

SECOND INSULTS – POST ADMISSION Systemic and Intracranial

SISClin-Hypox = Hypoxic episode during clinical course

SISClin-Hypotens = Hypotensive episode during clinical course

SISClin- Hypocap = Inadvertent hypocapnia during clinical course

SSIClin-Seiz = Seizures during clinical course

1. CDE Variable	SISClin-Hypox = Hypoxic episode during clinical course SISClin-Hypotens = Hypotensive episode during clinical course SISClin- Hypocap = Inadvertent hypocapnia during clinical course SSIClin-Seiz = Seizures during clinical course
2. CDE Definition	Hypoxic episode occurring during inhospital treatment. Hypotensive episode occurring during inhospital treatment. Episode of inadvertent hypocapnia occurring during inhospital treatment. Any seizure activity (EEG or clinical) observed during inhospital treatment.
3. Recommended instrument for assessment	N/A.
4. Description of measure	Categorical.
5. Permissible values	<p><u>Hypoxia/hypotension/hypocapnia:</u> Basic: - no - single episode, short duration - multiple episodes or long duration (>15 min) - unknown Intermediate/advanced: - no - single episode, short duration - single episode, prolonged duration (>15 min) - multiple episodes - unknown</p> <p>In the advanced format we recommend to additionally record the total number of episodes occurring over a given time period (e.g. daily or summated over clinical treatment period) and the duration of the longest episode.</p> <p>Definitions for episodes: Hypoxia: PaO₂ < 8kPa (60mmHg) and/or SaO₂ < 90% Hypotension: blood pressure <90mmHg Hypocapnia (inadvertent): PaCO₂ ≤ 25mmHg</p> <p><u>Seizures</u> Basic: - no - partial/focal - generalized</p>

	<ul style="list-style-type: none"> - unknown Intermediate/advanced: - no - 'silent', e.g. documented only on EEG - clinical: partial/focal - clinical: generalized - unknown
6. Classification: Basic/Intermediate/Advanced	See above.
7. Procedure	Obtain information from review medical charts and/or patient data management system.
8. Comments/Special instructions:	
<p>The occurrence of second insults in the in-hospital situation should be documented by objective measurements. Hyperventilation is an – albeit somewhat debated – an accepted treatment modality for raised intracranial pressure by virtue of its effects to decrease cerebral blood volume. Inadvertent or inappropriate hypocapnia not deliberately employed for treating raised intracranial pressure is considered a second insult as the resulting vasoconstriction may lead to further ischaemic brain damage. The intent here is to only score hypocapnia as second insult in situations where it was not deliberately employed to treat raised intracranial pressure. For seizure activity, only score the category 'silent' if seizure activity has been documented by EEG or electrocorticographic recordings without any clinical signs of seizures.</p>	
9. Rationale/justification:	
<p>Many types of second insults may occur in the in-hospital situation, both systemic and intracranial. Systemic second insults may for example also include episodes of hypoglaecemia, hyponatremia, hypernatremia, hyperthermia and many more. We chose to recommend to document the clinically most relevant and frequently occurring second insults: hypoxia, hypotension, inadvertent hypocapnia and seizure activity. Hypoxia, hypotension and inadvertent hypocapnia are the most frequent causes of jugular desaturations, and periods of low brain tissue oxygen tension. The depth and duration of systemic second insults during the clinical course is related to poorer outcome. In the intensive care environment with continuous monitoring, accurate detection of the number and duration of episodes of second insults should be possible. Thus permitting an accurate documentation of the number, depth and duration of these insults individually and summated per insult over a given period. Unfortunately, most commercially available monitoring systems do not include dedicated software to facilitate this approach. We therefore recommend to simply document the occurrence of second insults, differentiating single episodes of short duration from multiple episodes or those of more prolonged duration, as these latter may have more profound effects in aggravating secondary brain damage. In the advanced version we recommend to capture the number of episodes and to document the approximate duration of the episode lasting longest.</p>	
10. References:	
<p><i>McHugh GS, Engel DC, Butcher I, et al. Prognostic value of secondary insults in traumatic brain injury: results from the IMPACT study. J Neurotrauma. Feb 2007;24(2):287-93.</i></p> <p><i>Signorini DF, Andrews PJ, Jones PA, et al. Adding insult to injury: the prognostic value of early secondary insults for survival after traumatic brain injury. J Neurol Neurosurg Psychiatry. Jan 1999;66(1):26-31</i></p>	
Recommended time for assessment:	
<p><u>Basic:</u> Aggregated over in-hospital course</p> <p><u>Intermediate/advanced:</u> daily, up to day 14 and on discharge.</p>	