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Medical toxicology education in US emergency medicine residencies

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Medical toxicology (TOX), a core content area of the American Board of Emergency Medicine [1] and an American Board of Medical Specialties (ABMS) recognized subspecialty of Emergency Medicine (EM), Pediatrics, and Preventive Medicine [2] focuses on the “diagnosis, management, and prevention of poisoning and other adverse effects due to medications, occupational and environmental toxicants and biological agents” [3]. The importance of TOX training has long been recognized. In 1983, the American College of Emergency Physicians declared that “Emergency physicians should be qualified to render toxicologic care, and that they should be prepared by training and by facility organizations to fulfill this function.” [4] There is limited literature describing US-emergency medicine (EM)-resident TOX education and training. We sought to describe this education through a survey of EM-residency-program directors.

Program and assistant program directors of the 164 Accreditation Council for Graduate Medical Education (ACGME)-approved US-EM-residency programs in the 2015–2016 academic year were asked to describe TOX-curriculum; the duration and nature of the rotation (mandatory/elective, activities), location of the rotation (<1 h. drive from home institution), the number of full-time -board-certified/eligible TOX faculty affiliated with the program, the number of TOX lectures given to residents each year outside of a TOX rotation, and the number of graduates pursuing TOX fellowship in the preceding 5 years. Responses were anonymous with the exception of program identification to prevent duplication of responses. For non-respondents, the residency website was queried whether a mandatory or elective rotation was part of the curriculum, the duration of the rotation, and the number of board-certified/eligible-full-time TOX faculty affiliated with the residency program. Information was obtained for all 164 ACGME-approved-EM-residency programs.

One-hundred-seven of the 164 ACGME approved EM residencies responded to the survey (65%). Figs. 1–4 describe survey results. TOX rotations were: 4 weeks ($n = 67$; 72%), 3 weeks ($n = 7$; 4%), 2 weeks ($n = 18$; 18%), and 1 week ($n = 1$; 1%). Nine programs described a mandatory rotation >1 h away from home institution with a mean of 6 h.; standard deviation (SD) of 4.2 h. (range: 2–12 h). Seven programs offered an elective rotation >1 h away with a mean of 4 h.; SD of 1.4 h. (range: 2–5 h).

Amongst programs offering rotations, there was a mean of 11 lectures per year (SD of 5.8 (range: 0–35)). Amongst programs with no available rotation, there was a mean of 11.6 lectures per year (SD of 7.7 (range: 0–20)). Programs without a rotation reported no graduates

pursuing fellowship while programs with a rotation (elective or mandatory) reported an average of 1.15 graduates (SD: 1.4; range: 0–7) ($p = 0.015$). Programs offering a rotation had a statistically significantly higher number of TOX faculty than those without ($p = 0.008$).

Amongst the 57 programs that did not respond to the survey request, 25 had neither a mandatory or elective rotation listed on their website. Only 5 of these programs had at least 1 board certified/eligible medical toxicology faculty. 8 programs offered an elective in medical toxicology and 24 offered a mandatory rotation. Programs with rotation had an average of 1.25 faculty (SD 1.22 and range 0–5). Duration of rotations was: 4 weeks ($n = 20$; 63%), 3 weeks ($n = 3$; 9%), 2 weeks ($n = 6$; 19%), and 1 week ($n = 3$; 9%).

We describe the nature of TOX education amongst US-EM-residency programs.

We demonstrate a statistically significant difference in the number of board-certified TOX faculty and graduates pursuing TOX fellowship present between programs offering a TOX rotation and those that do not. Graduates of 39 US EM residency programs (24%) have no formal toxicology rotation available to them during their residency. Others have an abbreviated formalized experience with rotations of two weeks or less. Even at programs with an available rotation, 23% had no full-time toxicology faculty available as part of the residency program. This suggests that many EM residents interact with toxicologists in a formalized setting such as during a rotation but perhaps not again during residency. The majority of EM residencies without an available rotation also have no full-time toxicology faculty (61%). More than half of survey respondents report 1 or fewer full-time toxicology faculty. This may have important implications regarding who is teaching EM residents about the management of the poisoned patient as well as who is directing the care of poisoned patients both in the ED and inpatient setting. Both the present study and previously described studies demonstrate that poison control center and toxicology hospital consult service education experiences are common in US EM TOX rotations [5,6]. The lack of a poison control center affiliation or dedicated toxicology consult service may therefore, by necessity, limit the ability to offer a TOX rotation in the minds of many residency program directors. Further research is necessary to determine both the nature of the optimal TOX rotation and the impact of limited full-time toxicology faculty exposure on EM residents.

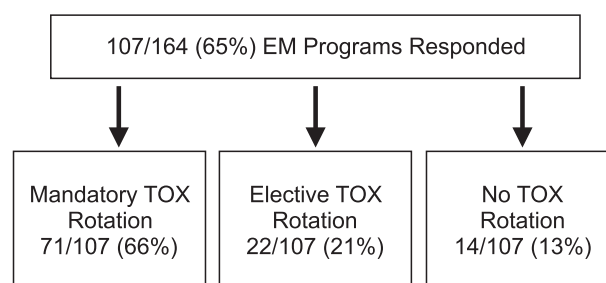


Fig. 1. Toxicology rotations offered in EM residencies.

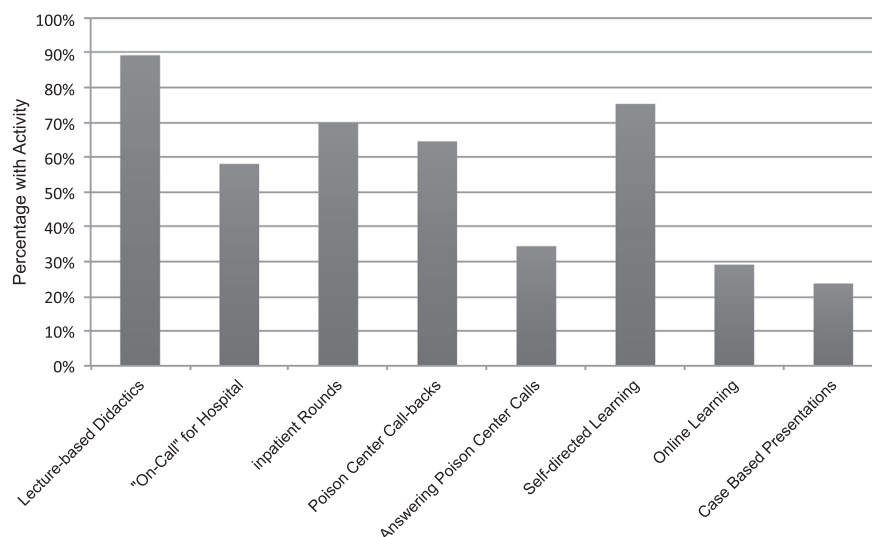


Fig. 2. Educational activities during toxicology rotation.

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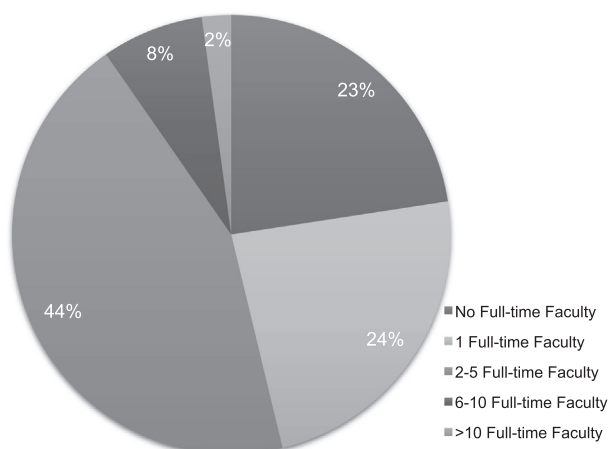


Fig. 3. Toxicology faculty at EM programs with toxicology rotations.

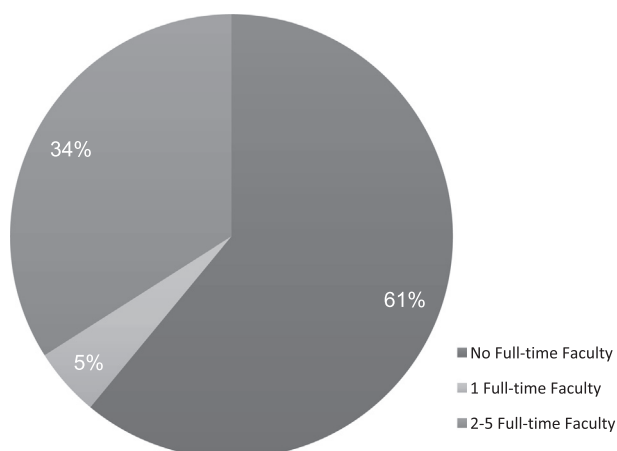


Fig. 4. Toxicology faculty at EM programs without toxicology rotations (n = 14).

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