



Local Anesthetic Systemic Toxicity Prevention Recognition and Treatment in a Perioperative Setting: A Quality Improvement Project and DNP Project

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INTRODUCTION

- The use of local anesthetics (LAs) is growing ²
- Local anesthetic systemic toxicity (LAST) occurs from uptake of LAs into the bloodstream ⁵
- LAST can cause CNS changes, seizures, EKG changes and cardiac collapse ⁵
- CRNAs are responsible for administration and care of patients receiving LA's ^{1,4}
- The purpose of this DNP quality improvement project is to assess CRNA perceptions of adequacy of a LAST Quick Reference Guide designed to assist in identifying high-risk patients, to quickly diagnose LAST, and appropriately treat LAST should it occur

METHODS

- A single Plan-Do-Study-Act (PDSA) cycle ³
- Pre- and Post-survey design using Qualtrics survey software
- Project tools developed with the project team.
- Survey included evidence-based Likert-type, correct response, and an open response question
- Survey assessed participants' perceptions of QRG adequacy as well as knowledge and confidence gained from the project resources
- Data analysis of the survey to determine perceived usefulness of the QRG
- Dissemination and presentation of results to participants and the participating organization

RESULTS

Figure 1

Pre and Post-implementation lipid emulsion therapy mechanism of action assessment (n=9)

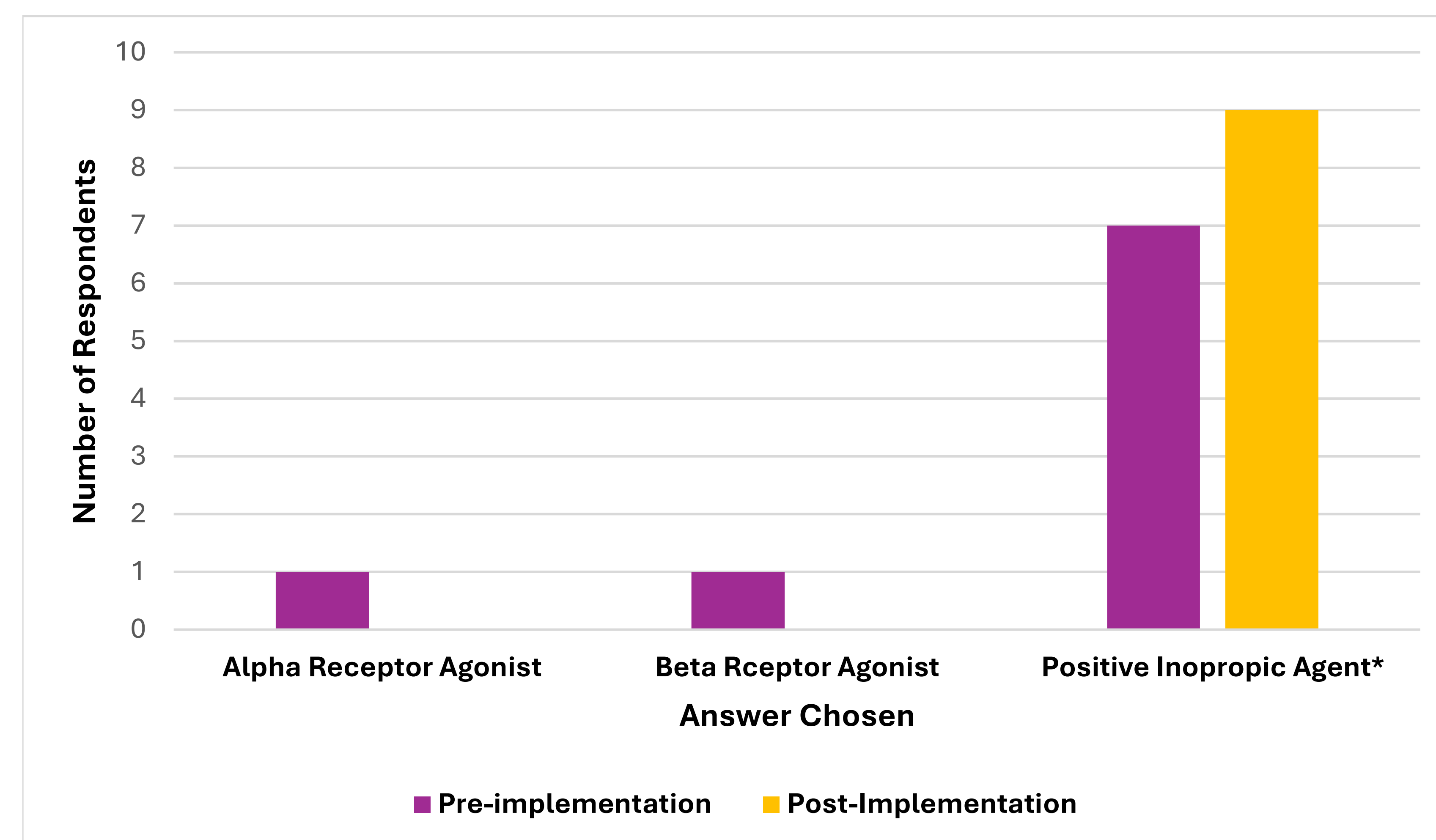
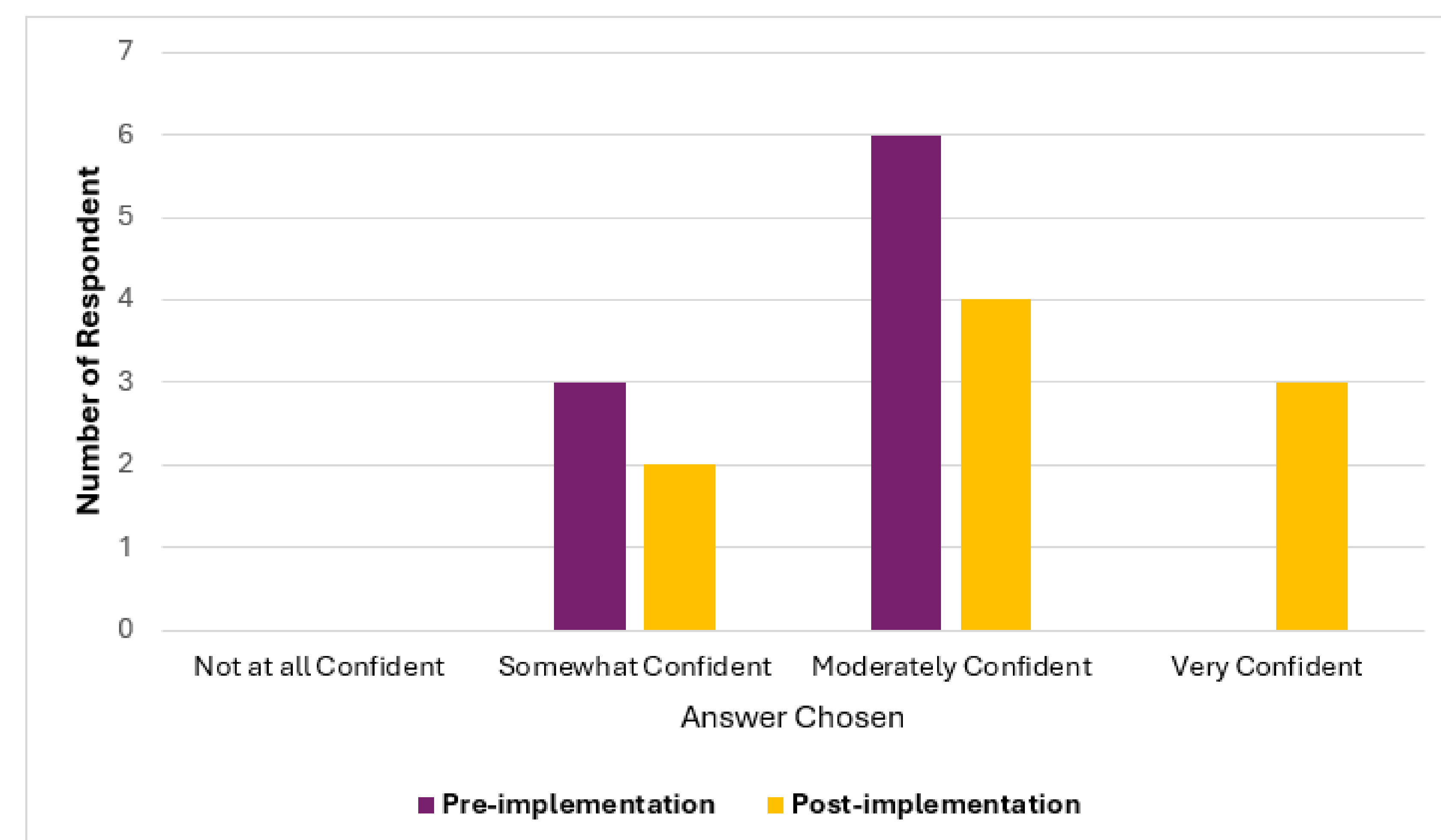


Figure 2

Pre and Post confidence in maximum dosage of local anesthetics with and without epinephrine (n=9)



DISCUSSION

- Nine CRNAs responded to both the pre-implementation and post-implementation surveys
- Participating CRNAs reported improved understanding of the mechanism of action of lipid emulsion therapy
- Participating CRNAs reported increased confidence levels regarding maximum dosages of local anesthetic agents
- Eight of nine participating CRNAs reported the BICEPSS mnemonic to be useful
- Eight of the nine participating CRNAs supported implementing a QRG at the participating organization

CONCLUSIONS

- **Limitations**
 - Relatively small sample size
 - Short implementation period
- **Recommendations**
 - Larger sample size with longer implementation periods
 - QRG developed by the CRNAs who will be using it
 - Inclusion of other groups of anesthesiologists at the partnering institution
- **Implications**
 - Potential for cost savings
- **Sustainability**
 - Low cost to print and distribute materials
 - Project champion

REFERENCES

1. American Association of Nurse Anesthetists. (2023). *Scope of Nurse Anesthesia Practice*. AANA. <https://www.aana.com/wp-content/uploads/2023/01/scope-of-nurse-anesthesia-practice.pdf>
2. El-Boghdady, K., Pawa, A., & Chin, K. J. (2018). Local anesthetic systemic toxicity: Current perspectives. *Local and Regional Anesthesia*, 11, 35-44. <https://doi.org/10.2147/LRA.S154512>
3. Institute for Healthcare Improvement. (2022). Model for improvement: Plan-Do-Study-Act (PDSA) cycles. Science of improvement: Testing changes. [https://www.ihl.org/resources/how-improve-model-improvement#:~:text=Testing%20Changes-.The%20Plan%20Do%20Study%20Act%20\(PDSA\)%20cycle,adapted%20for%20action%20oriented%20learning.](https://www.ihl.org/resources/how-improve-model-improvement#:~:text=Testing%20Changes-.The%20Plan%20Do%20Study%20Act%20(PDSA)%20cycle,adapted%20for%20action%20oriented%20learning.)
4. North Carolina Board of Nursing. (2024). Certified Registered Nurse Anesthetist. North Carolina Board of Nursing. <https://www.ncbon.com/certified-registered-nurse-anesthetist-0>
5. Van Wicklin, S. A. (2024). Local anesthetic systemic toxicity (LAST). *Plastic & Aesthetic Nursing (PAN)*, 44(3), 168-171. <https://doi.org/10.1097/PSN.0000000000000582>