SUSTAIN-EUROPE Appendix 1 - Synopsis

Principal Investigator	Linda Grüßer, MD, MPH, University Hospital RWTH, Aachen, Germany
Co-Principal Investigator	Patricio González-Pizarro, MD, PhD, La Paz Children's Hospital, Madrid, Spain
Trial Statistician	András Keszei, MD, PhD, Centre for Translational & Clinical Research, Medical Faculty RWTH Aachen, Germany
Title	Sustainable anaesthesia practices in Europe – a multicentre, prospective observational study (SUSTAIN-EUROPE)
Short Title	SUSTAIN-EUROPE
Trial Registration	NCT07252973
Protocol Version	V1.0
Background	In response to the climate crises, Societies of Anaesthesiology call for action to reduce the carbon footprint of daily clinical work. They recommend the use of regional and total intravenous anaesthesia, and for inhalational anaesthesia cases, the use of sevoflurane with minimal fresh gas flow (FGF) settings < 0.5 l min^{-1}. Surprisingly, the type of anaesthesia and ventilation settings commonly used remain largely unknown.
Objectives	SUSTAIN-EUROPE aims to describe the current anaesthesia practices in paediatric and adult patients undergoing surgery or a procedure with anaesthesia care across Europe (including inhalational and intravenous general anaesthesia, regional anaesthesia, sedation, and combinations thereof) in a large-scale, prospective, observational study. By providing information on the status-quo we seek to identify potential areas for improvement of sustainable practices that can be addressed in future studies.
Study design	This study is designed as a multicentre, prospective, observational study. At participating European departments of anaesthesiology, eligible cases will be included within a predefined study period. For each case, routine clinical data will be obtained once at a standardized time point during the procedure (5-60 minutes after skin incision or start of procedure, respectively).
Outcomes	Primary endpoint: • Type of anaesthesia (inhalational and total intravenous general anaesthesia, regional anaesthesia, sedation, combinations, monitoring only) Secondary endpoints: • Proportional use of kind of inhalational anaesthetics in inhalational anaesthesia cases • FGF used stratified by total intravenous anaesthesia (TIVA) and inhalational general anaesthesia; for inhalational cases further stratified by use of manual settings versus automated end-tidal dosing control

	• MAC (age-adjusted), expiratory fraction and vaporiser settings in inhalational anaesthesia cases • Proportion of kind of main i.v. medication used in TIVA cases • Proportion of inhalational inductions • Proportional use of inhalational agent capture and automated end-tidal dosing control • Rebreathing fraction (FGF/expired minute volume ventilation) in general anaesthesia cases • Among procedures anatomically amenable to regional anaesthesia alone, distribution of documented reasons for not using regional anaesthesia as the sole technique • Use of depth of anaesthesia monitoring, corresponding values and availability of density spectral array • MAC (age-related) and depth of anaesthesia monitoring stratified by FGF rates • proportional use of antiemetics • ventilation settings in general anaesthesia cases including tidal volume kg^{-1} ideal body weight, ventilation pressures, fraction of inspired oxygen, respiratory rate, and end-tidal carbon dioxide
Inclusion & Exclusion Criteria	**Inclusion criteria:** All patients receiving any form of anaesthesia care (whether general or regional anaesthesia, monitored sedation, combinations thereof or monitoring only) from an anaesthetist at an anaesthesia workstation in participating European departments of anaesthesiology during the selected data-collection period. **Exclusion criteria**: Patients (or legal guardians) who decline consent and patients for whom valid informed consent cannot be obtained due to language barriers or other factors preventing adequate information and understanding.
Number of Participants	At least 8000 cases.
Duration	1 week (=5 consecutive working days) for each participating centre; 1 year for the entire study; patient-level data collection at a single time point 5-60 minutes after skin incision or start of procedure, respectively.
Centres	All departments of anaesthesiology from European hospitals are invited to participate.
Statistical Considerations	Descriptive analyses of outcomes will be performed in the study population and in prespecified subgroups. Additionally, exploratory hierarchical regression models will be used to estimate associations with case and hospital characteristics.
Risk-Benefit analysis	The collection of routine anaesthesia care data in SUSTAIN-EUROPE poses no foreseeable risk to participants while delivering substantial

	benefit through a comprehensive, multicentre observation of anaesthesia practices across European hospitals.