Improving Efficiency and Environmental Sustainability of Nasal Cannula Oxygen Delivery in the Recovery Rooms

Primary Investigator: Maria Deda BSN RN-BC New York Presbyterian Hospital/Weill Cornell New York City, New York Co-Investigators: Theresa Raczko MS RN CPAN, Linjia Jia MD, Deirdre Kelleher MD

Introduction: Oxygen is critical for treatment and prevention of hypoxia in the post anesthesia care unit (PACU). Operating rooms (ORs) have nipple-type oxygen delivery systems while PACUs have fluted knob-type systems. Surgical centers must ensure uninterrupted oxygen delivery to enhance patient safety and outcomes.

Identification of the problem: Patients were placed on end-tidal carbon dioxide (EtCO2) monitoring nasal cannulas (NCs) compatible with nipple-type oxygen delivery systems in procedural rooms but incompatible with knobs in PACU. Upon PACU arrival, staff either exchanged the NC for a knob-compatible NC or secured a green "Christmas tree" adapter. Both methods contributed to waste and prolonged oxygen downtime. "Christmas trees" pose an added infection risk because they are one time use.

Purpose of the study: To prevent oxygen delivery disruptions and reduce the environmental/fiscal impact of current oxygen delivery systems.

Methods: Through direct observation, we quantified endoscopy patient NC exchanges on PACU arrival. We analyzed cost per patient using two NCs, cost using one NC and one "Christmas tree," nursing time lost, and oxygen downtime. We collaborated with anesthesia and supply chain leadership to introduce new EtCO2 monitoring NCs compatible with oxygen delivery systems in both ORs and PACUs.

Outcomes/Results: Pre-implementation, we observed approximately 12 NC exchanges per day versus 0 exchanges for three months post-implementation. This solution is estimated to save \$8,091/year in material costs among endoscopy alone, reduce endoscopy's plastic footprint by 595 pounds/year, reduce oxygen downtime patients experience on PACU arrival from 1 minute to under five seconds, and redirect 45 hours/year to direct nursing care.

Discussion: A neighboring organization implemented reusable brass nipples in lieu of Christmas trees, but this posed regulatory compliance concerns regarding infection control. Leadership analyzed cost/unit of supplies; however, after nursing collaboration, we analyzed cost/patient because patients were using two products each, experiencing extended PACU stays, and requiring more nursing time. The new NC costs more per unit, but less per patient.

Conclusion: Through multi-disciplinary collaboration, this change was implemented in all our procedural areas enabling us to provide high quality care while reducing our environmental/fiscal impact.

Implications for perianesthesia nurses and future research: Nurses offer invaluable input when determining efficiency. Their different experiences help reveal hidden operational costs in addition to material costs.