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# Occupational exposures in US obstetrics and gynecology resident physicians

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Occupational exposures are defined as any exposure to body fluids that are potentially infectious during performance of healthcare duties; these include sharps injuries and mucous membrane exposures (MMEs). These events pose a risk of infection to providers and patients should transmission of an infectious agent occur. Providers of obstetrics and gynecology frequently perform procedures and are therefore at risk of experiencing occupational exposures. Procedures with high blood loss, common in obstetrics and gynecology, are associated with higher rates of occupational exposures.<sup>1</sup> Several studies document high rates of occupational exposures and infrequent reporting of injuries among surgical trainees; however, few obstetrics and gynecology resident physicians are represented in these reports.<sup>2,3</sup> We determined the self-reported frequency of occupational exposures and exposure reporting trends by US obstetrics and gynecology residents.

## Methods

An online survey was circulated to leadership of all Accreditation Council for Graduate Medical Education (ACGME)-accredited obstetrics and gynecology residency programs requesting distribution to all resident physicians. Also, 3 reminders were sent over the

following 6 weeks. The voluntary 22-item university institutional review board-approved survey remained open from May 1 through June 25, 2019. Consenting residents answered the survey and entered a raffle for a \$50 e-gift card.

The survey was created using REDCap (Research Electronic Data Capture) tool, managed by the coordinating team at the University of Pittsburgh, and it was verified for comprehension. Physicians reported the total number of sharps injuries and MMEs experienced during residency and whether they reported the exposures to occupational health. Descriptive analyses used percentages, means, and medians. Variables were evaluated for significance by  $\chi^2$  test and analysis of variance (ANOVA). All P values were 2-sided. Demographics were compared to national ACGME information.<sup>4</sup>

## Results

In total, 441 residents participated, representing 9% of the 4,716 residents in ACGME-accredited obstetrics and gynecology programs in 2019.<sup>4</sup> The mean age of respondents was 29.9 years, and 85.7% were women. In comparison, among US obstetrics and gynecology resident trainees in 2019, the mean age was 28.5 years and 82.8% were women. Of 441 respondents, 356 (80.7%) experienced at least 1 occupational exposure (Table 1). Sharps injuries were sustained by 322 residents (73.0%) and increased with years of training ( $P < .01$ ). MMEs were sustained by 255 residents (57.8%) and also increased with years of training ( $P < .01$ ). By the final year of training, 91% of residents experienced at least 1 sharps injury (mean, 3.29). The mean number of exposures did not differ by gender (4.3 for women vs 3.4 for men;  $P = .25$ ), marital status (4.3 for

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**Table 1.** Number of Exposures in Relationship to Postgraduate Year of Training

Year of Training	Total Residents, No.	Sharps Injuries		MMEs		Any Exposure <sup>a</sup>			
		Residents, No. (%)	Mean No. per Resident	Residents, No. (%)	Mean No. per Resident	Residents, No. (%)	All Exposures Reported, No. (%)	Some Exposures Reported, No. (%)	No Exposures Reported, No. (%)
PGY-1	104	54 (51.9)	1.03	41 (39.4)	1.28	72 (69.2)	26 (36.1)	10 (13.9)	36 (50)
PGY-2	126	94 (74.6)	1.97	77 (61.1)	1.81	100 (79.4)	23 (23)	36 (36)	41 (41)
PGY-3	110	83 (75.5)	2.38	71 (64.5)	2.92	92 (83.6)	18 (19.6)	40 (43.5)	34 (37)
PGY-4	100	91 (91)	3.29	66 (66)	3.88	92 (92)	27 (29.3)	47 (51)	18 (19.6)
All residents	441 <sup>b</sup>	322 (73)	2.18	255 (57.8)	2.45	356 (80.7)	94 (26.4)	133 (37.4)	129 (36.2)

Note. PGY, postgraduate year; MME, mucous membrane exposure. Added percentages may not equal 100 due to rounding.

<sup>a</sup>Sharps injuries and/or MMEs.

<sup>b</sup>One respondent had missing PGY data.

singles, 4.1 for those in long-term relationships, and 5.8 for those divorced or separated;  $P = .62$ ), or academic versus community program (4 vs 4.5;  $P = .75$ ).

Injuries from sharp suture needles were most common ( $n = 259$ , 58.5%), followed by blunt suture needles ( $n = 66$ , 14.9%) and injection needles ( $n = 61$ , 13.8%). The most common MMEs were amniotic fluid splashes ( $n = 208$ , 45.1%) and blood splashes ( $n = 145$ , 31.5%).

Overall, 262 of 356 residents (73%) failed to report at least 1 exposure. Among those who did not report an exposure, 129 of 262 residents (49.2%) did not report any exposure experienced. Only 94 of 356 residents (26.4%) reported every exposure. Also, 36 of 72 interns (50%) had never reported their exposures.

Common reasons for reporting injuries included following institutional protocol (86 of 356, 24%) or personal safety concerns (65 of 356, 18%). Reasons for not reporting included perception that the patient was at low infection risk (116 of 356, 33%), a cumbersome reporting process (88 of 356, 25%), or lack of time (44 of 356, 12%).

## Discussion

This is the first study reporting on occupational exposures incurred by trainees in obstetrics and gynecology. Occupational exposures were commonly experienced by the residents who participated in this survey. Most respondents did not report all exposures, and 40% never reported an exposure. These results are similar to those among other surgical trainees.<sup>5</sup> Although low reporting rates might reflect the perception that patients are at low risk of HIV infection, assessment of risk may be inaccurate.<sup>6</sup> Further, the rising prevalence of hepatitis C infection heightens the concern for transmission of infection during occupational exposures.<sup>7</sup> Lack of time and cumbersome processes were noted, similar to those reported from other surgical trainees.<sup>2,8</sup> Most sharps injuries occurred using sharp suture needles. Safety device engineering, use of blunt sutures and double gloving can reduce percutaneous injuries.<sup>9,10</sup>

The low response rate was the main limitation of this study. The true response rate might actually be higher; we could not confirm that the resident program leadership forwarded our survey request to all residents. Sampling bias might have occurred because those sustaining exposures might have been more likely to participate. Recall bias is another limitation, particularly for upper level residents remembering exposures that occurred earlier in training. Additionally, we did not capture data on the individual exposures; therefore, we were unable to determine whether the nature of the exposure influenced reporting.

Occupational exposures are experienced by obstetrics and gynecology residents and are frequently not reported. Our study highlights the need for efforts to minimize occupational exposures among trainees. Further attention should be made to increasing educational efforts on the risks and long-term implications of these injuries as well as to streamline processes to enable opportunities for post-exposure prophylaxis.

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