Endpoint definitions:

Table 1: All-cause mortality

Endpoint	Definition	Excluded	Additionally reported	Limitation and comments	Ref.
All-cause mortality	Death within 30 days of surgery		1-year mortality 2-year mortality		¹ STeP mortality

Table 2: Postoperative pulmonary complications

Endpoint	Definition	Excluded	Limitation and comments	Ref.
Respiratory	Postoperative PaO2 < 8 kPa (60 mmHg)		EPCO definition	EPCO definition ²
Respiratory failure	Postoperative PaO2 < 8 kPa (60 mmHg) on room air, a PaO2:FIO2 ratio <40 kPa (300 mmHg) or arterial oxyhaemoglobin saturation measured with pulse oximetry < 90% and requiring oxygen therapy or 5L O2/min oxygen therapy when arterial saturation or peripheral saturation on room air is not available OR Need for mechanical ventilation >24h postoperative* Postoperative oxygen supplementation via a nasal cannula on the day of surgery is seen as common practice and therefore not registered as postoperative respiratory failure. Persistent oxygen supplementation on postoperative day 1 will be registered		EPCO definition of respiratory failure (as defined under postoperative pulmonary complications) complemented with *	EPCO definition ²
	as respiratory failure if fulfilling the above stated criteria.			

Table 3: Causes of severe respiratory failure

Causes of severe respiratory failure		ref
ARDS	Berlin definition for ARDS	Berlin definition for ARDS ³
Pleural effusion	Chest radiograph demonstrating blunting of the costophrenic angle, loss of sharp silhouette of the ipsilateral hemidiaphragm in upright position, evidence of displacement of adjacent anatomical structures or (in supine position) a hazy opacity in one hemithorax with preserved vascular shadows	EPCO ²
Pneumothorax	Air in the pleural space with no vascular bed surrounding the visceral pleura	EPCO ²

Atelectasis	Lung opacification with a shift of the mediastinum, hilum or hemidiaphragm toward the affected area, and compensatory over-inflation in the adjacent non-atelectatic lung	EPCO ²
Respiratory infection	See table 7	StEP Infection and sepsis ⁴
Aspiration pneumonitis	Acute lung injury after the inhalation of regurgitated gastric contents	EPCO ²
Bronchospasm	Newly detected expiratory wheezing treated with bronchodilators	EPCO ²
Cardiopulmonary edema	An elevated jugular venous pressure, respiratory rales/crackles and crepitations, presence of S3 and at least one of the following radiographic findings: (a) Vascular redistribution (b) Interstitial pulmonary oedema (c) Frank alveolar pulmonary oedema AND NT-proBNP >300 pg/ml	Designation trial ⁵
Pulmonary embolism	A clinical diagnosis of PE confirmed by helical CT- scan	STeP cardiovascular ⁶
Unknown		

Table 4: Postoperative cardiovascular complications

Endpoint	Definition	Excluded	Limitation	Ref.
MACE	Composite outcome including: - Cardiac death - Non-fatal cardiac arrest - Coronary revascularization - Myocardial infarction	 Pulmonary embolism Hemorrhage Deep venous thrombosis All-cause mortality 		STeP cardiovascular ⁶
Cardiac death	Death with a vascular cause and included those deaths after a myocardial infarction, cardiac arrest, and cardiac revascularization procedure.	 Death after pulmonary embolism Death after hemorrhage Multi-organ failure Cause of death unknown 		STeP cardiovascular ⁶
Non-fatal cardiac arrest	Successful resuscitation from either documented or presumed ventricular fibrillation, sustained ventricular tachycardia, asystole, or pulseless electrical activity requiring cardiopulmonary resuscitation, pharmacological therapy, or cardiac defibrillation			STeP cardiovascular ⁶
Coronary revascularizati on	Percutaneous coronary intervention or coronary artery bypass graft surgery within 30 days of the index surgery.			STeP cardiovascular ⁶
Myocardial infarction in noncardiac surgery	Acute myocardial injury with clinical evidence of acute myocardial ischaemia and with detection of an increase or decrease in cTn values with at least one value above the 99th percentile URL and at least one of the following:		No routine ECG after noncardiac surgery	STeP cardiovascular and 4 th universal definition of myocardial infarction ^{6,7}

	 Symptoms of myocardial ischaemia New ischaemic ECG changes Development of pathological Q waves Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality in a pattern consistent with an ischaemic aetiology Identification of a coronary thrombus by angiography or autopsy Post-mortem demonstration of acute atherothrombosis in the artery supplying the infarcted myocardium Cardiac death in patients with symptoms suggestive of myocardial ischaemia and presumed new ischaemic ECG changes before cTn values become available. 		
Acute myocardial infarction in cardiac surgery	Elevation of cTn values > 10 times the 99th percentile URL in patients with normal baseline cTn values. In patients with elevated pre- procedure cTn in whom cTn levels are stable ($\leq 20\%$ variation) or falling, the postprocedure cTn must rise by > 20%. However, the absolute postprocedural value still must be > 10 times the 99th percentile URL. In		4 th universal definition of myocardial infarction ⁷

	addition, one of the following elements is required: 1. Development of new pathological Q waves;* 2. Angiographic documented new graft occlusion or new native coronary artery occlusion; 3. Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality in a pattern consistent with an ischaemic aetiology. *Isolated development of new pathological Q waves meets cardiac myocardial infarction criteria if cTn values are elevated and rising but < 10 times the 99th percentile URL.		
Acute myocardial injury in noncardiac surgery	Detection of an elevated and increased or decreased cTn value above the 99th percentile URL is defined as myocardial injury. The diagnosis will be acute myocardial injury if there is no confirmed diagnosis of myocardial infarction		StEP cardiovascular, 4 th universal definition of myocardial infarction ^{6,7}
Acute myocardial injury in cardiac surgery	Elevation of cTn values > 10 times the 99th percentile URL in patients with normal baseline cTn values. In patients with elevated pre- procedure cTn in whom cTn levels are stable (≤ 20% variation) or falling, the postprocedure cTn must rise by > 20%. However, the absolute postprocedural value still must be > 10 times the	In rhythm surgery and valve surgery substantial amount of troponin release will be related to the direct procedure related tissue trauma and not ischemia.	4 th universal definition of myocardial infarction ⁷ + own interpretation

	99th percentile URL. The diagnosis will be acute myocardial injury if there is no confirmed diagnosis of myocardial infarction		
Acute heart failure	An elevated jugular venous pressure, respiratory rales/crackles and crepitations, presence of S3 and at least one of the following radiographic findings: (a) Vascular redistribution (b) Interstitial pulmonary oedema (c) Frank alveolar pulmonary oedema AND NT-proBNP >300 pg/ml	Definition of heart failure did not reach consensus in the StEP initiative.	StEP cardiovascular, heart failure guideline ESC ^{6,8}
Pulmonary embolism	A clinical diagnosis of PE confirmed by helical CT-scan	Diagnosis will be missed in a large portion of patients	StEP cardiovascular ⁶
Atrial fibrillation/ flutter	New onset of irregularly irregular heart rate in the absence of P waves lasting at least 30 s or for the duration of the ECG recording (if <30 s)	No routine ECG or holter registration postoperatively, except for patients admitted to the ICU or PACU.	StEP ⁶
Stroke	An embolic, thrombotic or haemorrhagic cerebral event with motor, sensory or cognitive dysfunction (e.g. hemiplegia, hemiparesis, aphasia, sensory deficit, impaired memory). Mild: Results in only temporary harm and would not require specific clinical treatment. Moderate: More serious complication but one which does not usually result in permanent harm or functional		EPCO definition

limitation. Requires clinical treatment.		
Severe: Results in significant prolongation of hospital stay and/or permanent functional limitation or death. Requires clinical treatment.		

Table 5: Definitions exclusion criteria

Deep venous thrombosis	Diagnosis confirmed by 2- Point Compression Ultrasonography of the Lower Extremity	StEP ⁶ + adaptation to Dutch clinical practice standards
Multi-organ failure	Altered function in two or more organ systems during an acute illness such that homeostasis cannot be maintained without intervention	Definitions for sepsis and organ failure ⁹
Hemorrhage	Acute blood loss	
All-cause mortality	Any cause of death that doesn't fulfill the criteria for cardiac death	

Table 6: Sepsis

Endpoint	Definition	Excluded	Additionally reported	Limitation	Ref.
Sepsis	Increase in SOFA score of 2 or more, with evidence of infection, within 30 days.		Suspected site of infection; SOFA score.		StEP Infection and sepsis ⁴

Table 7: Postoperative respiratory infectious complication

Endpoint	Definition	Excluded	Additionally reported	Limitation	Ref.
Postoperative respiratory infectious complication Possible	 Signs/Symptoms/Laboratory: one of the following: Fever (> 38.0°C or > 100.4°F) Leukopenia (≤ 4000 WBC/mm3) or leukocytosis (≥ 12,000 WBC/mm3) For adults ≥ 70 years old, altered mental status with no other recognized cause OR New onset of purulent sputum or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements New onset or worsening cough, or dyspnea, or tachypnea Rales or bronchial breath sounds Worsening gas exchange AND Imaging: One chest imaging test result with at least one of the following: Pulmonary infiltrate, consolidation or cavitation 		Cause: CAP, HAP, VAP,		
Probable	 Signs/Symptoms/Laboratory: at least one of the following: Fever (> 38.0°C or > 100.4°F) Leukopenia (≤ 4000 WBC/mm3) or leukocytosis (≥ 12,000 WBC/mm3) For adults ≥ 70 years old, altered mental status with no other recognized cause AND: Imaging: two or more serial chest imaging results with either new and persistent OR progressive and persistent changes of 		Cause: CAP, HAP, VAP,		StEP infection and sepsis ⁴

	 infiltrate consolidation cavitation (In patients without underlying cardiac or pulmonary disease one definitive imaging test result is acceptable AND at least two of the following: New onset of purulent sputum or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements New onset or worsening cough, or dyspnea, or tachypnea Rales or bronchial breath sounds Worsening gas exchange (with PF <200, O2 supplementation >5L/min, or start of (non)-invasive ventilation) 			
Definite	 Criteria for probable postoperative respiratory infection AND One of the following criteria: Positive culture of causative lung pathogen in respiratory secretions Positive blood culture with causative pathogen for pneumonia Isolation of a virus or proof of a viral pathogen in airway secretion by PCR Histopathologic evidence for pneumonia 	Cause: CAP, HAP, VAP,	Definition of StEP + additional criteria	

Table 8: Causes postoperative respiratory infectious complication

Community acquired pneumonia (CAP)	Pneumonia occurring on day 0 or 1 after hospital admission, considering day of admission as day 0			
Hospital acquired pneumonia (HAP)	Pneumonia occurring ≥ day 2 of hospital admission, considering day of admission as day 0			
Ventilator- Associated pneumonia (VAP)	Pneumonia occurring ≥ day 2 after the start of mechanical ventilation (MV) and ≤ day 2 after the end of MV.	Non- invasive ventilation like CPAP, BiPAP, optiflow are not considered mechanical ventilation.		

Table 9: Abscess/Empyema

Endpoint	Definition	Excluded	Limitation and comments	Ref.
Abscess/empyema				
Possible	 Low clinical suspicion with one of: Fever Cough, increased respiratory secretions 			
	 debatable Imaging test evidence of abscess or other infection 			
Probable	 High clinical suspicion with one of: Fever Cough, increased respiratory secretions 			Step ⁴ with adaptation
	2. Imaging test evidence of abscess or other infection			

Definite	1. Organism seen on Gram stain of	
	lung tissue or pleural fluid, or	
	identification of pathogenic organism	
	from fluid or tissue from affected site	
	2. Abscess or other evidence of	
	infection on gross anatomical or	
	histopathologic	
	examination	
	examination	

Table 10: Surgical site infections

Endpoint	Definition	Excluded	Limitation and comments	Ref.
Surgical site infection (SSI)				
Superficial incisional SSI	Involves only skin and subcutaneous tissue of the incision			
Possible	Patient has at least two of the following signs or symptoms: - localized pain or tenderness - localized swelling - erythema - heat.			
Superficial incisional SSI	Patient has at least one of the following:			StEP infection and
Definite	 Purulent drainage from the superficial incision. Organism(s) identified from an aseptically- obtained specimen from the superficial incision or subcutaneous tissue by a microbiologic testing method which is performed for purposes of clinical diagnosis or treatment. 			sepsis 4,10

Deep incisional SSI	 Superficial incision that is deliberately opened and culture or non- culture based testing of the superficial incision or subcutaneous tissue is not performed AND Patient has at least one of the following signs or symptoms: localized pain or tenderness, localized swelling, erythema or heat. Abscess at physical examination, re- operation, histopathologic or radiologic examination. Involves deep soft tissues of the incision (for example, fascial and muscle layers) 		
Possible	Patient has at least two of the following signs or symptoms: - localized pain or tenderness - localized swelling - erythema - heat.		
Definite	 Patient has at least one of the following: Purulent drainage from the deep incision. a deep incision that spontaneously dehisces, or is deliberately opened AND organism(s) identified from the deep soft tissues of the incision by microbiologic testing which is performed for purposes of clinical diagnosis or treatment, or microbiologic testing is not performed. AND 		StEP infection and sepsis 4,10

	 patient has at least one of the following signs or symptoms: fever (>38°C), localized pain or tenderness. - an abscess or other evidence of infection involving the deep incision that is detected on gross anatomical or histopathologic exam, or imaging test. 		
Organ/Space SSI	Event involves any part of the body deeper than the fascial/muscle layers that is opened or manipulated during the operative procedure		
Possible	 Patient has at least one of the following signs or symptoms: Fever > 38 C Pain in the area of surgical procedure (not superficial) 		
Probable	Possible criteria AND Imaging test evidence suggestive of infection.		
Definite	Patient has at least one of the following: a. purulent drainage from a drain that is placed into the organ/space b. organism(s) identified from fluid or tissue in the organ/space performed for purposes of clinical diagnosis or treatment. c. an abscess or other evidence of infection involving the organ/space that is detected on gross anatomical or histopathologic exam		StEP infection and sepsis 4,10

Table 11: Urinary system infection, blood stream infection, other infection

Endpoint	Definition	Excluded	Additionally reported	Limitation and comments	Ref.
Urinary tract infection (Catheter and not catheter related)	 One of the following signs or symptoms: Fever (>38C) Suprapubic tenderness* Costovertebral angle pain or tenderness* Urinary urgency^ Urinary frequency^ Dysuria^ Microbiologic cultures: Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of ≥10^5 CFU/ml * Without other recognized		Catheter related: If indwelling urinary catheter had been in place for more than 2 consecutive days on the date of event AND was present on the day of the event or removed the day before.		CDC ¹¹
High Urinary system infection	cause ^ These symptoms cannot be used when a catheter is in place - Identification of pathogenic organism from fluid or tissue from affected site - Abscess or other evidence of infection on gross anatomical examination, during invasive procedure, or during histopathologic examination OR one of - Fever >38C - localised pain or tenderness with no other recognised cause AND ONE OF				StEP ⁴

		1		
	 purulent drainage from affected site organism identified in blood by culture or non- culture based biological testing imaging suggestive of infection which if equivocal is supported by clinical correlation, specifically physician documented treatment for urinary system infection 			
Primary Blood stream infection (BSI)/ Central line blood stream infection (CLBSI)	A Laboratory Confirmed Bloodstream Infection (LCBI) that is not included in the common commensal list and is not secondary to an infection at another body site OR Patient has at least one of the following signs or symptoms: fever >38C, chills or hypotension, and at least one of the following: (a) Common skin contaminant cultured from two or more blood cultures drawn on separate occasions (b) Common skin contaminant cultured from at least one blood culture from a patient with an intravascular line, and the physician institutes appropriate antimicrobial therapy (c) Positive blood antigen test.	Common commens al list: see: Common Commens al organism s include, but are not limited to, diphthero ids (Coryneb acterium spp. not C. diphtheri a), Bacillus spp. (not B. anthracis) , Propionib acterium spp., coagulase -negative staphyloc occi (including		CDC ¹²

S. epidermi dis), viridans group streptoco cci, Aerococc us spp. Micrococ cus spp. and Rhodococ
cus spp Organism s that are parasites and
viruses. Campylob acter, Salmonell a,
Shigella, Listeria, Vibrio and Yersinia as well as
C. difficile, Enterohe morrhagi c E. coli, and Enteropat hogenic E. coli.
Blastomy ces, Histoplas ma, Coccidioi des, Paracocci

		dioides, Cryptoco ccus, and Pneumoc ystis.		
Infection eci/ 'other infection'	Strong clinical suspicion of infection but the source has not been confirmed because clinical information suggests more than one possible site, OR infection is not a respiratory infection, surgical site infection, primary bloodstream infection or urinary tract infection: meeting two or more of the following criteria: Core temperature < 36C or >38C; white cell count >12x10^9 l-1 or < 4x10^9 l-1, respiratory rate >20 breaths per minute or PaCO2 < 4.7 kPa (35mmHg); Pulse rate >90 beats per minute		CDC and EPCO definitions are used for 'Infection eci' criteria. We added 'Other infection'	CDC ¹³ AND EPCO ²

Table 12: Postoperative renal complications

Endpoint	Definition	Excluded	Limitation and comments	Ref.
Acute Kidney Injury (AKI)	 Stage 1: Increase in serum creatinine by ≥0.3 mg/dl (≥26.5 µmol/L) within 48 hours OR increase in serum creatinine to 1.5-1.9 times baseline. Stage 2: increase in serum creatinine to 2.0-2.9 times baseline Stage 3: increase in serum creatinine to ≥ 3 times baseline OR increase in serum creatinine to ≥353.6 µmol/L OR initiation of renal replacement therapy 			StEP Renal Endpoints

Table 13: Postoperative blood loss

Endpoint	Definition	Excluded	Limitation and comments	Ref.
Postoperative bleeding in cardiac surgery	Type 1: bleeding that is not actionable and does not cause the patient to seek an unscheduled performance of studies, hospitalization, or treatment by a health care professional; it may include episodes leading to self- discontinuation of medical therapy by the patient without consulting a health care professional. Type 2: any overt, actionable sign of hemorrhage (e.g., more bleeding than would be expected for a clinical circumstance, including bleeding found by imaging alone) that does not fit the criteria for type 3, type 4, or type 5 but does meet at least one of the following criteria: requiring nonsurgical, medical intervention by a health care professional; leading to hospitalization or increased level of care; or prompting evaluation. Type 3a: overt bleeding plus a hemoglobin drop of 3 to 5 g/dL* (provided the hemoglobin drop is			¹⁵ BARC

	related to bleed); any transfusion with overt bleeding. Type 3b: overt bleeding plus a hemoglobin drop of 5 g/dL (provided the hemoglobin drop is related to bleed); cardiac tamponade; bleeding requiring surgical intervention for control (excluding dental, nasal, skin, and hemorrhoid); bleeding requiring intravenous vasoactive agents. Type 3c: intracranial hemorrhage (does not include microbleeds or hemorrhagic transformation, does include intraspinal); subcategories confirmed by autopsy or imaging, or lumbar puncture; intraocular bleed compromising vision. Type 4: coronary artery bypass grafting-related bleeding; perioperative intracranial bleeding within 48 hours; reoperation after closure of sternotomy for the purpose of controlling bleeding; transfusion of 5 U of whole blood or packed red blood cells within a 48-hour period; chest tube output 2 L within a 24-hour period. Type 5a: probable fatal bleeding; no autopsy or imaging confirmation but clinically suspicious. Type 5b: definite fatal bleeding; overt bleeding or autopsy, or imaging confirmation.	
Postoperative bleeding noncardiac surgery	Postoperative bleeding Clavien Dindo classification ≥3	

In addition, all adverse events in the postoperative period will be graded according to the Clavien-Dindo system¹⁶:

Grade I	Any deviation from the normal postoperative course without the need for
	pharmacological treatment or surgical, endoscopic and radiological interventions.
	Allowed therapeutic regimens are: drugs as anti-emetics, antipyretics, analgetics,
	diuretics and electrolytes and physiotherapy. This grade also includes wound infections
	opened at the bedside.
Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I
	complications. Blood transfusions and total parenteral nutrition are also included.
Grade III	Requiring surgical, endoscopic or radiological intervention
	a. Intervention not under general anesthesia
	b. Intervention under general anesthesia
Grade IV	Life-threatening complication (e.g. brain hemorrhage, ischemic stroke, subarrachnoidal
	bleeding, but excluding transient ischemic attacks) requiring Intensive Care management
Grade V	Death of a patient

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