therapeutic intervention(s) were performed for stroke, or the neurological deficit results in death <p>AND: No other readily identifiable non-stroke cause, e.g., progression of existing traumatic brain injury, seizure, tumor, metabolic or pharmacologic etiologies, is identified</p> <p>AND: Diagnosis is confirmed by neurology or neurosurgical specialist or neuroimaging procedure (MR, CT, angiography,) or lumbar puncture (CSF demonstrating intracranial hemorrhage that was not present on admission.)</p>
Superficial surgical site infection	Drainage of purulent material from wound or active treatment of the wound, including opening a closed wound or antibiotics for the wound.	Infection occurs within 30 days after any NHSN operative procedure (where day 1 = the procedure date) AND involves only skin and subcutaneous

		<p>tissue of the incision AND patient has at least <i>one</i> of the following:</p> <ol style="list-style-type: none"> purulent drainage from the superficial incision. organisms identified from an aseptically-obtained specimen from the superficial incision or subcutaneous tissue by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment (e.g., not Active Surveillance Culture/Testing (ASC/AST)). superficial incision that is deliberately opened by a surgeon, attending physician** or other designee and culture or non-culture based testing is not performed. <p>AND patient has at least <i>one</i> of the following signs or symptoms: pain or tenderness; localized swelling; erythema; or heat. A culture or non-culture based test that has a negative finding does not meet this criterion.</p> <ol style="list-style-type: none"> diagnosis of a superficial incisional SSI by the surgeon or attending physician** or other designee.
<p>Systemic sepsis:</p>	<p>Sepsis and/or Severe Sepsis defined as an obvious source of infection with bacteremia and two or more of the following:</p> <ul style="list-style-type: none"> Temp >38 C or <36 C WBC count >12,000/mm, or >20%immature (source of infection) Hypotension – (Severe Sepsis) Evidence of hypo perfusion: (Severe Sepsis) Anion gap or lactic acidosis or Oliguria, or Altered mental status. <p>medical record, and must have occurred during the patient’s initial stay at your hospital.</p>	<p>(Consistent with the American College of Chest Physicians and the Society of Critical Care Medicine October 2010. Always use the most recent definition provided by the American College of Chest Physicians and the Society of Critical Care Medicine.)</p> <p>Severe sepsis: sepsis plus organ dysfunction, hypotension (low blood pressure), or hypoperfusion (insufficient blood flow) to 1 or more organs.</p> <p>Septic shock: sepsis with persisting arterial hypotension or hypoperfusion despite adequate fluid resuscitation.</p> <p>A diagnosis of Sepsis must be documented in the patient's medical record, and must have occurred during the patient’s initial stay at</p>

your hospital.

Supplementary Table 2: Overview of missing data. Individual complications had similar percentages of missing data, owing to the TQIP 2007-2016 data structure. Here, complications were recorded as entries in a separate table. In the case of missing data, it was thus not possible to determine which (if any) complication recording was missing, and all complications were thus recorded missing.

Variable	Missing data (%)
Age	0.70
Gender	0.35
Glasgow Coma Score (GCS)	0.61
Injury Severity Score (ISS)	0.04
Acute renal failure	5.8
ARDS	5.8
Cardiac arrest with CPR	5.8
Deep SSI	5.8
DVT/ thrombophlebitis	5.8
Myocardial infarction	5.8
Organ/space SSI	5.8
Pneumonia	5.8
PE	5.8
Stroke / CVA	5.8
Superficial SSI	5.8
Systemic sepsis	5.8

Supplementary Table 3: Sensitivity analyses of the regression models on the imputed dataset. The corrected model was adjusted for age, gender, Glasgow Coma Score and Injury Severity Score.

	Corrected Model			Univariate Model		
	OR	95% CI	p Value	OR	95% CI	p Value
Acute renal failure	0.73	0.72-0.73	<0.01	0.73	0.72-0.73	<0.01
ARDS	0.71	0.70-0.71	<0.01	0.70	0.71	<0.01
Cardiac Arrest with CPR	0.74	0.74-0.75	<0.01	0.74	0.74-0.75	<0.01
Deep SSI	1.02	1.01-1.02	<0.01	1.02	1.01-1.02	<0.01
DVT/Thrombophlebitis	1.01	1.00-1.01	<0.01	1.01	1.00-1.01	<0.01
Myocardial infarction	0.70	0.70-0.71	<0.01	0.71	0.70-0.71	<0.01
Organ/Space SSI	0.71	0.70-0.71	<0.01	0.71	0.70-0.71	<0.01
Pneumonia	0.78	0.78-0.79	<0.01	0.77	0.77-0.78	<0.01
Pulmonary embolism	0.71	0.70-0.71	<0.01	0.70	0.70-0.71	<0.01
Stroke/CVA	1.03	1.03-1.04	<0.01	1.03	1.03-1.03	<0.01
Superficial SSI	0.72	0.71-0.72	<0.01	0.72	0.70-0.71	<0.01
Systemic sepsis	0.81	0.80-0.81	<0.01	0.81	0.80-0.81	<0.01

