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Recent national trends in pelvic and paraaortic lymphadenectomy in gynecologic oncology fellowship training programs: ACGME data from 2019–2025

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ABSTRACT

Purpose: To investigate trends in surgical experience performing pelvic and paraaortic lymphadenectomies by gynecologic oncology (GO) fellows in the U.S.
Methods: Summary statistics for ACGME GO training programs were obtained from the ACGME public reporting system. The ACGME data only contains this short time frame. For each academic year spanning 2019–2020 through 2024–2025, the national mean procedure count was extracted for pelvic and paraaortic lymphadenectomies.
Results: Over the past 5 years there has been a significant decline in the number of pelvic ($p = 0.0004$) and paraaortic ($p = 0.002$) lymphadenectomies being performed by GO fellows in the U.S. During this same time there was a progressive significant upward trend in the number of SNL performed ($p = 0.003$). The mean procedure count declined from 61 to 38 on pelvic and 36 to 18 on *para*-aortic and SLN increased from 63 to 96.
Conclusions: Gynecologic oncology training experience in performing both pelvic and paraaortic lymphadenectomy has declined. The decline may have implications that extend to training in radical pelvic surgery.

1. Introduction

Training to become a gynecologic oncologist in the United States includes completion of a 3-year ACGME-accredited fellowship. The ACGME describes required rigorous competencies in both surgical and medical training in its common program requirements (CPR) (Program Requirements, 2025). According to 2025 CPR, fellows must demonstrate competence in the dissection of pelvic and paraaortic lymph nodes by open laparotomy and minimally invasive approaches (CPR 4.5.a.2). These procedures have historically been used for surgical staging or therapy for endometrial, cervical and ovarian cancers. Expertise in performing these procedures is justified as it implies intimate knowledge of retroperitoneal and vascular anatomy and sufficient experience to manage complications and rare oncologic scenarios encountered in gynecologic cancer. These procedures contribute to the preparedness of a competent gynecologic oncologist able to manage a variety of operations beyond lymphadenectomy, including radical hysterectomy, pelvic cytoreduction and pelvic exenteration.

There has been a transformation in assessing nodal spread in endometrial cancer over the past decade, with sentinel lymph node assessment (SLN) becoming the standard practice after multiple studies demonstrated the high reliability of SLN evaluation (Rossi et al., 2017).

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Similarly, SLN has become increasingly utilized in cervical cancer staging (Tu et al., 2025; Cibula et al., 2025). Further, surgical treatment of early-stage cervical cancer has declined in the United States (Folino et al., 2025; Covelli Velez et al., 2026). The sentinel lymph nodes in endometrial and cervical cancer patients are pelvic in most cases but occasionally are found in the paraaortic chain. While SLN has not impacted staging for early ovarian cancer (Gardner et al., 2025), the implementation of tailored lymphatic staging based on histology and prospective data demonstrate a lack of benefit from routine systematic lymphadenectomy at primary debulking operations have resulted in reduced use of lymphadenectomy for ovarian cancer as well (Harter et al., 2019).

These shifts in the surgical management of gynecologic cancers have resulted in several benefits including shorter operating times and decreased surgical complications such as lymphocyst and lymphedema, in particular (Rossi et al., 2017; Tu et al., 2025; Cibula et al., 2025). However, the reduced number of lymphadenectomies in training results in less experience and familiarity with retroperitoneal anatomy, dissection of vessels and nerves and management of complications related to these procedures. These skills remain essential for surgeons managing gynecologic cancers.

With advances in surgical practice from staging most gynecologic cancers with pelvic and paraaortic lymphadenectomy to SLN, there is concern regarding workforce preparedness in these basic surgical skills which prompted our investigation of current fellowship training in these procedures. Beginning in the 2019–2020 academic year, the Accreditation Council for Graduate Medical Education (ACGME) has reported annually the total surgical experience per graduating gynecologic oncology (GO) fellow. These data are available through the ACGME website as public domain (Accreditation Council for Graduate Medical Education, Gynecologic Oncology Case Logs National Data; Reports). A prior study modeled the theoretical impact of SLN fellow experience in lymphadenectomy. However, demonstration of actual fellow experience had not been published (Kumar et al., 2018).

The purpose of this study was to evaluate the impact of the widespread adaptation of sentinel lymph node mapping on the number of pelvic and paraaortic lymphadenectomies, based on ACGME data, performed by graduating GO fellows from 2019 to 20 compared to 2024–25.

2. Methods

Summary statistics for ACGME programs were obtained from the ACGME public reporting system (https://apps.acgme.org/ads/Public/Reports/Report/25). Data were restricted to the specialty of Gynecologic Oncology (specialty code 225) and academic years spanning 2019–2020 through 2024–2025. For each academic year, the national average, standard deviation and number of fellows were extracted for each surgical procedure of interest, which were pelvic lymphadenectomy, paraaortic lymphadenectomy and SLN. The primary outcome of the study was whether significant trends existed for these procedures during the 6-year time period that would encompass the available documentation since ACGME assumed certification for training programs. Trends over time were evaluated using inverse-variance weighted linear regression applied to yearly summary statistics. For each year, the average of procedures and its associated standard deviation and sample size of fellows were used to estimate the variance of the mean. Linear regression models were then fitted with year as a continuous predictor and weighted by the inverse of the estimated variance, such that years with more precise estimates contributed greater weight to the analysis. The statistical significance of trends was assessed using the p-value for the slope coefficient from the weighted regression model. All analyses were performed using R software, version 4.5.2.

3. Results

Six-year trends in the recorded number of pelvic and paraaortic lymphadenectomies performed by graduating gynecologic oncology fellows are shown in Figs. 1 and 2. We observed a progressive downward trend ($p < 0.05$) in the reported mean number of pelvic and paraaortic lymphadenectomies. During this same time there was a progressive significant upward trend in the number of SNL performed (Fig. 3). There was substantial variation in reported fellow experience (Table 1, 2). For example, using the 2024/2025 reporting year, the 30th and 70th percentile for pelvic lymphadenectomies performed ranged from 29 to 49: similarly, performance of paraaortic lymphadenectomy for the 30th and 70th percentile ranged between 13 and 27, respectively.

During this 5-year period, the median number of pelvic sentinel node dissections has increased from 63 to 96. Pelvic lymphadenectomy fellow case numbers in the 10thth percentile for the 2024–25 academic year ($n = 19$ cases) were just above the newly proposed minimums set by the ACGME (15 cases).

4. Discussion

Fellow experience in performing pelvic and paraaortic lymphadenectomy has decreased significantly since 2019. ACGME has recently established minimum targets for graduating fellows, and our observations suggest that some programs may struggle to meet minimums. Additionally, we observed meaningful variations in experience across fellowships, reaffirming the need for ACGME minimums. Regardless, the reduction in these procedures raises questions about how to maintain critical surgical skills necessary for the specialty of gynecologic oncology.

The present findings are similar to a prior report of long-term trends (2001–2019 graduates) in fellow surgical procedures reported from a subset ($n = 14$) of long-standing GO fellowship programs (Hoffman et al., 2024). Over the course of that study, the median number of pelvic lymphadenectomies performed ranged from approximately 80–100 throughout the 18-year period, without a declining trend. This is similar to the median number of 66 cases reported by ACGME in the 2019–20 database. The median number of paraaortic lymphadenectomies in the prior study declined from approximately 60 to 40 between 2015/16 and 2018/19 graduates). This is similar to the median number of 30 in the 2019–20 ACGME database. Our current findings document the continued decline of critical procedures coincident with changes in practice. Additionally, we observed significant variation in the reported fellow experience in these procedures nationally. The recent ACGME announcement of proposed minimums for the first time is a welcome first step in addressing surgical training. The proposed minimum for both pelvic and paraaortic lymphadenectomy is 15. Although we did not have access to minimum numbers, the data available indicates that most fellowship programs would have met the ACGME requirement of 15. However, there is a wide standard deviation around the mean, suggesting some programs provide less surgical experience compared with others. As with any surgical procedure the number of cases performed may not confirm competence. For example, the learning curve to define competence in performing a total laparoscopic hysterectomy has been reported to be approximately 50 cases (Terzi et al., 2016; Lenihan et al., 2008; Woelk et al., 2013). A future goal of training and certification should be heightened emphasis on measures of competency and not simply meeting minimum numbers.

Of the surgical procedures that gynecologic oncologists routinely perform, we focused on lymphadenectomy for several reasons. The indications (e.g., non-mapping, recurrence, early-stage ovarian cancer and vascular injuries) though less frequently encountered will always be situations for which we must be immediately and independently prepared to manage. Lymphadenectomy has a high potential for major intraoperative complications, including vascular, neurologic and ureteral injuries. Paraaortic lymphadenectomy has perhaps an even greater

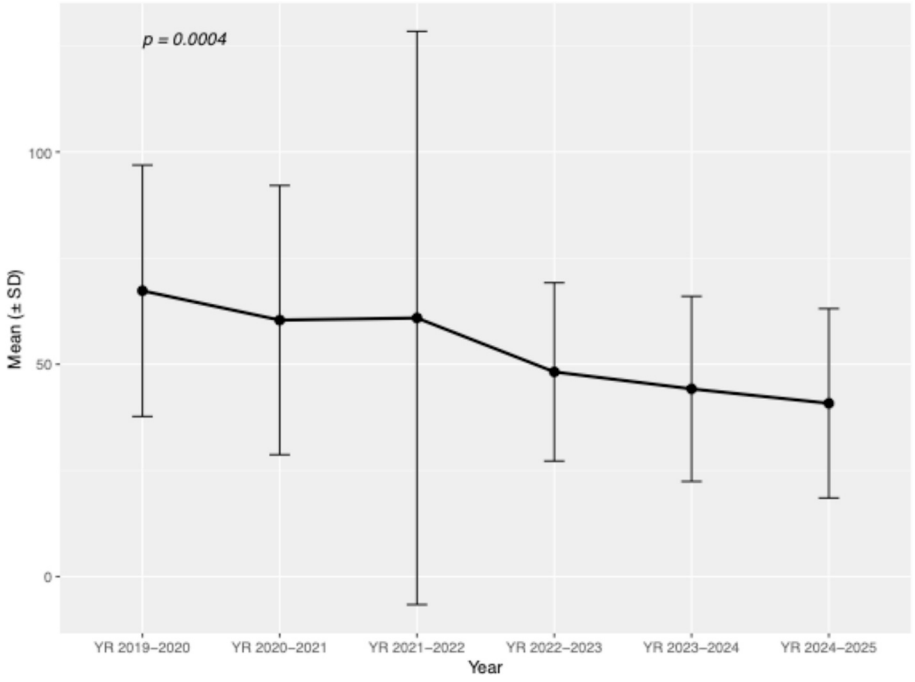

Fig. 1. ACGME 2019–2025 linear trend, All roles, pelvic lymphadenectomy.

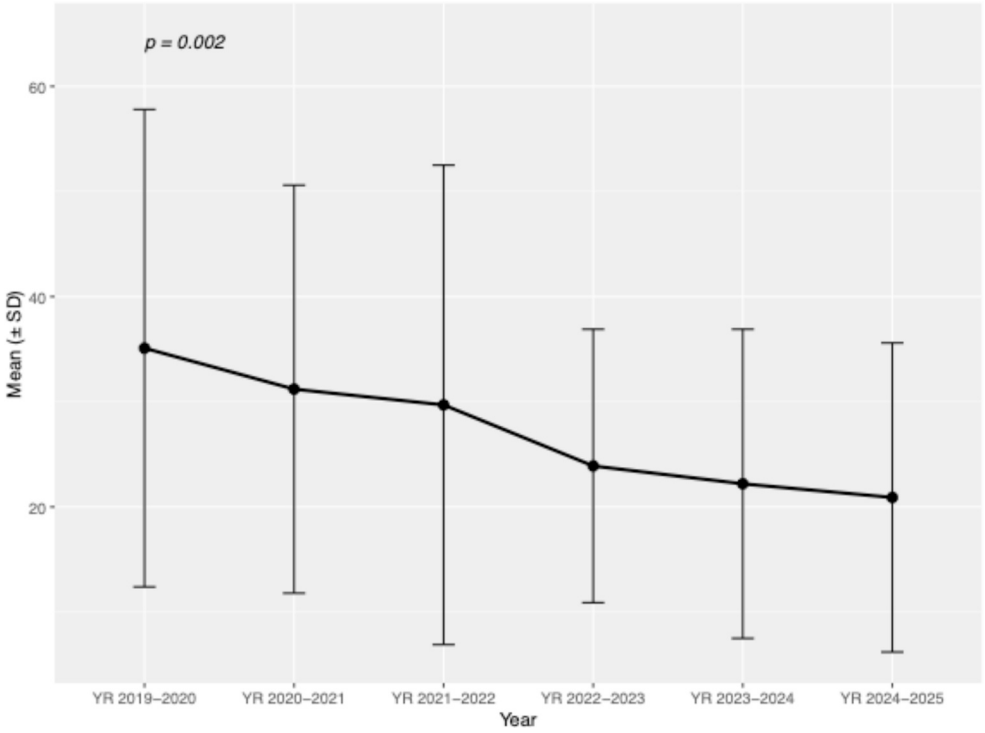

Fig. 2. ACGME 2019–2025 linear trend, All roles, paraaortic lymphadenectomy.

potential for intraoperative complications. Gynecologic oncologists acquire a myriad of skills from extensive experience in retroperitoneal surgery including vascular dissection and repair, ureteral mobilization and repair to name a few. Adequate exposure to these procedures in no small part contributes to the preparedness of a competent gynecologic oncologist able to manage a variety of operations beyond lymphadenectomy. The present data and additional data show that SNL has increased over the 5-year interval, replacing pelvic lymphadenectomy (Gómez-Hidalgo et al., 2018; Friedman et al., 2025). SLN requires development of the retroperitoneal spaces and an understanding of the neurovascular surgical anatomy in the pelvis. However, SLN entails limited retroperitoneal dissection and is unlikely to provide the same training exposure to retroperitoneal spaces, vessels, nerves and ureter.

The strength of the current study is that it utilized national data from ACGME fellowship programs in the U.S. The study has several limitations. Data is only available for 6 recent years given the duration of data accrual and validation under ACGME certification. Based on increased use of SLN and tailored staging in ovarian cancer, it is likely that the

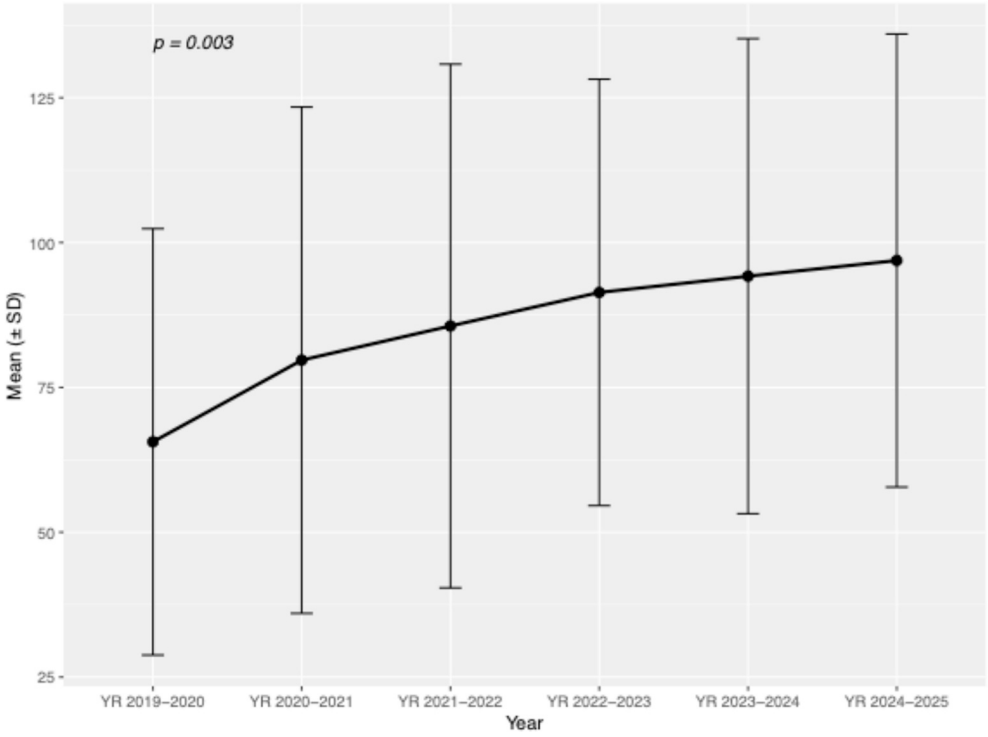

Fig. 3. ACGME 2019–2025 linear trend, All roles, SLN.

Table 1
Gynecologic oncology fellowship case log data for U.S. Fellows graduating 2019–20 and 2024–2025. The table displays selected percentile (underlined) benchmarks of performance. For example, a score at the 10th percentile indicates that 10% of residents achieved less than the value while the remaining 90% achieved more than the value. https://apps.acgme.org/ads/Public/Reports/Report/25.

Total Experience 2019-2020 and 2024-2025					
Percentile %	**10**	**30**	**50**	**70**	**90**
Pelvic lymphadenectomy	25 19	46 29	61 38	75 49	97 64
Paraaortic lymphadenectomy	9 5	21 13	30 18	39 27	56 38
SLN	10 51	40 77	63 96	83 117	122 141

SLN = sentinel lymph node assessment.
Numbers in black represent the 2019–2020 experience and numbers in red represent the 2024–2025 experience.

declining trend in the number of pelvic and paraaortic lymphadenectomies began prior to this. The analyses relied exclusively on publicly available summary statistics rather than individual program-level or trainee-level data. Additionally, fellows and programs were both expanding during the reporting period and becoming familiar with reporting requirements so some underreporting may have occurred which is not possible to measure. Trend analyses were based on inverse-variance weighted linear regression of yearly means and were subject to assumptions of normality and independence. These analyses do not account for within-year heterogeneity or individual-level confounding, and findings should be interpreted as descriptive of overall temporal trends.

This study demonstrates that current fellows are completing training with fewer pelvic and paraaortic lymphadenectomies than were performed even 5 years previously. Much of this decline is a result of advances in surgical research which allowed more refined surgery to

replace en bloc nodal resection, as well as changes in overall management of many gynecologic cancers: these changes do not remove the need for full dissection in some cases. The challenge for our specialty is how to fill the gaps in acquiring surgical expertise brought about by changes in clinical practice. Evolution in surgical training should occur to ensure adequate experience in performing pelvic and paraaortic lymphadenectomy, and the varied retroperitoneal surgery skills that accompany them. Options include restructuring current training, development of novel training models and development of continuing medical education programs (i.e. hands-on courses, mentoring, coaching, curriculum that emphasize surgical videos and workshops). Moving from procedural numbers to assessment of competency in training would be valuable. Better methods are needed to identify and recruit individuals for training who have the inherent ability and motivation to become excellent surgeons (Anastakis et al., 2000; Fatunmbi et al., 2022). Surgical volume is essential to training and must be constantly monitored so that essential skills are not lost during this era of surgical advancement (Fritz et al., 2019; Maruthappu et al., 2015; Olson, 2021). Fellowship training programs must make surgery a priority, with particular attention to cases with a high value to surgical education. Programs have the responsibility to help their faculty become good surgical educators (Jackson et al., 2022). Finally, we have the difficult but important task to look for ways to give fellows more autonomy, a critical factor in development as a surgeon (Coleman et al., 2018; Hauer et al., 2015; Hauer et al., 2014; Sandhu et al., 2017; George et al., 2018).

Declaration of generative AI use

During the preparation of this work the authors did not use any AI technology.

CRediT authorship contribution statement

Mitchel Hoffman: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Daniel Clarke-Pearson:** Writing – review & editing, Validation, Methodology, Investigation, Formal analysis. **Dennis Chi:** Writing – review & editing, Validation. **Karen H Lu:** Writing – review & editing, Validation, Funding acquisition. **Wenyi Fan:** Writing – review & editing, Methodology, Formal analysis. **William Cliby:** Writing – review & editing, Validation, Investigation, Formal analysis, Data curation, Conceptualization.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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