Medtronic

Clinical Evidence Guide

Your partner in reducing ventilator-associated pneumonia

Shiley™ Evac Oral Endotracheal Tube with TaperGuard™ Cuff Technology

Shiley™ Flexible Tracheostomy Tube with Evac Technology

Globally, ventilator-associated pneumonia (VAP) occurs in 15.6% of patients who are mechanically ventilated.[1] Routine use of Shiley™ evac technology has been shown to reduce the risk of VAP by 44%.[2] Similarly, TaperGuard™ cuff technology has been shown to improve sealing, reduce pressure on the trachea, and decrease microaspiration.[3-8] Together, Shiley™ endotracheal and tracheostomy tubes with evac technology and TaperGuard™ cuff technology can reduce the risk of VAP by reducing the silent aspiration of oral and/or gastric secretions that promote the development of VAP.[2, 6]

Ventilator-associated Pneumonia (VAP)

Background

Definition[2]	Hospital-acquired pneumonia developed in intubated patients receiving mechanical ventilation for ≥48 hours.	
Prevalence[1]	Globally: 15.6%	United States: 13.5% Europe: 19.4% LATAM: 13.8% APAC: 16.0%
COVID-19[9]	COVID-19 patients may have a higher risk of developing VAP (OR = 3.24, 95% CI: 2.2 to 4.7, P = 0.015).	
Patient Consequences[10]	• Longer mean (± SD) durations of mechanical ventilation (28.8 ± 25.0 vs 10.3 ± 10.5 days, P < 0.0001) • Higher mean cost of hospitalization ($99,598 vs $59,770, P < 0.0001)	
Current Strategies	Care bundles to reduce the incidence of VAP infections have been studied and documented, yet the burden continues. *"VAP prevention bundles, including the utilization of endotracheal tube secretion drainage (ETT-SD), monitoring cuff pressure, and oral care with chlorhexidine were efficient in reducing the rate of VAP."[11]*	

Review the evidence of benefits associated with Shiley™ evac technology

Shiley™ Evac Endotracheal & Tracheostomy Tubes with Taperguard™ Cuff

Technologies to Help Reduce VAP RISK

TaperGuard™ Cuff Technology

The TaperGuard™ cuff has an elongation of the cuff that gives a greater seal between cuff and trachea with documented benefits including:

- Low-volume, low-pressure tapered cuffs have **significantly lower cuff pressure** vs high-volume, low-pressure cuffs,[3] and have **significantly lower cuff pressure changes with positional changes** in the head and neck.[4]
- Tapered cuffs show **improved sealing** and **less microaspiration** with 0% patients experiencing leakage into the trachea, whereas traditional cuffs had dye leakage in 20-40% of patients.[5, 6]
- Tapered cuffs have a **40% lower insertion force** than cylindrical-shaped cuffs and have a **significantly lower average pressure exerted on the lateral wall of the trachea**.[7]
- Tapered cuffs have a **significantly lower incidence of sore throat** (32% vs 54%, RR = 0.60, 95% CI: 0.43 – 0.85; P = 0.003).[8]

Shiley™ Evac Technology

Subglottic secretion drainage (SSD) helps **remove oral and/or gastric secretions** from above the endotracheal tube cuff before they can be aspirated.

- SSD usage results in a **44% reduction in risk for VAP[2]**

Guidelines that support SSD usage:

- SHEA Guidelines[12]
- American Thoracic Society/ Infectious Diseases Society of America (ATS/IDSA) – Level I[13]
- Centers for Disease Control (CDC) – Category II[14]
- American Association of Critical Care Nurses (AACN)[15]
- Agency for Healthcare Research and Quality (AHRQ)[16]
- Difficult Airway Society/Royal College of Anaesthetists[17, 18]

Review the evidence of benefits associated with Shiley™ evac technology

Background

- Ventilator-associated pneumonia (VAP)
- Shiley™ technology

SSD Meta-analysis

- Pozuelo-Carrascosa et al.

TPG Evac

- Nam et al.

QI Program Summary

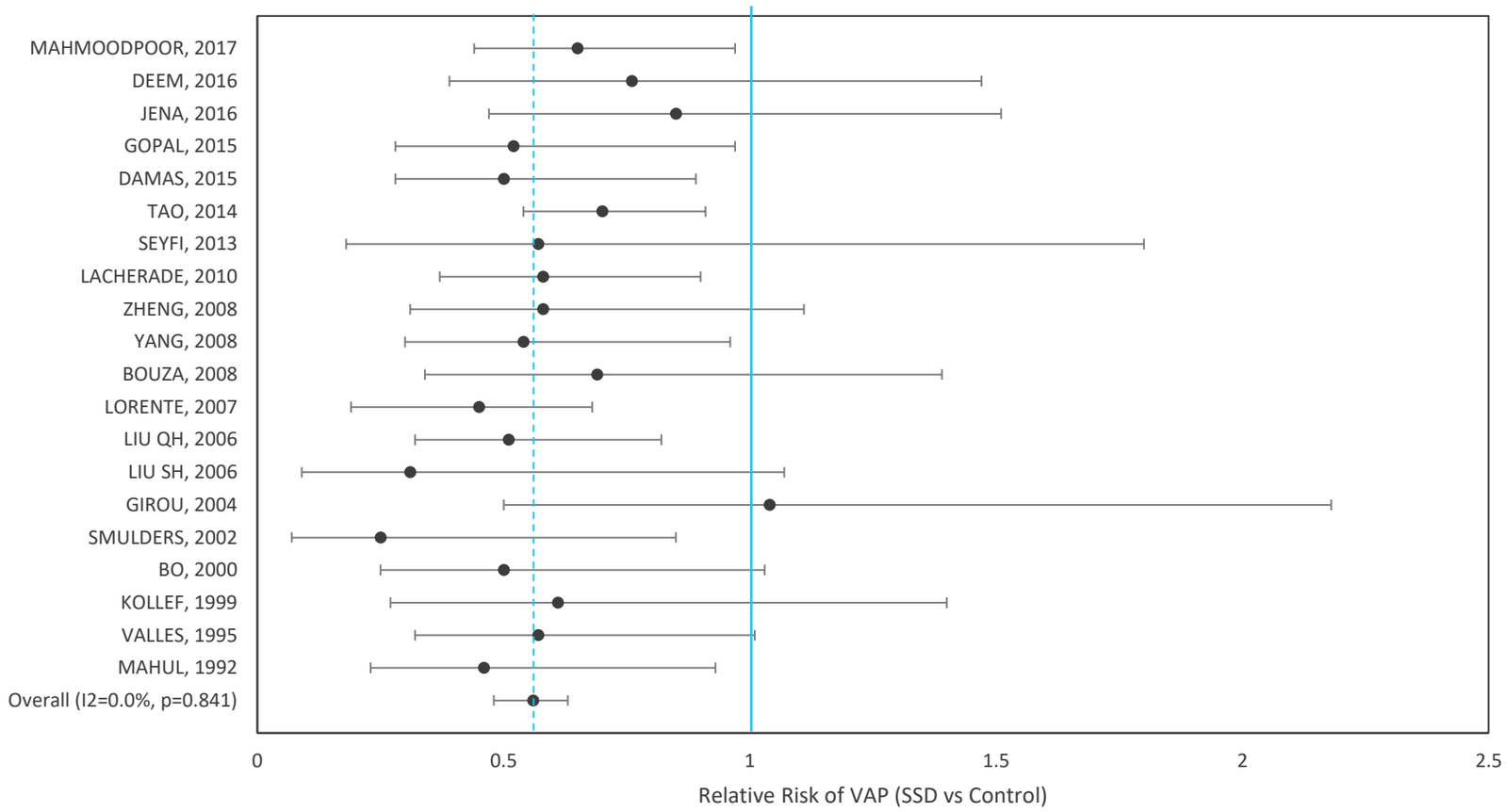
- Weston Smith et al.

Pozuelo-Carrascosa DP, et al.

Subglottic secretion drainage for preventing ventilator-associated pneumonia: an overview of systematic reviews and an updated meta-analysis

European Respiratory Review. Mar 2020, 29 (155) 190107; DOI: 10.1183/16000617.0107-2019

Adapted from Pozuelo-Carrascosa, Figure 2



Study information

Study design	International, systematic review and meta-analysis
Methods	• 20 RCT were identified from 1992 to 2017 that included 3684 adults that received mechanical ventilation and admitted to ICU • Primary outcome was VAP incidence with or without subglottic secretion draining (SSD).
Results	• SSD significantly reduced VAP incidence (RR: 0.56, 95% CI: 0.48 – 0.63; I^2=0%, p = 0.841) when pooled across all RCT. • SSD significantly reduced mortality in patients with VAP (RR: 0.88, 95% CI: 0.80 – 0.97; I^2=0%; p = 0.888).

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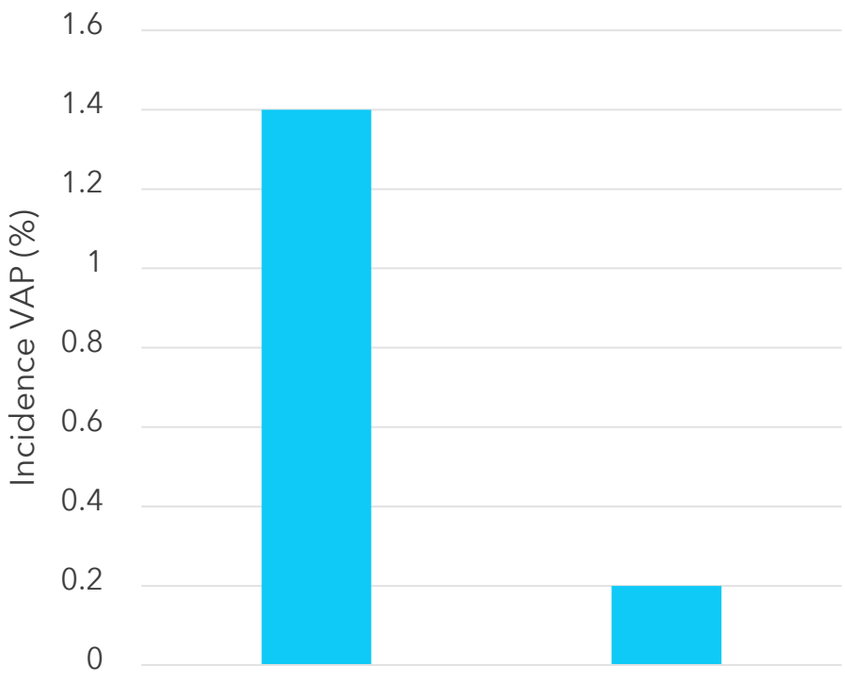
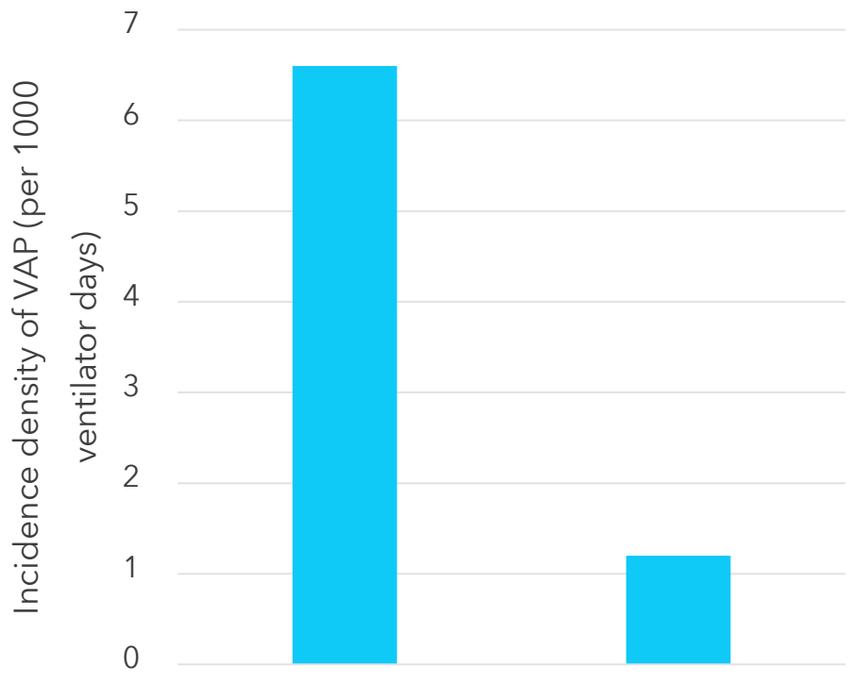
Nam K, Park JB, Park WB, et al.

Effect of Perioperative Subglottic Secretion Drainage on Ventilator-Associated Pneumonia After Cardiac Surgery: A Retrospective, Before-and-After Study.

J Cardiothorac Vasc Anesth. 2021;35(8):2377-2384. doi:10.1053/j.jvca.2020.09.126





Study information	
Study design	Single-center, retrospective, before-and-after, cohort
Methods	• 2,576 adult cardiac surgery patients from Jan 2013 to dec 2018 were assessed. • Routine use of subglottic secretion drainage (SSD) during surgery began in dec 2017 (interventional group, n = 468) • Risk of VAP was primary outcome
Results	• Risk of VAP after cardiac surgery was significantly lower in patients with perioperative SSD (adjusted OR= 0.29; 95% CI: 0.14 – 0.5; p < 0.001) • Duration of mechanical ventilation, rates of reintubation, tracheostomy, and all-cause in-hospital mortality were similar between groups

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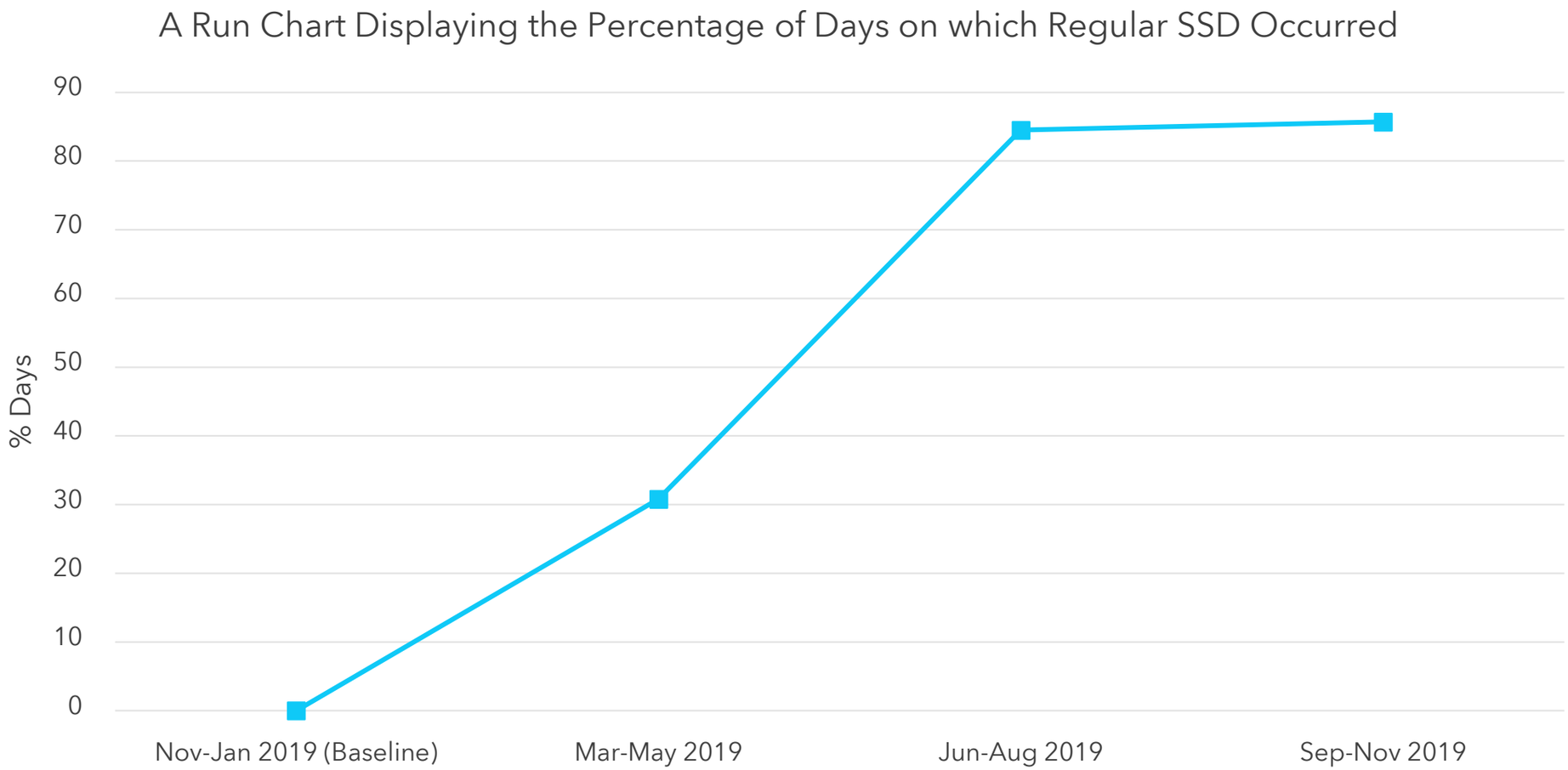
Weston Smith N, Spivey M.
Promoting subglottic secretion drainage: a quality improvement project in a UK critical care unit.
BMJ Open Qual. May 2021;10(2)doi:10.1136/bmjoq-2020-001269



Study information

Study design	Quality improvement, Plan-Do-Study-Act methodology
Methods	• Subglottic secretion drainage (SSD) was prescribed every 6 hours within the clinical information system incorporated into tracheostomy care bundle • 24 patients were included that accumulated 353 ventilator days
Results	• At baseline, there was no documented evidence of SSD use • By implementing the care bundle, over the next 6 months there was a marked increase in SSD use

Review the evidence of benefits associated with Shiley™ evac technology

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SSD Meta-analysis

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- Nam et al.

QI Program Summary

- Weston Smith et al.

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6135 Gunbarrel Avenue | Boulder, CO 80301 | 800.635.5267 medtronic.com

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Review the evidence of benefits associated with Shiley™ EVAC Technology

Background

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SSD Meta-analysis

- Pozuelo-Carrascosa et al.

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