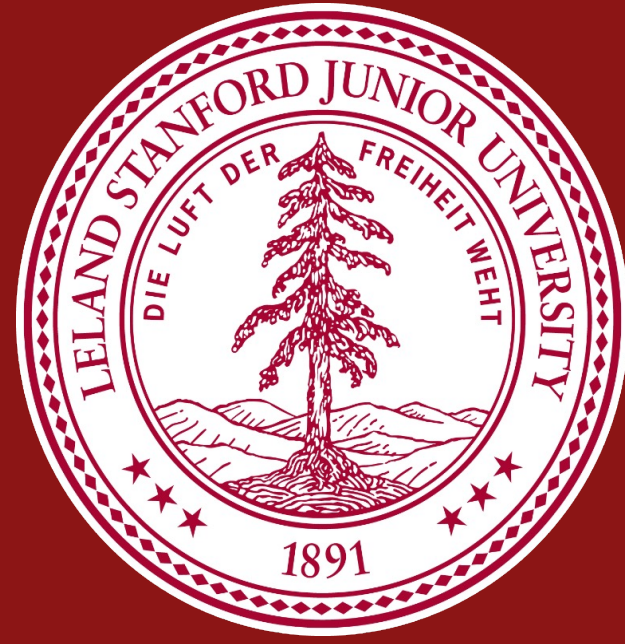




Stanford  
Anesthesiology,  
Perioperative  
& Pain Medicine



# Thoracic epidural education in the era of minimally invasive surgery: training adaptations at a large academic center

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## Introduction

- Thoracic epidural analgesia is an integral part of enhanced recovery after surgery pathways and has been demonstrated to reduce pulmonary morbidity in the postoperative period (1, 2).
- At our institution like many others, surgical trends towards minimally invasive surgery have reduced the number of open thoracotomy and laparotomy cases that would warrant thoracic epidurals (3).
- Outside of the obstetric setting, there is large variance in the training of epidural placement and management.
- We aimed to assess residents' confidence surrounding thoracic epidurals and their preferred educational methods to supplement the existing curriculum.

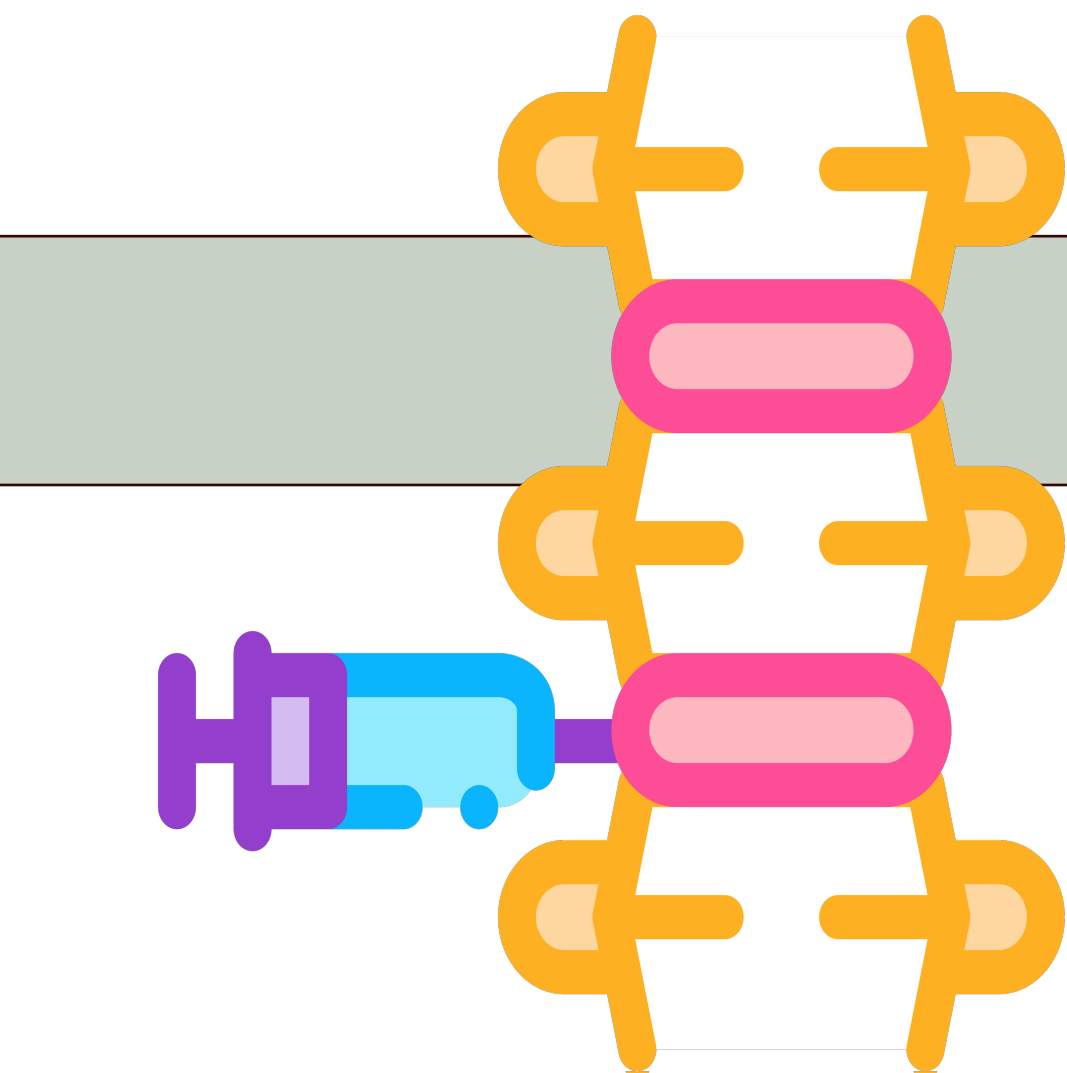
## Methods

- This educational study was approved by Stanford University's IRB (Protocol 72517).



Please rate how familiar you are with each of the following aspects of peri-operative epidural management; how familiar are you with...

|                                                                                        | Not at all familiar   | Slightly familiar                | Somewhat familiar                | Very familiar                    |
|----------------------------------------------------------------------------------------|-----------------------|----------------------------------|----------------------------------|----------------------------------|
| Steps for placing a thoracic epidural                                                  | <input type="radio"/> | <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/>            |
| Indications for placing a thoracic epidural                                            | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/>            | <input type="radio"/>            |
| Discussing important considerations (e.g. risks, benefits) of epidurals                | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> |
| Intraoperative dosing of epidurals                                                     | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/>            | <input type="radio"/>            |
| Writing orders for epidurals                                                           | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> |
| Troubleshooting epidurals                                                              | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/>            | <input type="radio"/>            |
| Using ultrasound for epidural placement                                                | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/>            | <input type="radio"/>            |
| Verification techniques such as column test, stimulation, confirming level of epidural | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/>            | <input type="radio"/>            |



- An anonymous survey was distributed to all Stanford resident anesthesiologists and recently graduated residents who stayed on as fellows. No monetary compensation was provided.

## In the era of minimally invasive surgery, thoracic epidurals are becoming less common.

## Despite growing confidence in thoracic epidural management with increasing PGY training level, all PGY levels of residents at our institution felt there were *knowledge gaps* with the following 3 topics:

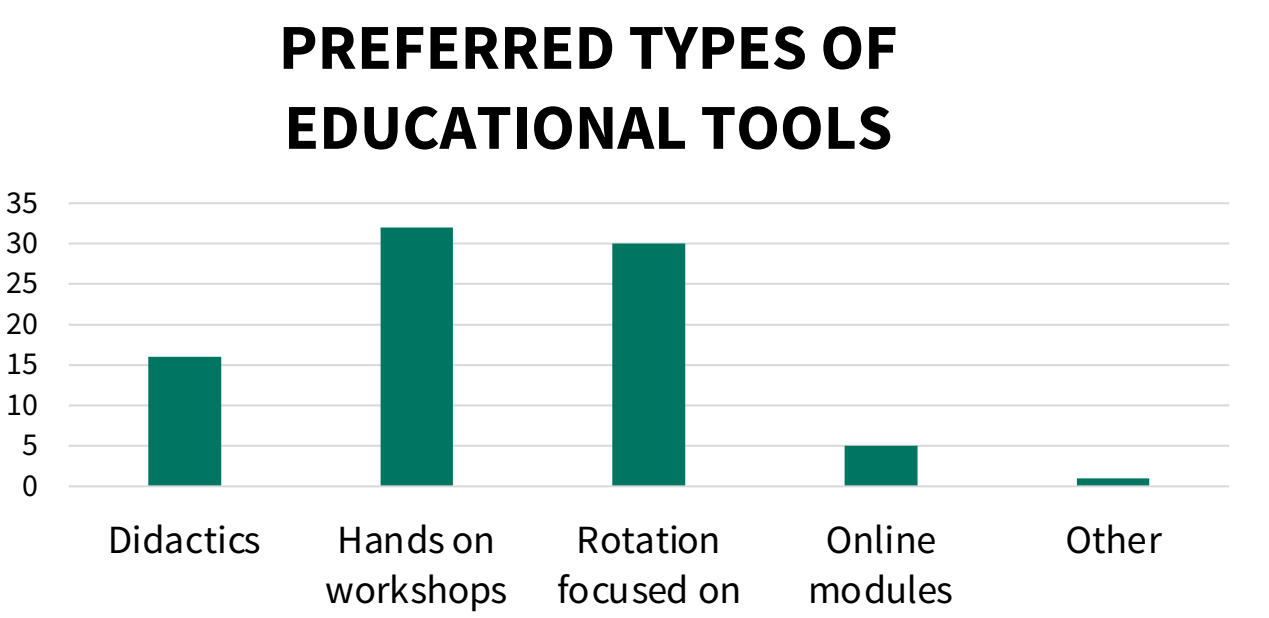
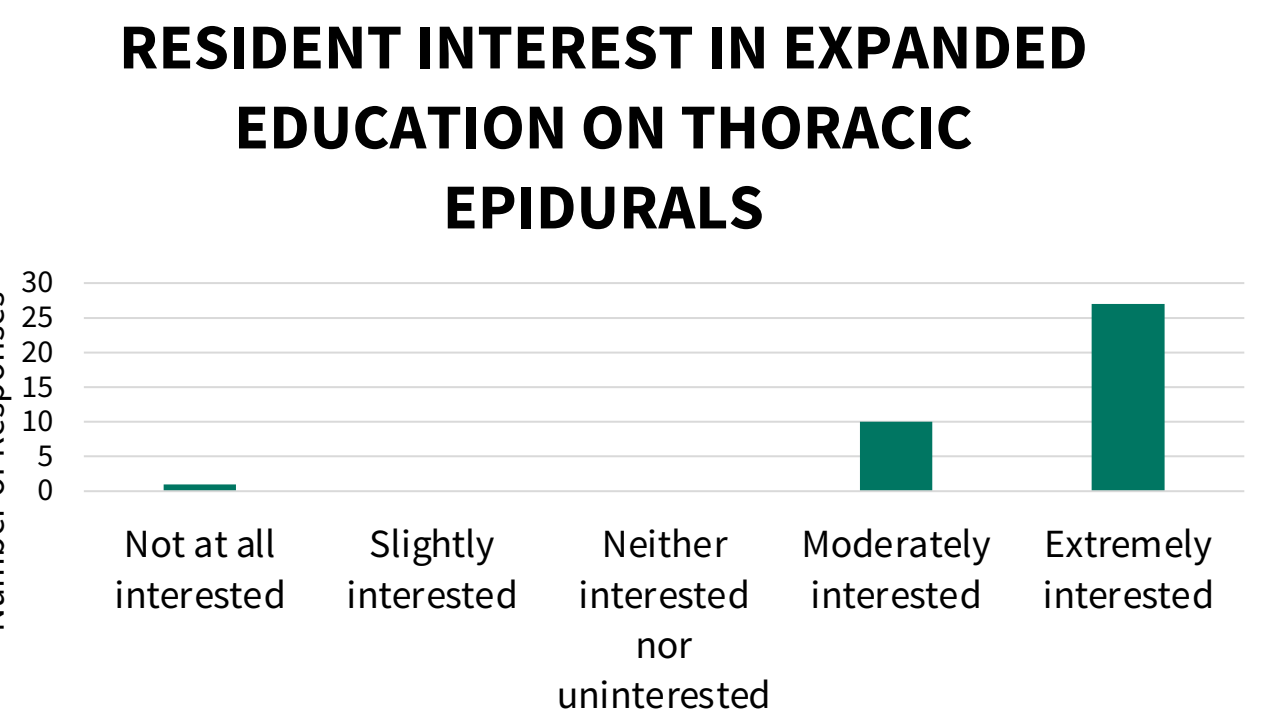
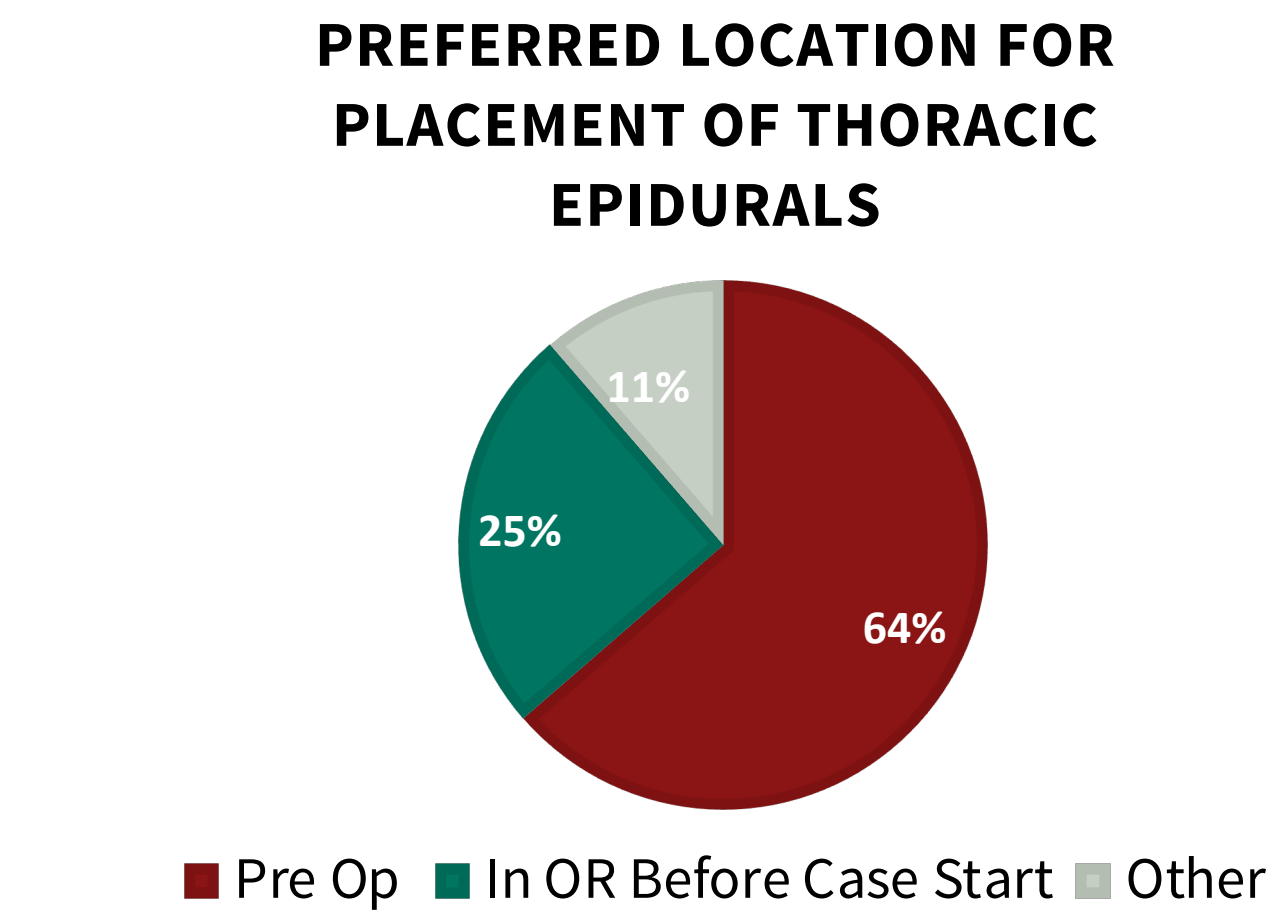
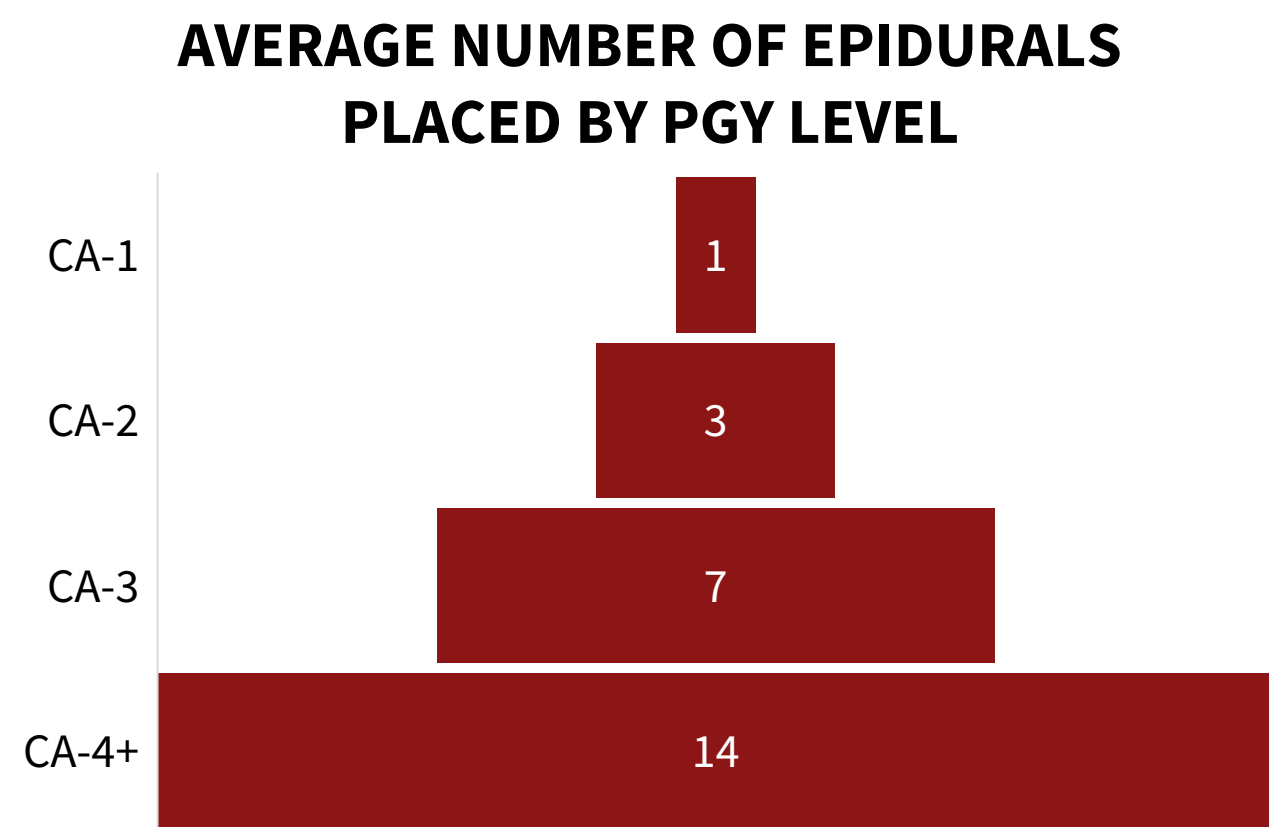
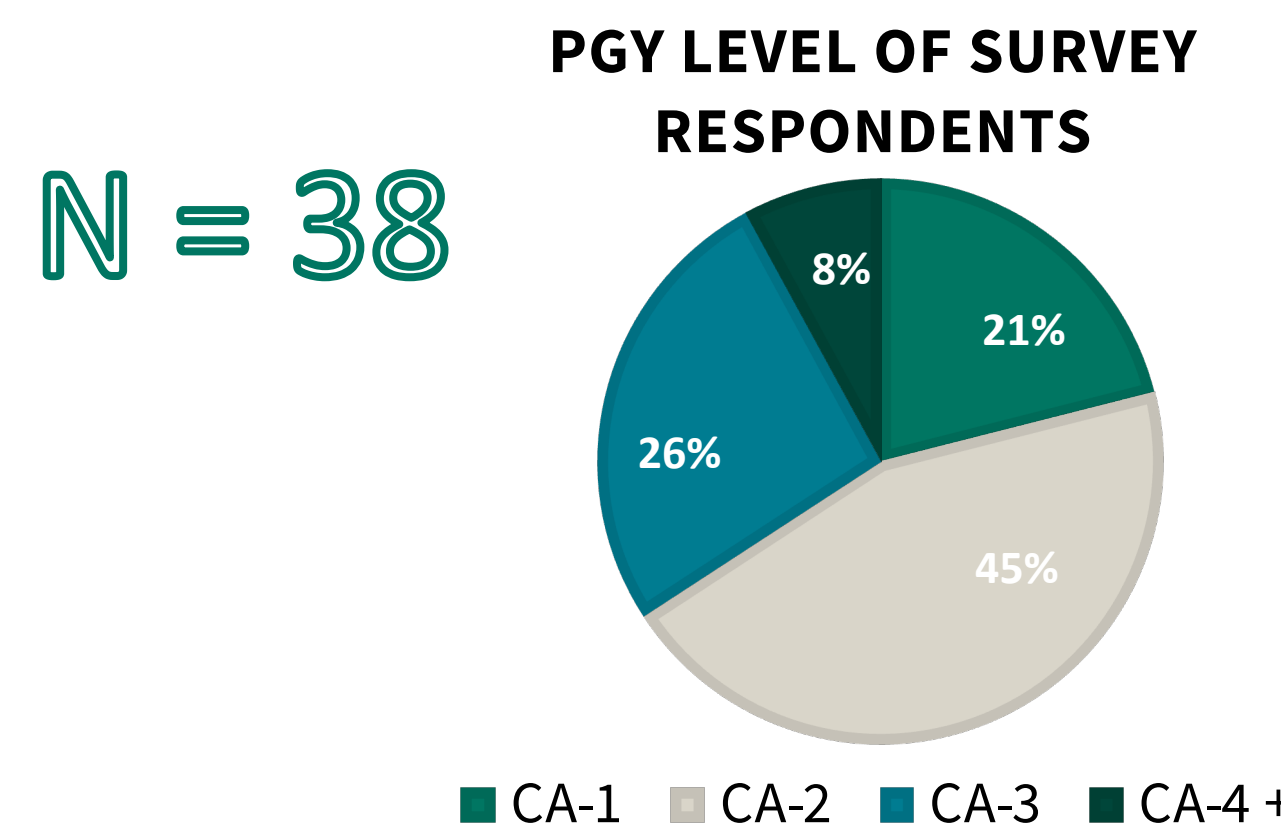
- Using ultrasound for placement
- Verification techniques
- Intraoperative dosing

## Residents requested more education including:

- Hands-on workshops — incorporating next academic cycle
- Targeted rotations for teaching epidurals
- Dedicated didactics — 1 lecture per CA class added this year



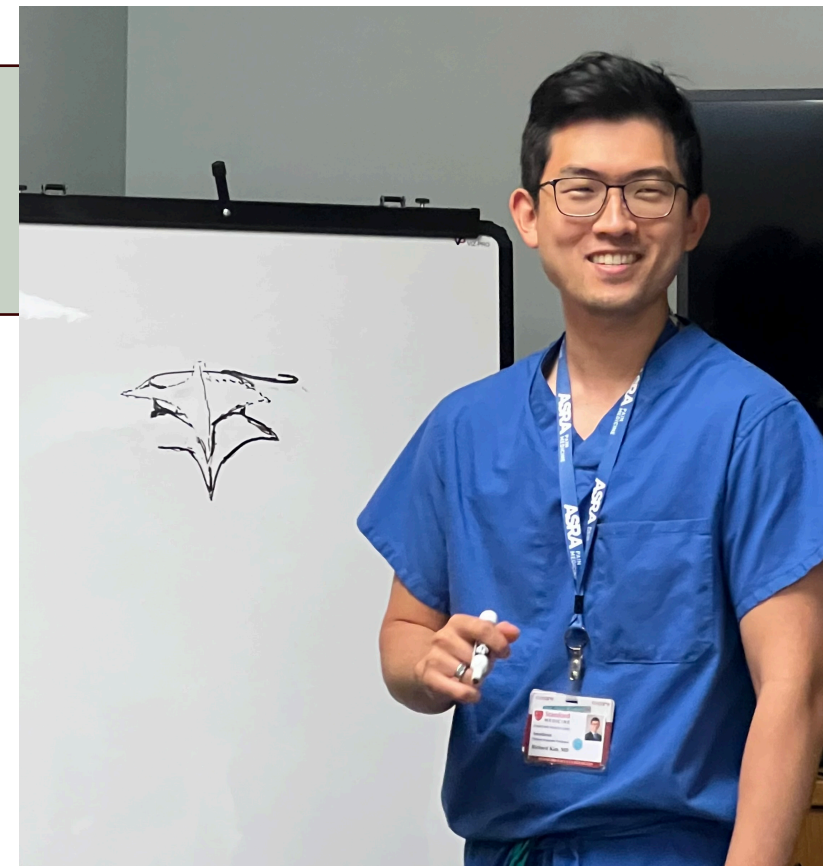
## Results & Discussion



**Interventions:** 1) added dedicated lectures for CA-1, CA-2, and CA-3 residents, 2) incorporating hands-on workshops for all PGY levels, 3) creating a protocol for intraoperative dosing for resident use.

## References

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| Average Likert Score By PGY Level                                       |                |              |              |                |
|-------------------------------------------------------------------------|----------------|--------------|--------------|----------------|
| Likert Question: Familiarity with...                                    | PGY - 2 (CA-1) | PGY-3 (CA-2) | PGY-4 (CA-3) | PGY-5+ (CA-4+) |
| Steps for placing a thoracic epidural                                   | 2.3            | 3.2          | 3.8          | 4.3            |
| Indications for placing a thoracic epidural                             | 2.1            | 3.4          | 3.9          | 4              |
| Discussing important considerations (e.g. risks, benefits) of epidurals | 2.6            | 3.3          | 4            | 4.7            |
| Intraoperative Dosing                                                   | 1.3            | 2.6          | 2.9          | 3.7            |
| Writing Orders                                                          | 1.6            | 3.4          | 3.9          | 4              |
| Troubleshooting                                                         | 1.9            | 3.3          | 3.8          | 4.3            |
| Using Ultrasound for Placement                                          | 1.4            | 2.2          | 3.2          | 4              |
| Verification Techniques                                                 | 1.8            | 2.9          | 3            | 4              |

Likert Scale for Familiarity: 1 = Not at all familiar, 2 = Slightly familiar, 3 = Somewhat familiar, 4 = Very familiar, 5 = Extremely familiar