# Supplement 1

# Categorisation of variables of LCOS definition

First the definitions were categorised in ‘children’ or ‘adults’. If the study population had a mean or median age under 18 years old, the study was categorised in ‘children’, if the study population had a mean or median age of 18 years or older, the study was categorised in ‘adults’.

Secondly, we examined if the definitions were reproducible. To be reproducible, definitions needed to have a cut-off value, if the definition included ‘lactate’, ‘saturation’, ‘cardiac index’, ‘high/increasing/maximal inotropic drugs use’, ‘hypotension’, ‘metabolic acidosis’, ‘pulmonary capillary wedge pressure’, ‘cardiac output’, ‘systemic vascular resistance’, ‘fever’, ‘ejection fraction’, ‘oliguria’ or ‘tachycardia’. Furthermore, vague terms were categorised as not reproducible. Vague terms included ‘hemodynamic compromised’, ‘maintain stable hemodynamics’ and clinical signs of hypoperfusion without describing those signs. Definitions did not need a cut-off value to be reproducible for the following clinical signs: ‘altered state of mind’ and ‘cold extremities’ to be categorised as reproducible.

Lastly, we categorised the different parts of the definition. We made no separate categories for variables that occurred in less than 1% of the articles (no. of articles < 3), those were categorised in ‘others’. Variables that occurred in less than 2% of the articles (no. of articles < 5), were categorised as ‘too high’ or ‘too low’ without their cut-off value. Variables that occurred in 2% or more of the articles were also categorised with their cut-off value. After categorizing the definitions, we had thirteen main categories, i.e: ‘inotropes’, ‘mechanical support’, ‘metabolic acidosis’, ‘cardiac function’, ‘blood pressure’, ‘clinical signs of hypoperfusion’, ‘saturation’, ‘pulmonary capillary wedge pressure’, ‘renal replacement therapy’, ‘instable hemodynamics’, cardiac arrest’, ‘death’ and ‘others’.

We found four ways that inotropes were measured and therefor devided inotropes in four subcategories: ‘number of inotropes’, ‘Vasoactive-Inotropes-Score’, ‘duration of inotropes use’ and ‘type of inotropes’.

When a definition included statements like ‘the need for pharmacologic therapy’ or ‘the need for inotropes’, they were categorised in the main category ‘inotropes’ without further specification. If definitions included statements like ‘need for additional inotropes’, they were categorised in the main category ‘inotropes’ and specified as more than one inotrope needed in the subcategory ‘number of inotropes’. If a definition described more than one duration, like ‘the need for inotropes for 24-48 hours’ or ‘the need for norepinephrine for 24 hours or dopamine for 48 hours’, the shortest duration was noted.

The main category ‘mechanical support’ has 3 subcategories: ‘Intra-Aortic Balloon Pump’, ‘Ventricular Assist Device’ and ‘Extracorporeal Membrane Oxygenation’. If a definition included a statement like ‘the need of mechanical support’, without specifying, we categorised them in all three subcategories.

The main category ‘metabolic acidosis’ was devided in four subcategories, ‘high lactate’, ‘high base-deficit’, ‘low pH’ and ‘low bicarbonate’. ‘Lactate’ and ‘base-deficit’ have cut-off values, ‘low pH’ and ‘low bicarbonate’ are only categorised as ‘too low’, because less than 2% of the definitions used these parameters. If definitions included increase in lactate, they were listed as a lactate cut-off value of ‘higher than 2’. If a definition included two kinds of cut-off values (for example “an increase in lactate of 2 or a lactate higher than 4”), they were listed as the lowest value (in this example ‘higher than 2’). If the definition only mentioned a metabolic acidosis, it was listed in the main category without further specifics.

The main category ‘cardiac function’ has three subcategories, ‘cardiac index’, ‘left ventricle ejection fraction’ and ‘low cardiac output’. ‘Cardiac index’ and ‘left ventricle ejection fraction’ were categorised with cut-off values and ‘low cardiac output’ was only dichotomized.

The main category ‘blood pressure’ has four subcategories, called: ‘systolic arterial hypotension’, ‘mean arterial hypotension’, ‘central venous pressure’ and ‘systemic vascular resistance’. Only ‘systemic vascular resistance’ was dichotomized, the other subcategories had cut-off values. If definitions included statements like ‘sank under an age-related normal systolic blood pressure’, they were listed as ‘under p5 systolic blood pressure’. When a definition only mentioned a hypotension without further specifying, they were listed in the main category without further specifics. If a definition mentioned a hypotension under 90mmHg, they were listed in the subcategory ‘systolic arterial hypotension’. When definitions described a range, like ‘a mean arterial pressure under 50-60mmHg’, they were listed with the highest cut-off, in this case they were listed with the cut-off value of 60mmHg.

The main category ‘clinical signs of hypoperfusion’ has six subcategories, named: ‘oliguria’, ‘tachycardia’, ‘cold extremities’, ‘decreased consciousness’, ‘clammy skin’ and ‘other clinical signs of hypoperfusion’. Clinical features that occurred in less than 1% of the articles were categorised in ‘other clinical signs of hypoperfusion’. Definitions including ‘peripheral vasoconstriction’, ‘poor peripheral perfusion’, ‘prolonged capillary refill’ or ‘differences in core-periphery temperature’ were listed as ‘cold extremities’. ‘Oliguria’ and ‘tachycardia’ were the only two subcategories with cut-off values. Definitions including terms like ‘signs of tissue hypoperfusion/organ hypoperfusion’ were listed in the main category ‘clinical signs of hypoperfusion’ without further specifying.

The main category ‘saturation’ has three subcategories, called: ‘differences in arterial and venous saturation’, ‘decreased arterial saturation’ and ‘venous saturation’. ‘Differences in arterial and venous saturation’ and ‘venous saturation’ had cut-off values, ‘decreased arterial saturation’ was only categorised as ‘too low’. From the two subcategories with venous saturations, we also listed if the definition included mixed or central venous saturation.

The main category ‘pulmonary capillary wedge pressure’ has no subcategories, the category was listed with a cut-off value. When definitions described a range, like ‘ a pulmonary capillary wedge pressure between 20-25mmHg’, they were listed with the lowest cut-off value.

The main category ‘renal replacement therapy’, ‘instable hemodynamic’, ‘cardiac arrest’ and ‘death’ were categorised as present or not present.

**Supplement 2**

**Reference list of literature review**

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