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## Situational Awareness Errors in Anesthesia Malpractice Claims

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### Introduction:

Situation awareness (SA) is "the *perception* of elements of the environment within a volume of time and space, the *comprehension* of their meaning and the *projection* of their status in the near future."<sup>(1)</sup> Inadequate perception, comprehension and projection of changing clinical situations in a timely fashion (SA error) may result in high severity outcomes, especially in complex and dynamic domains such as anesthesia.<sup>(2,3,4)</sup> Therefore, we analyzed the role of individual SA errors in malpractice claims for death and permanent brain damage.

### Methods:

A random sample of 100 anesthesia malpractice claims for death or severe brain damage that occurred in 2002-2011 was selected from the Anesthesia Closed Claims Project database of 10,093 claims. Only claims with anesthesia-related damaging events that occurred intra-anesthesia were included; claims associated with chronic or acute pain management or obstetric anesthesia care were excluded. Two anesthesiologists (CS, AB) independently evaluated the claim narratives to identify whether SA errors contributed to the death or brain damage. Inter-rater reliability was measured by Cohen's kappa. Claims with SA error were compared to other claims by Fisher's exact test for proportions and Mann Whitney U Test for magnitude of payments.

### Results

SA errors contributed directly to death or brain damage in 78 claims (78%, kappa= 0.694). SA error claims did not differ from the other 22 claims in their basic characteristics: 54% male, 95% adults, 64% ASA 3-5, 24% emergency, 73% general anesthesia, 23% monitored anesthesia care. The most common damaging events in SA error claims were respiratory (50%), cardiovascular (31%), equipment (9%), and medication (6%, Figure). The most common respiratory events in SA error claims were inadequate ventilation (18% of 78 SA errors), difficult intubation (14%), and pulmonary aspiration (10%). All of the SA errors occurred in the OR, with 10% continuing into the postoperative period (PACU or ICU). SA errors by the surgical and/or postoperative care team were identified in 29% of the SA error claims, most in combination with anesthesia team SA errors.

SA error claims were more likely to result in payment than other claims, with 91% paid by some defendant (vs. 50% of others,  $p < 0.001$ ) and 83% paid on behalf of the anesthesiologist (vs 45% of others,  $p = 0.001$ ). If a payment was made on behalf of the anesthesiologist in SA error claims, the median payment (\$551,000, IQ range \$250,000 - \$960,000, in 2012 dollars) did not differ from payment amounts in the other non-error claims.

### Discussion:

SA errors contributed to a large proportion of claims for death and brain damage, illustrating the crucial role of situational awareness in anesthesia. These claims were more likely to result in payment on behalf of the anesthesiologist than non-SA-error claims. Although anesthesia malpractice claims in general focus on deficiencies of anesthesia care, in almost one third of claims SA errors were also detected in the surgical team.

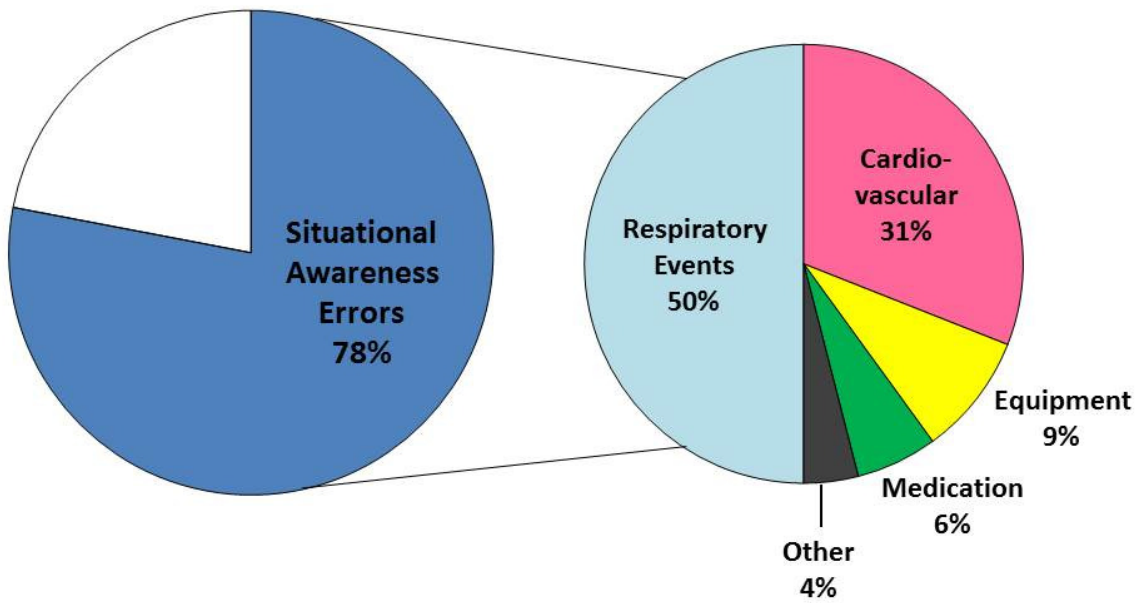
Other high-risk domains (e.g. aviation) identified the important role of SA and the valuable contribution of SA training to improve outcome. The identification of patterns of SA errors and the development of strategies for prevention holds potential to improve anesthesia patient safety and liability.

### References:

1. Endsley MR. Human Factors Society Annual Meeting, Oct 1988; 97-101
2. Endsley MR. Hum Factors 1995; 32
3. Gaba DM. Hum Factors 1995; 20
4. Schulz CM. Anesthesiology 2013; 729

**Figure 1**

### Most Common Damaging Events in Claims for Situational Awareness Errors



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