

Introduction

- Anesthesia providers have an ethical responsibility to do no harm to the patient, but what about the environment?
- Anesthetic gases used on a daily basis, including isoflurane, desflurane, sevoflurane, and nitrous oxide (N2O), are categorized as greenhouse gases and can have a tremendous impact on the environment including global warming and depleting the ozone layer.
- A specialty area where most inhaled anesthetic exposure occurs is during pediatric induction and intubation.

Background and Significance

- Global temperatures are expected to rise in the years to come and the repercussions include droughts, heat waves, wildfires, stronger and more intense hurricanes, shrinking of glaciers, rising sea levels, ocean acidification, and changes in land cover (Shaftel et al., 2021).
- Sevoflurane, isoflurane, desflurane and N2O have atmospheric lifetimes of 1, 3, 14, and 114 years respectively (Allersen et al., 2012).
- 1 hour of running desflurane at 6.7% at 1 L/min is the equivalent of driving 198 miles, while 1-hour of running Sevoflurane at 2.2% is the equivalent of driving 4 miles (Sherman et al., 2017).
- The responsibility of reducing greenhouse gas emissions in the hospital will have to fall on the shoulders of those choosing to use the drugs.

Problem and Purpose Statement

- Would scientific data and environmental terminology be made relatable and meaningful so that adopting a new clinical practice made sense?
- Were anesthesia providers willing to make a practice change if there is data lacking on how much waste anesthetic gas is saved by turning off fresh gas flows as opposed to the vaporizer during pediatric intubation?

Clinical Question

- Will creating a PSA for anesthesia providers about turning off fresh gas flow as opposed to the vaporizer prior to pediatric intubation save waste anesthesia gas and minimize the impact on the environment?

Aim and Objectives

- Design a 3-5 minute video PSA highlighting the current climate change problem, anesthesia's contribution to the problem, and ways to lessen the environmental cost of providing inhaled anesthetics
- Display video during the Fall NJANA meeting (October 2021)
- Administer pre and post PSA surveys that will measure these two goals with 5-Likert scale style questions
- Promote the video PSA through other social media outlets such as YouTube via the Total Recall: Educational Videos for SRNAs page

Method

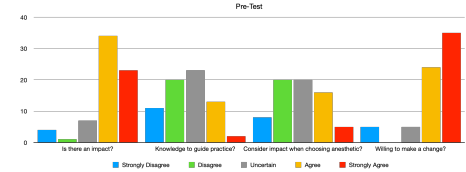
- A quantitative study was performed to measure the success of recommending a clinical practice change for anesthesia providers to shut off fresh gas flows immediately prior to pediatric intubation.
- The pre-test survey consisted of questions pertaining to whether anesthesia providers were aware of the harmful effects of anesthetic gases on the environment, and how current providers practice in terms of fresh gas flows use and vaporizer use.
- A public service announcement (PSA) video and slide presentation provided an explanation and description of the effects of anesthetic gas on the environment and recommended ways to decrease that impact.
- The post-test survey examined if the providers understood the need for clinical practice change, the effects of anesthetic gas on the environment, and whether they considered changing their practice.
- Comparative results taken of the pre- and post-tests of anesthesia providers who took part in the study, examining the increase in knowledge and willingness to change their practice.



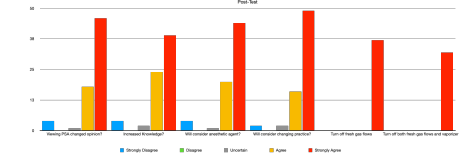
YouTube link:



Results



Question	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Is there an impact?	4	20	23	34	23
Knowledge to guide practice?	11	20	23	13	2
Consider impact when choosing anesthetic?	8	20	20	16	5
Willing to make a change?	5	0	5	24	35



Question	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Viewing PSA changed content?	4	0	2	15	46
Increased knowledge?	4	0	2	24	38
Will consider anesthetic event?	4	0	1	20	44
Will consider changing practice?	2	0	2	16	48
Turn off fresh gas flows	0	0	0	0	37
Turn off both fresh gas flows and vaporizer	0	0	0	0	30

Analysis

The Wilcoxon Signed-Rank Test was used to analyze the significance of participants responses on 4-measures - before and after viewing the video PSA.

Wilcoxon Signed Ranks Test

Ranks				Z	
	N	Mean Rank	Sum of Ranks		
I am willing to make changes to my anesthesia practice regarding fresh gas flows and pediatric intubation < After viewing the Environmental Cost of Anesthesia PSA, I am willing to make changes to my anesthesia practice regarding fresh gas flows and pediatric intubation	24 ^a	17.75	426.00	-2.274 ^b	.023
I am willing to make changes to my anesthesia practice regarding fresh gas flows and pediatric intubation > After viewing the Environmental Cost of Anesthesia PSA, I am willing to make changes to my anesthesia practice regarding fresh gas flows and pediatric intubation	10 ^b	16.90	169.00		
Ties	35 ^c			a. Wilcoxon Signed Ranks Test	
Total	69			b. Based on positive ranks.	

- P-values for each question:**
- Question #4 - p = .001
 - Question #5 - p < .001
 - Question #6 - p < .001
 - Question #8 - p = .023

A Wilcoxon signed-rank test showed that a 4-minute video PSA regarding anesthesia and the environment did elicit a statistically significant change in participants willingness to change their anesthetic practices. (Z = -2.274, p = 0.023).

References



Pre and Post Test Surveys

RUTGERS

Pre-Intervention Survey

1. How long have you been practicing as a CRNA/CCRN/Respiratory Therapist?

2. In what state are you currently practicing as a CRNA?

3. At what type of facility do you practice majority of the time?

4. The environmental impact of anesthesia-related products and procedures is an important factor that should be taken into account when conducting anesthesia practice.

5. My level of knowledge on the environmental impact of inhaled anesthetics is sufficient to guide my practice.

6. I consider the environmental impact when choosing inhaled anesthetic agents.

7. When choosing a mask from a patient prior to pediatric intubation, I routinely turn off the fresh gas flow and the vaporizer on both the fresh gas flow and the vaporizer off.

8. I am willing to make changes to my anesthesia practice regarding fresh gas flows and pediatric intubation.

RUTGERS

Post-Intervention Survey

9. After viewing the Environmental Cost of Anesthesia PSA, the environmental impact of anesthesia-related products and procedures is an important factor that should be taken into account when conducting anesthesia practice.

10. After viewing the Environmental Cost of Anesthesia PSA, my level of knowledge on the environmental impact of inhaled anesthetics is sufficient to guide my practice.

11. After viewing the Environmental Cost of Anesthesia PSA, I will consider the environmental impact when choosing inhaled anesthetic agents.

12. After viewing the Environmental Cost of Anesthesia PSA, when receiving a mask from a patient prior to pediatric intubation in the future, I plan to: turn off the fresh gas flow; turn off both the fresh gas flow and the vaporizer on both the fresh gas flow and the vaporizer off.

13. After viewing the Environmental Cost of Anesthesia PSA, I am willing to make changes to my anesthesia practice regarding fresh gas flows and pediatric intubation.