

Capnography monitoring during physician-led procedural sedation for Bronchoscopic procedures

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Introduction

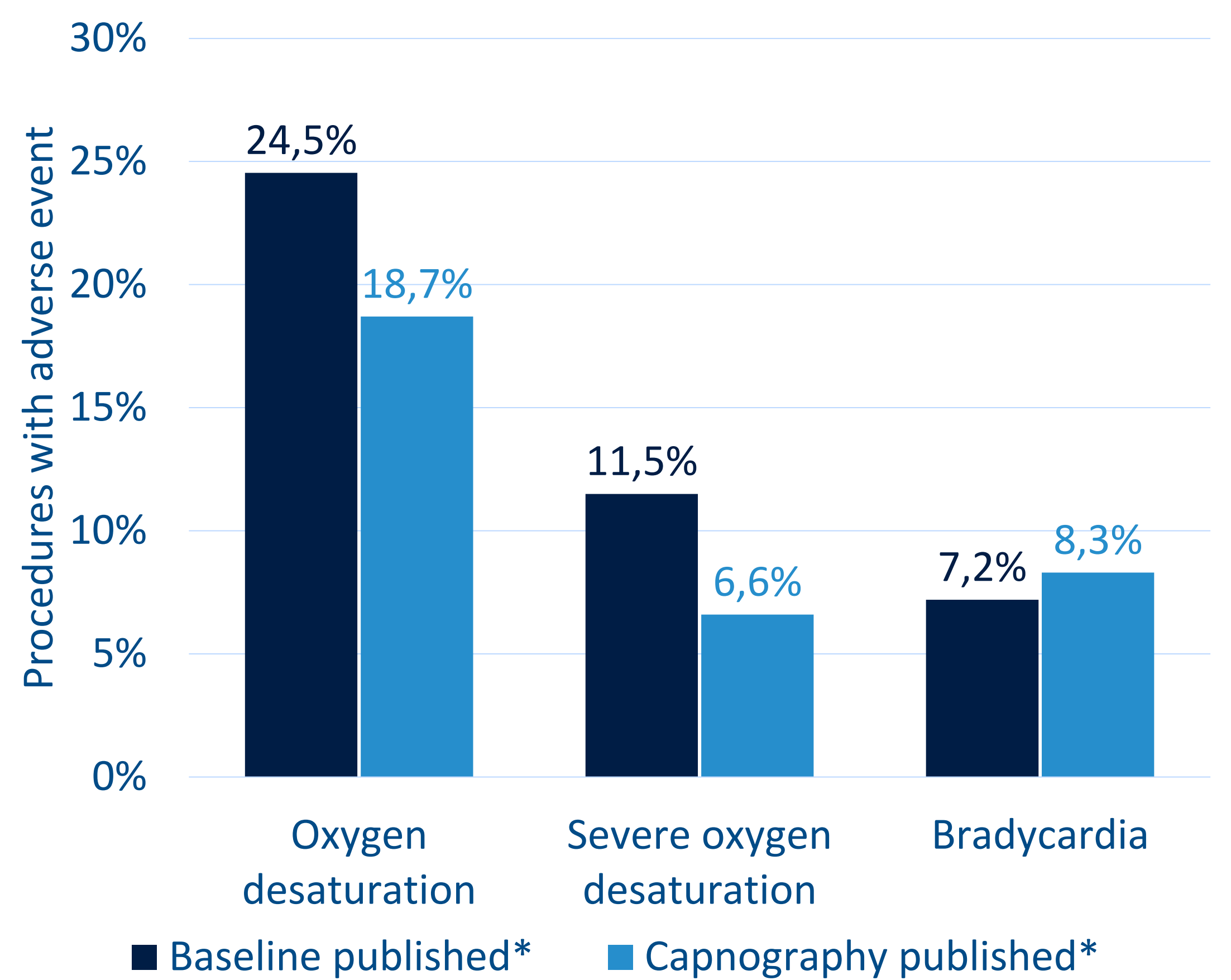


Figure 1 Results of a published meta-analysis (*Saunders R et al. Patient safety during procedural sedation using capnography monitoring : a systematic review and meta-analysis. BMJ Open. 2017;;1–10.)

- Capnography measures the end-tidal CO2 which may lead to an earlier detection of respiratory compromise compared to pulse oximetry
- Due to the earlier detection meta-analyses show a reduced incidence in respiratory compromise. (Figure 1)
- In the UK physician-led sedation is common practice, leading to a need of accurate feedback during the procedure
- Quality improvement initiatives (QIIs) are a cooperative effort between hospitals and manufacturers to introduce or expand the use of potentially beneficial innovative technologies at a reduced risk for both sides.
- One such QII was launched to expand the use of Capnography at Cambridge University Hospitals NHS Foundation Trust.

Setting



Figure 2 Departments involved in the Quality improvement initiative

- Capnography was already in use for selected procedures at Cambridge University Hospitals NHS Foundation Trust.
- The QII aimed to introduce Capnography in additional departments and for additional procedures while recording the effect on adverse event rates.
- A secondary focus was the identification of the population associated with the highest benefit from the addition of capnography.
- Multiple departments participated in the QII (Figure 2):
 - Respiratory medicine (RM)
 - Interventional cardiology (IC) & vascular access (VA)
 - Gastroenterology (GI)

Methodology

Minor risk descriptors	Sentinel risk descriptors
<ul style="list-style-type: none"> Oxygen desaturation (75-90% for <60s) Bradycardia Tachycardia Apnoea, not prolonged Airway obstruction 	<ul style="list-style-type: none"> Oxygen desaturation, severe (<75% at any time or prolonged <90% for >60s) Apnoea, prolonged (>60s) Cardiovascular collapse/shock Cardiac arrest/absent pulse

Table 1 Standardized adverse events for procedural sedation according to the World SIVA International Sedation Task Force. Chosen adverse events for the cumulative endpoint

- A structured process led to the selection of an endpoint by which to measure the success of the QII
- The endpoint (Table 1) was the cumulative incidence of oxygen desaturation (<75% any duration, 75-90% <60 seconds(s), <90% >60s), bradycardia, and tachycardia (>25% change from baseline).
- We targeted a 20% reduction in this cumulative endpoint post capnography implementation.
- Data was collected between December 2017 and January 2020 and results were collected on-site in an Excel-based data tool.
- No patient identifiers were recorded to ensure anonymity.
- The collected data was analyzed to compare Capnography to the previous standard of care.

Results

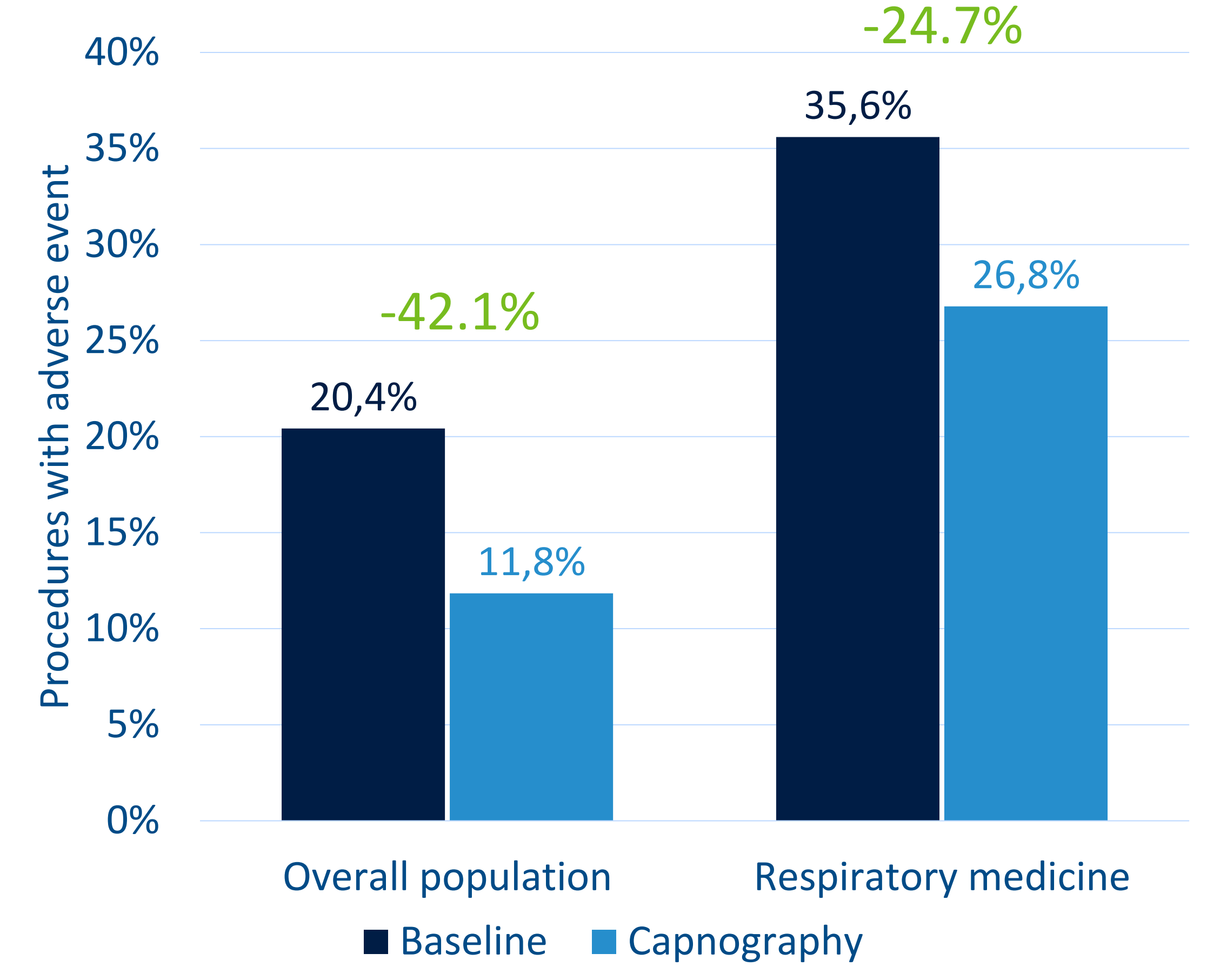


Figure 3 Adverse event occurrence during baseline and with capnography

- In total, data from 1,401 procedures across the GI, IC, and RM services were collected.
- The first 666 procedures served as a baseline pre-capnography introduction and the following 735 procedures utilized capnography.
- Over the full population a 42.1% (p<0.05) reduction in the incidence of the cumulative endpoint was recorded with capnography.
- In RM, of the 129 bronchoscopies, there were 26 events recorded for the 73 baseline patients and 15 events for the 56 capnography patients.
- This corresponded with a 24.7% reduction in the cumulative endpoint (Figure 3).
- While the reduction of adverse events is considerably smaller than for the overall population, clinicians reported that they were more comfortable continuing procedures after adverse events had been resolved when using Capnography.

Disclosure

JH, GC, PP, TCS, and DMR have nothing to disclose. RTT is an employee and RS is the owner of Coreva Scientific, which received consulting fees from Medtronic during the conduct of the study. CL is an employee of Medtronic UK, the funder of this study. AP reports non-financial support from Medtronic, in form of provisioning of monitors and training during the conduct of the study.

Conclusion

With capnography monitoring, a 24.7% reduction in adverse events was recorded in the RM service during bronchoscopies. GI, IC, and RM services support including capnography monitoring in the hospital's sedation guidelines.