Fellow-Led Emergency Simulation Improves Infrastructure and Response Readiness in an Outpatient Chronic Pain Clinic

Cody Barbari, DO, Stephanie Vu, MD, Maxim Eckmann, MD, Mfonobong Okubadejo, MD

Department of Anesthesiology & Pain Medicine, The University of Texas Health Science Center at San Antonio

ASRA PAIN MEDICINE
25th Annual Pain Medicine Meeting
November 5-7, 2026 | Tampa, Florida
#ASRAFALL26

Introduction

Outpatient interventional pain clinics provide increasingly complex procedural care in settings that may lack the immediate resources of a hospital or operating room, while patients remain vulnerable to time-critical emergencies including vasovagal collapse, hypoxia, local anesthetic systemic toxicity, seizure, and acute cardiovascular or neurologic events. Although crisis-resource management and simulation-based training are well established in anesthesiology, their application in outpatient pain settings remains less standardized. Simulation provides a structured environment to assess clinical response, team communication, role clarity, equipment accessibility, and system-level readiness, while debriefing can identify latent safety threats and drive targeted improvements.[1,2,5] Following a vasovagal event in our clinic in 2022 that exposed gaps in emergency preparedness, we developed a fellow-led, longitudinal simulation program focused on strengthening both individual response and the systems required for timely, coordinated emergency care.

Material and Methods

Beginning May 2022, our academic outpatient interventional pain clinic implemented recurring emergency simulation sessions, now transitioning to a quarterly cadence. Eight sessions were held through March 2026, convening a multidisciplinary team of fifteen to twenty participants, including anesthesiology, emergency medicine, and physical medicine and rehabilitation residents, pain fellows, pain faculty, medical assistants, and clinic staff. Later sessions incorporated two scenarios selected from hypoxia, vasovagal collapse, stroke, and myocardial infarction, reflecting emergencies encountered in our patient population. Pain fellows served as clinical team leaders. Structured debriefing identified deficiencies in emergency preparedness and generated targeted system improvements. Beginning March 2024, real-world clinic emergencies were prospectively tracked, including event-type, responder count, response time, and patient disposition. No patient-identifiable information was collected.

Figure 1



UTHSCSA Pain Staff Debrief after a scenario. Review of key points and brainstorming session to optimize emergency responses.

Figure 2



UTHSCSA Pain Fellows, Staff, and Residents participate in scenarios at the pre-procedure bay and procedure room.

Figure 3



UTHSCSA Pain Fellows, Staff, and Residents participate in scenarios in the fluoroscopy suite.

Results

Debriefing identified actionable infrastructure gaps, including limited crash cart/bag accessibility, absence of a bradycardia algorithm, and inadequate two-way radio coverage, prompting targeted system improvements. From March 2024 to July 2026, 26 real-world emergencies were documented, most commonly vasovagal episodes, with additional events including falls, hypoxia, seizure, and suspected stroke or myocardial infarction. Most events were recognized and managed within 1–2 minutes, with responder teams ranging from 1–13 participants. Overall, 69% of events were managed internally, while the remainder required EMS activation or hospital transfer, including later transfers for suspected stroke and myocardial infarction.

Discussion

A fellow-led emergency simulation program is a feasible and sustainable strategy to improve emergency preparedness in an outpatient interventional pain clinic. Simulation debriefing directly identified actionable infrastructure deficiencies that prompted system changes, while prospective tracking demonstrated consistently rapid responses and appropriate escalation during real clinical emergencies. These findings support simulation-based emergency preparedness as a standard, continuously refined patient safety initiative for outpatient pain programs.

References

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