



Clinical Practice Statement

Updates to post-treatment surveillance after curative intent treatment for patients with gynecologic cancers: A Society of Gynecologic Oncology clinical practice statement

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HIGHLIGHTS

- Surveillance practices are designed to improve cancer related outcomes.
- Vaginal cytology should be eliminated in the surveillance of ovarian and uterine cancers.
- Emerging strategies, such as ctDNA and groin ultrasounds, may enhance surveillance practices but require additional study.

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ABSTRACT

Gynecologic malignancies accounted for ~15 % of new cancer cases and cancer survivors in 2022. Advances in cancer care are expected to improve outcomes, and the growth in survivorship is expected to increase by over 25 % in the next several years. After completion of primary therapy, follow-up care is designed to monitor patients for recurrence; however, the evidence for surveillance recommendations is weak and often based on retrospective studies, resulting in wide variability in clinical practice.

Therefore, understanding the most clinically efficient tools to detect cancer recurrence, particularly when interventions can lead to survival and/or quality of life improvements, is a priority. Currently, symptom review and physical examination are reportedly the most effective methods to detect recurrence across gynecologic tumor types. Interestingly, tests such as vaginal cytology, which have negligible benefit in recurrence detection, are still frequently utilized in the posttreatment evaluation of patients. Similarly, imaging is often routinely used without proven benefit; however, it is important to note that imaging may play a role in specific settings. Lastly, incorporating novel serum biomarkers and emerging tests, such as circulating tumor DNA (ctDNA), requires additional studies. This article is designed to provide an update on best practices for surveillance in gynecologic cancer patients after curative intent primary therapy.

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1. Introduction

New cases of gynecologic malignancies account for nearly 1.5 million (15 %) and over 100,000 (12 %) of the cancer cases worldwide and in the United States, respectively, every year [1,2]. Advancements in cancer care have led to a growing population of cancer survivors. The number

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of gynecologic cancer survivors in the United States alone is projected to rise by 26 %, reaching over 1.61 million by 2030 [3]. These data highlight the importance of optimizing post-treatment cancer surveillance.

After curative-intent treatment, surveillance should be tailored to the overall risk of recurrence, including the interval of visits and the interval and extent of tests. The intention of surveillance evaluation should focus on detecting recurrences that are amenable to cure or allowing earlier initiation of therapy that improve survival outcomes. Like other malignancies, symptom review, comprehensive examination, and educating patients on signs and symptoms are often the most impactful methods for detection of cancer recurrences [4].

As current recommendations are predominantly based on expert opinion and retrospective studies, there is significant variation in current gynecologic surveillance practices. Interestingly, studies across cancer types consistently demonstrate that resource-intense surveillance strategies do not improve outcomes and are associated with significant costs but continue to be utilized at high rates in clinical practice. Thus, defining the most clinical- and cost-effective strategies will help inform best practices.

This manuscript provides an update to previous recommendations with a review of the most recent data on best practices for cancer surveillance for patients who have a complete response to curative-intent treatment for gynecologic malignancies in the primary treatment setting.

2. Endometrial cancer

Endometrial cancer globally accounts for 420,000 new cases annually [1]. Although the mortality rate has increased by 21 % over the last two decades, there are still more than 600,000 endometrial cancer survivors in the U.S. and this estimate is expected to grow to 1 million by 2030 [5]. Approximately 15–20 % of endometrial cancer patients will experience disease recurrence, with the majority occurring within the first three years [6,7]. The current SGO and National Comprehensive Cancer Network (NCCN) guidelines for surveillance include symptom review and physical examination, with the frequency of examinations depending upon the risk of recurrent disease (Table 1) [7,8]. These guidelines also recommend against routine vaginal cytology and imaging, which has also been incorporated into the SGO Choosing Wisely campaign [9].

Published in 2022, the TOTEM trial is the first large, prospective trial evaluating surveillance strategies in endometrial cancer [10]. A total of 1847 patients with stage I–IV endometrial cancer in clinical remission following treatment were randomized to intensive or minimalist surveillance, stratified by low (FIGO 2009, stage IA, grade 1–2) and high recurrence (IA, grade 3, ≥IB) risk. Intensive surveillance included clinical exams, routine vaginal cytology, CA-125 testing, ultrasonography, and

CT scans, while minimalist surveillance involved scheduled clinical exams with annual imaging for high-risk patients. The trial found no significant difference in five-year overall survival between the strategies.

This study provided valuable insights. Vaginal cytology showed trivial utility (<0.1 %) in early detection, reaffirming that cytology should be eliminated in endometrial cancer surveillance setting [7]. Imaging did not demonstrate benefit in low-risk patients and intensive imaging beyond once annually did not benefit the high-risk group. As most recurrences were identified in symptomatic patients, the findings reaffirm our prior recommendations suggesting that more intensive strategies should be focused on symptomatic patients.

It is important to note that there are some limitations, the high-risk cohort was predominantly Stage IB disease (77.6 %), and there were only small cohorts of Stage 3–4 disease (6 %) or non-endometrioid subtypes (8.2 %). Though the TOTEM trial showed no benefit in routine CA125 testing, it may be useful in patients with elevated levels at diagnosis [11]. Furthermore, molecular profiling was not incorporated into risk assessment, limiting applicability. Considering these data and ongoing discussions about staging criteria, we propose a revised SGO surveillance guideline (Table 2). This guideline aims to incorporate histological and molecular markers to effectively stratify patients into low and high-risk categories for recurrence, while continuing to utilize the FIGO 2009 staging criteria for consistency and comparability.

In alignment with a shift toward less intensive surveillance approaches, the randomized controlled ENSURE (ENDometrial cancer SURvivors' follow-up care) trial evaluated the effect of reduced follow-up care (4 versus standard arm of 8–11 visits over 3 years) on satisfaction in patients with early-stage, low-risk (FIGO 2009 stage 1 A–1B, grade 1–2) endometrial cancer [12]. In the 316 participants, there were no differences in anxiety between the groups and participants in the reduced follow-up group had higher satisfaction without increase in visits to other providers. There were 14 recurrences (9 in reduced visit arm; 5 in standard arm). In total, 93 % occurred within the first two years, nine patients were diagnosed at unscheduled visits with 8 prompted by symptoms. In the remaining five patients, three reported symptoms and two had an abnormal examination. Since symptoms and examination resulted in most of the recurrence diagnoses, the ENSURE study findings support reduced visits and highlights the potential value of telemedicine in symptom screening.

Conservative management of endometrial intraepithelial neoplasia or cancer is an option for patients who desire fertility preservation. The use of progestin therapy for the management of early-stage, low-risk endometrial cancer results in high rates of remission (>80 %) at two years, recurrence rates after discontinuation remain significant, with rates as high as 36 % [13–15]. Though retreatment has high response rates (85 %), continued surveillance is recommended [14].

Table 1
Five-year surveillance protocols in the TOTEM trial compared to the 2017 SGO and 2024 National Cancer Comprehensive Network (NCCN) Surveillance Guidelines [7,8,10].

Definition	TOTEM				2017 SGO Guidelines		2024 NCCN Guidelines All stages, grades
	Low Risk: FIGO 2009 stage IA, G1–2		High Risk: FIGO 2009 stage IAG3 Any grade ≥ stage IB		Low Risk: FIGO 2009 Stage I–II endometrioid histology	High Risk: FIGO 2009 Stage III–IV or high-risk histology	
	Minimalist*	Intensive	Minimalist*	Intensive	N/A	N/A	N/A
Number of scheduled clinical exams	11	13	13	14	6–8	14	10–16
Vaginal cytology	–	Annual × 5 years	–	Annual × 5 years	Not recommended	Not recommended	Not recommended
CT chest/abdomen /pelvis	–	Annual × 2 years	Annual × 2 years	Annual × 5 years	As clinically indicated (if recurrence suspected)	As clinically indicated (if recurrence suspected)	As clinically indicated
Abdominal and pelvic ultrasound	–	–	–	Every 6 months × 3 years, then annual × 2 years	Not recommended	–	As clinically indicated
Serum CA-125	–	–	–	At each of the 14 visits	N/A	N/A	If elevated initially

* Based on the TOTEM trial results, the study recommended adopting a minimalist surveillance schedule for all endometrial cancer patients.

Table 2
2025 SGO Endometrial Cancer Surveillance Recommendations.

Definition	Low Risk ^a : FIGO 2009 Stage I–II, endometrioid histology or POLE mutation present	High Risk ^a : FIGO 2009 stage III–IV, any high-risk histology, aberrant P53 mutations
Number of scheduled clinical/pelvic exams in asymptomatic patients who are in clinical remission after primary treatment	8 Years 1–2: every 6–12 months Years 3–5: every 12 months	10 Years 1–2: every 3–6 months Years 3–5: every 6 months
Vaginal cytology	Not recommended	
CT chest/abdomen /pelvis	As clinically indicated	Years 1–2: Consider annual CT or as clinically indicated Years 3–5: As clinically indicated
CA 125	If initially elevated, Years 1–5: every 6–12 months	If initially elevated, Years 1–2: every 3–6 months Years 3–5: every 6 months
ctDNA	–	May be considered in select cases

^a May be followed by a gynecologic oncologist or generalist.

Based on retrospective studies, after a complete response in the absence of pregnancy, endometrial sampling has been recommended every 6 months for two years and then yearly [15–17]. Ultimately, due to the high risk of recurrence after medical management alone, we recommend definitive surgery with a hysterectomy for patients who no longer desire future fertility.

3. Uterine sarcomas

Uterine sarcomas are malignant mesenchymal tumors and include uterine leiomyosarcoma (uLMS), endometrial stromal sarcoma (ESS), adenosarcoma, and undifferentiated uterine sarcoma (UUS). Though only accounting for 3–9 % of uterine malignancies, these tumors are often associated with a poor prognosis [18]. uLMS is the most common subtype, and even when confined to the uterus, recurrences - most often in the lungs, pelvis, and liver - occur in over 50 % of patients [8,18]. Symptom review and examinations are an essential part of surveillance care for these patients. When abnormal findings are present, further evaluation with imaging should be performed. However, owing to the substantial risk of recurrence, particularly at distant sites, imaging has been readily incorporated into routine surveillance recommendations.

Although there are no prospective data proving that active surveillance improves outcomes, expert opinion and medical society recommendations have supported its use, typically based on strategies extrapolated from clinical trials. The NCCN guidelines recommend post-treatment CT scan every 3–6 months for 2–3 years, and then every 6–12 months until year 5 [8]. Similarly, other groups have advocated that imaging should be a routine part of surveillance after sarcoma treatment. In general, for patients with high-grade uterine sarcoma, CT scans of the chest, abdomen, and pelvis have been advised every 3–4 months for the first two years and then every 6 months for five years. Thereafter, examinations and symptom review may be used alone, while others have advocated for continued annual imaging [18–20]. Since there is no consensus about the optimal interval for diagnostic imaging in patients with low-grade sarcoma, surveillance strategies are often individualized.

The role of PET-CT scans in post-surgical surveillance of patients with sarcoma has also been reported. In a study of 36 patients, PET or PET-CT scans were highly sensitive in detecting asymptomatic recurrences or useful in further evaluating abnormal findings on CT scan imaging [21]. Though it may be useful in certain settings, we recommend

additional studies before incorporating PET-CT scans into routine surveillance.

Due to limited data, we recommend similar surveillance strategies in UUS as uLMS patients. Endometrial stromal tumors, accounting for 10 % of cases, are the second most common uterine sarcoma histology. Endometrial stromal tumors tend to be indolent with a favorable prognosis. However, these tumors may recur many years after diagnosis, often in the abdomen, pelvis, or chest [22]. Though routine surveillance with imaging may be low yield and omitted in the absence of clinical suspicion, long-term clinical follow-up and assessment is recommended.

4. Epithelial ovarian, fallopian tube, primary peritoneal cancer (EOC)

In 2022, EOC contributed to 324,603 new cancer cases and 206,839 cancer deaths globally [1]. While the incidence of EOC has been declining in recent years, 5-year survival rates remain poor, ranging from 30 to 50 % [23]. The high mortality rate is largely due to non-specific symptoms and lack of reliable screening tools, resulting in most cases being diagnosed in late stages [24]. Furthermore, even with a complete clinical response following primary treatment, 25 % of patients with early-stage disease and 70–80 % with advanced disease recur [24]. With recent advances in therapy, patients with recurrent disease may respond favorably to salvage treatments, suggesting the importance of continuing to evaluate surveillance optimization [24].

Traditionally, EOC surveillance has consisted of a thorough review of symptoms, including abdominal bloating, early satiety, nausea/vomiting, fatigue, shortness of breath, and changes in bowel or bladder habits, as well as a comprehensive physical/pelvic examination [7]. One study of 144 patients reported symptomatology (49 %) and exam findings (60 %) frequently triggered a diagnosis of EOC recurrence [25]. Though physical examination is a low-cost tool, reproducibility varies significantly, with detection rates ranging from 15 % to 78 % [26,27]. Additionally, examination alone typically proves insufficient for evaluation of retroperitoneal nodes, the upper abdomen, and other distant sites that are common locations for disease recurrence. Interestingly, after the recent COVID-19 pandemic, which required rapid changes to usual surveillance practices, two retrospective studies probed the role of physical examination in EOC surveillance. The first study, 147 patients, reported that recurrence was detected by tumor marker (31 %), imaging (55 %), and symptoms (12 %). Though 14 % of patients had abnormal physical exam findings at the time of recurrence, no patient was diagnosed by examination alone [28]. The second study, 109 patients, reported that recurrence was detected by elevated CA125 (89 %), symptoms (37.6 %), abnormal exam (24.8 %), and incidental imaging (5.5 %). Of note, elevated CA125 and symptoms were present in 96.3 % of cases, and physical exam alone was helpful in only 0.9 % of cases [29]. Both studies suggest that virtual assessment with appropriate counseling on symptoms and indications for reflex testing may be an alternative to in-person visits if needed.

Most EOC cases present with an elevated CA125 level with 62–94 % sensitivity and 91–100 % specificity for recurrence [25,30]. In the surveillance setting, elevation in CA125 levels have consistently been observed 2–5 months before detection of relapse by other means, even when the rise is within normal range [25,26,30]. Based on this observation, a randomized trial evaluated the value of CA125 surveillance in prompting the initiation of treatment [30]. The investigators noted that while early initiation of treatment based on CA125 elevation alone did not improve overall survival, elevations in CA125 did occur before the clinical detection of the disease. Therefore, we do not recommend using CA125 elevation alone to justify the initiation of therapy. Consistent with the ESGO-ESMO-ESP consensus statement, we recommend using CA125 as a surveillance tool to prompt heightened awareness of symptoms or additional evaluation as indicated [31]. It is important to recognize that CA125 may have limitations as a surveillance tool. In a recent ancillary study of the PAOLA-1 trial, utilization of CA125 surveillance for patients starting maintenance therapy was

most relevant in patients with abnormal baseline CA125 levels and may not be as useful in those with normal baseline values [32]. Though HE4 has not been shown to improve detection of recurrence, the potential role of other biomarkers, including ctDNA (see below), mesothelin, and folate receptor alpha, are being evaluated [33,34].

Clearly, radiographic imaging modalities are useful when recurrence is suspected; however, the role of routine imaging for surveillance is controversial. Those in favor of routine imaging suggest the detection of asymptomatic recurrences allows for earlier intervention, including secondary cytoreductive surgery and, thus, improved survival outcomes [36]. However, lead-time and selection bias likely impacted these results [35]. On the contrary, a retrospective series of 412 patients reported that the method of recurrence detection—whether by physical exam, CA-125, or routine imaging—did not impact survival among asymptomatic patients. Though every situation is unique, we recommend that imaging should be reserved for clinical indication [27].

Though imaging and CA125 individually may have qualified roles, the combination of these modalities continues to be evaluated. In a pooled analysis of four trials on PARP inhibitor maintenance therapy after platinum-sensitive relapse (Study 19, SOLO2, ARIEL3, NOVA), CT scan and CA125 were noted to have a high discordance rate in the detection for recurrence [36]. Like the PAOLA-1 trial, the authors concluded that CA125 monitoring alone may be insufficient, particularly in patients without elevated levels after the completion of chemotherapy [36]. Of note, the study did not identify the optimal frequency of imaging and if there were any impact on survival outcomes. Though further studies are warranted, these findings may support periodic surveillance imaging, particularly in cases for which CA125 is not a reliable biomarker (see Maintenance therapy section below).

In patients with suspected recurrence based on clinical findings, CT scans are generally the imaging modality of choice; however, PET-CT, MRI, and ultrasound have also been evaluated. PET-CT scans have higher sensitivity (96 % versus 84 %) and specificity (92 % versus 59 %) than CT scans in the detection of recurrent disease (especially nodal and peritoneal metastasis). In one study, PET-CT influenced clinical management in 42 % of cases with suspected EOC recurrence following negative or inconclusive CT findings, indicating a potential role [37]. The utility of body weight diffusion restricted (DWI) MRI has been shown to detect recurrence more accurately (94 % vs. 78 %) and identified candidates for complete resection at the time of secondary cytoreduction more reliably (94 % to 49 %) than CT scans [38]. While DWI-MRI is promising, it has higher costs and there is currently insufficient high-quality evidence to support its use in routine surveillance for recurrence. Understanding the limitations of various imaging modalities-while also considering the specific goals of imaging for each individual patient-can help guide providers in selecting the most appropriate imaging approach for the detection of EOC recurrence.

Since there is no consensus on the best surveillance strategy, an individualized approach with a thorough assessment of symptoms with or without physical examination should be undertaken. The role and limitations of CA125 monitoring should be reviewed. As the role of imaging remains controversial, educating patients on the indications for imaging will help support appropriate use. Although there is currently a lack of data to support survival benefit from routine imaging, as new therapies change the treatment landscape, it will be important to evaluate whether earlier detection of recurrent disease improves outcomes (Table 3).

5. Borderline Ovarian Tumors (BOTs)

BOTs account for approximately 15 % of EOC and exhibit an intermediate behavior, between that observed for benign and malignant ovarian neoplasms [39]. These tumors are often diagnosed in women of reproductive age, in early stages, and have a favorable prognosis.

The absence of standardized guidelines for follow-up after treatment of BOTs has led to diverse practices, which often follow EOC surveillance

Table 3
2025 SGO Epithelial Ovarian Cancer Surveillance Recommendations.

Time from completion of primary therapy	Years 0–2	Years 3–5	>5 years ^b
Symptom review	3–4 months	6 months	Yearly
Physical exam	3–6 months	6 months	Yearly
Pap test	Not recommended		
CA125, if initially elevated	3–6 months	6 months	As indicated
Radiographic imaging	Reserve for clinical indications; insufficient data to support routine use ^{a,b}		
ctDNA	May be useful in select cases		

^a Consider imaging if CA125 is not initially elevated.
^b May be followed by a gynecologic oncologist or generalist.

practices. Intensive follow-up is not only burdensome to patients but has a limited impact on outcomes [40]. Due to the excellent prognosis, early-stage endometrioid and mucinous BOTs, regardless of management, have a negligible risk of recurrence [44,47]. Similar to the other guidelines, our recommendation is that this patient cohort does not require additional cancer surveillance or definitive surgery, even if fertility sparing surgery (FSS) was performed and should resume routine gynecologic care.

In patients with early-stage serous borderline tumors, rates of recurrence are generally low (0–10.7 %) [46,47]. Patients undergoing FSS have higher rates of recurrence (3.5–23.5 %) compared to those undergoing definitive surgery (0–5.1 %) with almost all recurrences occurring within 5 years and do not impact disease-specific survival [46,47]. Though many recurrences are associated with symptoms, transvaginal ultrasound offers high sensitivity and specificity for detecting recurrent disease in the ovaries. Surveilling patients with transvaginal ultrasound yearly, particularly in those undergoing FSS, during the first 5 years is reasonable [41–43]. As the prognosis is excellent, in the absence of recurrence, we feel it is reasonable to omit completion surgery (hysterectomy and salpingo-oophorectomy) in patients with confirmed early-stage serous BOT and recommend routine follow-up.

Patients who have advanced-stage, incomplete surgical resection, and/or micropapillary pattern are considered at higher risk for recurrence. Though recurrent disease has a favorable prognosis, ~50 % recur and 2–3 % will have malignant transformation and this group of high-risk patients should undergo long-term follow-up due to the possibility of late recurrences [43,45]. For this population, our surveillance recommendations include symptom review, physical examination, tumor markers, such as CA125 and CA 19–9, if elevated pre-operatively, and semi-annual or annual imaging (ultrasound, with CT/MRI reserved for clinical indications [45]. Due to high recurrence rates, we recommend completion surgery for patients undergoing FSS with advanced or high-risk disease after completion of childbearing.

6. Non-epithelial tumors of the ovary

Malignant germ cell tumors of the ovary generally occur in a young population and account for approximately 1–2 % of all ovarian cancers [44]. Patients often undergo surgery, including fertility-sparing treatment, with or without adjuvant therapy. Germ cell tumors may produce serum tumor markers, such as alpha-fetoprotein (AFP), human chorionic gonadotropin (hCG) and lactate dehydrogenase (LDH), which can be useful for diagnosis, evaluating response to treatment, and surveillance [44,45].

Based on limited data, recurrences are rare and typically occur within the first 2 years. Though the prognosis for recurrent disease is poor, there are potential curative options such as multi-agent chemotherapy regimens and/or high-dose chemotherapy with autologous stem cell support. Therefore, surveillance with physical examination and tumor markers is advised every 3 to 4 months for the first two years and then every 6 months for the next year [45]. After year three, the interval may increase to yearly. Routine imaging with CT +/- PET

or MRI scans every 3 months may be considered for patients without a reliable tumor marker.

Sex cord stromal tumors account for 7 % of ovarian malignancies and may have biomarkers such as inhibin, estradiol, Müllerian inhibitory substance, and testosterone [46]. Granulosa cell tumors, the most common subtype, are known for late recurrence - with a reported median time to recurrence of 4–6 years [50]. In general, symptom review, physical examination, and assessment of tumor markers (if applicable) are recommended. Though pelvic ultrasound/imaging has been advised in patients who undergo fertility-preserving surgery, the utility is limited. We recommend a low threshold for imaging, but reserve it for patients with symptoms, elevated tumor markers, or suspicious findings on physical examination [7,46,47]. The interval for surveillance visits should depend on the stage, and it is reasonable to consider a 6-to-12-month surveillance interval for those with early-stage, low-risk disease and a 4–6-month surveillance interval for those with high-risk disease. Though the interval can be extended with time, long-term follow-up is advised due to late recurrences.

6.1. Cervical cancer

In 2022, there were an estimated 662,301 cervical cancer cases and 348,189 deaths globally [1]. The 5-year overall survival rate for all stages combined is 67 %: 91 % for early stage, 60 % for locally advanced disease, and 19 % for metastatic disease. Though recurrence rates are higher in advanced stages, 10–20 % with early-stage disease will experience a recurrence, and a majority are diagnosed within 2–3 years after the initial treatment [2,7,48,49]. Currently, the SGO and NCCN guidelines recommend follow-up evaluation every 3–6 months for the first 2 years, followed by every 6 months for the next 3 years based on risk assessment [7,49].

Recurrence is detected in 46–95 % of patients secondary to symptom presentation, which includes pelvic pain, vaginal bleeding/discharge, leg pain, or lymphedema [7]. Importantly, symptoms prompted unscheduled evaluation in approximately 40 % of patients [7]. Though physical exam findings vary, examinations may detect recurrence in 29–75 % of cases [7,50]. Thus, counseling patients regarding symptoms of recurrent disease and performing a comprehensive examination, particularly of the lower genital tract, is a critical component of cancer surveillance.

Cervicovaginal cytology or Pap tests have also been studied for the detection of local cervical cancer recurrence. However, when recurrence is detected, rarely is abnormal cytology the only finding [49,50]. A recent retrospective study evaluated the role of cytology in detecting recurrence in 233 cervical cancer patients. Of the 78 patients (33.5 %) had ≥ 1 abnormal Pap test, 28.2 % underwent biopsies, all of which were negative for malignancy. Of the 15 patients with local recurrence, the detection was prompted by symptoms (93.3 %) and visible disease (46.7 %); only one case was detected by cytology [51]. The authors also noted that abnormal cytology was higher in patients who received radiation compared to those who did not (41.6 % versus 17.1 %) and cytology alone did not detect any recurrences [51]. In another study of 155 patients with early-stage cervical cancer treated with hysterectomy only, cytology was abnormal in 19 patients (12.3 %). All low-grade lesions were self-limited and only three were significant (1 high grade, two malignant), and all three cases had clinical findings or an associated lesion [52]. Based on these data and cost-effectiveness practices, there is insufficient evidence to support cytology. We recommend omitting it, particularly after radiation therapy, or, at the most, limiting its use to once/year and reserving intervention for high-grade changes [53].

Along these lines, high-risk HPV surveillance has also been evaluated with equivocal findings. One institutional retrospective study of high-risk HPV detection after cervical cancer treatment found that positive testing was not associated with recurrence and often resulted in unnecessary interventions [54]. In a meta-analysis of 1055 patients treated with radiation for locally advanced cervical cancer, high-risk HPV

presence ranged from 18.6 %–93 %. Positive high-risk HPV was associated with increased risk of recurrence; however, the interval from positive test to recurrence was not reported [55]. Therefore, the role of high-risk HPV detection for surveillance is not well established. If performed, interventions based on a positive result should be limited and warrants further evaluation.

Another area of interest is the patient population undergoing FSS for early-stage cervical cancer. A population-based, retrospective cohort study from the Netherlands Cancer Registry and the Dutch Nationwide Pathology Databank evaluated 1462 FSS patients undergoing conization or trachelectomy [16]. After a median follow-up of 6 years, 614 patients (42.3 %) had at least one abnormal cytology result. In this group, low-grade cytology (80.3 %) was most common, followed by cervical intraepithelial neoplasia 2+ (15 %), including 5.4 % who were diagnosed with recurrent cancer. Of note, no cancers occurred in patients with negative high-risk HPV and low-grade/normal cytology, leading the authors to recommend a 6-month evaluation interval and then yearly after two negative tests [56]. In another retrospective series, 41 patients were evaluated with cytology after radical trachelectomy. Though abnormal cytology was noted in 50 % of patients-including high-grade (2 %), low-grade (20 %), and atypical cells (77 %)-no recurrences were diagnosed in these patients [57]. Though cytology use may be useful in patients undergoing FSS, we recommend limiting intervention to high-grade changes.

Imaging has also been used for surveillance in asymptomatic patients with a history of cervical cancer. Routine imaging modalities, including chest X-rays, CT scans, MRI, pelvic ultrasounds, and intravenous pyelograms, have demonstrated low detection rates and no apparent impact on survival [7,49,58]. The role of PET-CT scans in surveillance remains an area of interest. Though of no utility in early-stage disease, a PET-CT scan done 3 months after radiation therapy in locally advanced cervical cancer has been shown to have prognostic implications [64]. In one series of 108 patients after treatment with chemoradiation without disease progression, 68.5 % of patients demonstrated a complete response on PET-CT at 3 months. Of note, the 31.5 % of patients with residual disease on initial scan had a delayed complete response on repeat scan 6 months after treatment with comparable survival outcomes [59]. Thus, PET-CT scan 3–6 months after completion of radiation therapy with residual disease may help identify patients at high risk of recurrence. We have incorporated this use of PET-CT scan into our practices (Table 4). In the evaluation of clinical indications, PET-CT scans have high sensitivity (86 %) and specificity (87 %) in the detection of cervical cancer recurrence [7]. Cost-analysis modeling yields conflicting conclusions and unclear survival benefit for the use of PET-CT in routine surveillance, and aside from the initial post-treatment scan, we limit additional use to clinical indications only [58,60]. Prospective studies evaluating the role of imaging, particularly with improvements in therapies, are needed and will help determine the role and impact of imaging for the detection of recurrent cervical cancer.

6.2. Vulvar cancer

Vulvar cancer affects approximately 47,000 patients globally each year [1]. Its incidence is rising, with rates increasing more than two-fold in women under 60 years compared to older populations [61].

Posttreatment surveillance practices are based on limited evidence. In early-stage disease, surgical management includes radical vulvectomy and lymph node assessment and can be associated with considerable morbidity. More than 50 % of patients experience complications such as wound breakdown, infections, cellulitis, restricted mobility, and chronic leg lymphedema [62,63]. The introduction of sentinel lymph node biopsy (SNB) has mitigated treatment-related morbidity and become standard practice [64]. Early detection of recurrence is critical for patients with potentially salvageable conditions. As most recurrences develop locally on the vulva, regular examinations

Table 4
2025 SGO Cervical Cancer Surveillance Recommendations.^a

Time from completion of primary therapy	Years 0–1	Years 1–2	Years 2–5	>5 years ^a
Symptom review and physical exam				
Low risk (surgery only)	6 months	Yearly	Yearly	Yearly
High risk	3 months	3 months	6 months	Yearly
Pap test	Insufficient evidence ^b			
HPV testing	Insufficient data to support routine use			
Radiographic imaging	PET CT 3–6 months after radiation			
	Insufficient data to support routine use			
ctDNA	May be useful in select cases			

^a May be followed by a gynecologic oncologist or generalist.^b Insufficient evidence for cancer recurrence detection but may have value in detection of lower genital tract neoplasia and patients undergoing FSS.

are critical. Patients are also encouraged to self-examine the vulva and schedule evaluations if any changes are observed. Though the risk of relapse is highest in the first 2 years, observational studies have shown that up to 35 % of recurrences, or a second vulvar primary, develop beyond 5 years, supporting long-term follow-up [65]. In general, patients with vulvar cancer should be examined every 3–6 months for the first two years and then every 6–12 months until year 5, followed by an annual exam for life.

After primary therapy, recurrence with a clinically palpable groin node has a particularly poor prognosis with a mortality rate exceeding 90 % within 12 months despite treatment [66]. Given the elevated risk of isolated groin node recurrence following SNB, several studies have evaluated the utility of groin ultrasounds every 3 months. In one series, two patients (2.6 %) were diagnosed with asymptomatic, isolated groin node recurrences. Both patients remain disease-free after groin dissection and radiation [67]. Another retrospective study investigating serial groin ultrasound as a substitute for groin node dissection reported groin node recurrences in three of 32 patients. Two of these patients were successfully salvaged, while one, with palpable nodes, succumbed to the disease. All recurrences occurred within 12 months of the initial vulvar surgery [62,64]. Therefore, one could consider groin ultrasound evaluation after SNB every 3 months for the first year.

In patients with advanced disease, similarly to cervical cancer, some guidelines recommend PET-CT imaging to assess the response to chemo (radiation) treatment and/or if recurrence is clinically suspected [65]. These current recommendations are based on the best evidence to date (Table 5). Though HPV-associated cancers comprise 50–70 % of cases, cervical and vaginal cytology are of questionable benefit, and no prospective studies are available to validate this approach [74]. Standard cervical cancer screening guidelines may be employed but should be interpreted with caution in patients who have received radiation treatment [68]. Emerging evidence suggests that HPV-independent vulvar cancers have a worse prognosis than those that are HPV-associated. Currently, no guidelines are stratified based on HPV status, and future research is needed to determine whether recurrence patterns differ between these groups, potentially informing risk-stratified surveillance strategies.

In conclusion, vulvar cancer surveillance presents significant challenges. Further research is warranted to develop risk-stratified follow-up strategies to maximize benefit and cost-effectiveness of surveillance practices.

6.3. Vaginal cancer

Like treatment strategies, most recommendations for vaginal cancer surveillance are extrapolated from cervical cancer. There is limited data on the role of cytology in this setting. Post-treatment imaging, favoring a PET CT scan 3–6 months after completion of chemoradiation, may help inform future management strategies [69]. In a retrospective study of 124 patients, patients with advanced stage disease, large tumors (>4 cm), and lymph node metastases were noted to be at particularly high risk for recurrence [70]. Locoregional relapse was more common in squamous cell carcinoma and distant metastases in adenocarcinoma [70]. If the patient has persistent disease, they may be candidates for salvage (surgical or radiation) intervention. Systemic or palliative treatment may be indicated in the event of distant disease. In those with a complete response, the role of routine surveillance imaging has not been established, and we advocate for using imaging only in cases of suspected recurrence.

6.4. Additional considerations

6.4.1. Maintenance therapy

We would like to recognize that our surveillance recommendations are intended for patients who have experienced a complete response to primary, curative therapy. Currently, patients with advanced cancer may receive maintenance therapy after receipt of primary therapy. It is important to note that patients with residual disease after primary treatment may be at higher risk for recurrence and should be monitored accordingly. In patients who have had a complete response, active surveillance strategies, including imaging, biomarker testing, or other tools, may be cost-effective as they detect asymptomatic recurrence, resulting in discontinuation of ineffective high-cost therapies with associated adverse events. For these patients, treatment monitoring and/or surveillance practices should be based on individual clinical situations and discussed with patients in advance to set expectations.

6.4.2. Liquid biopsy

Circulating tumor DNA (ctDNA) and cell-free DNA (cfDNA) are liquid biopsies that offer a minimally invasive method for detecting cancer DNA in the blood. Recently, these tools have emerged as options for cancer surveillance and management across different tumor types. In gynecologic cancers, liquid biopsy has become a great area of interest and is

Table 5
2025 SGO Vulvar Cancer Surveillance Recommendations.^a

Time from completion of primary therapy	Years 0–1	Year 1–5	Years 2–5	>5 years
Symptom review and physical exam	3–6 months	6–12 months	6–12 months	Yearly ^a
+/- Groin ultrasound *After SLNB only	2–3 months	–	–	–
Pap and HPV testing	Per cervical cancer guidelines			
Radiographic imaging	PET CT 3 months after radiation			
	Insufficient data to support routine use			

^a May be followed by a gynecologic oncologist or generalist.

being evaluated, particularly regarding recurrence risk. An analysis of ctDNA in locally advanced cervical cancer from the CALLA trial reported the association of increased risk of disease progression and death with a high baseline ctDNA and lower risk in those with undetectable ctDNA after treatment [71]. The evaluation of ctDNA from the DUO-E trial in advanced/recurrent endometrial cancer noted that patients with detectable ctDNA at baseline was associated with shorter progression free survival than those with undetectable ctDNA [72]. Similarly, in a study of 101 patients with early-stage uterine cancer, though treatment data was not provided, patients with high-risk histology or sarcoma and a positive post-operative ctDNA result were noted to have a higher risk of recurrence (76). Another endometrial cancer series noted that cfDNA levels were higher in advanced stages, aggressive histology, and high tumor volume, and elevation in post-treatment cfDNA was associated with reduced progression-free survival [73]. In ovarian cancer, ctDNA tests have been shown to detect recurrence 10 months earlier than imaging [74]. Though not significant, positive ctDNA was associated with higher recurrence rates compared to patients with negative ctDNA (75 % versus 13 %), as well as reduced recurrence-free survival [74]. In another series, which included 31 patients with advanced ovarian cancer who had a complete response to primary treatment, patients with positive ctDNA had significantly shorter progression-free survival than patients with negative ctDNA [75]. These findings are provocative and suggest liquid biopsy may be a prognostic biomarker and a tool for post-treatment evaluation in gynecologic cancers. At this time, we recommend that ctDNA use should be individualized and should not replace evidence-based surveillance practices. As the role of liquid biopsy is relatively early in gynecologic cancers, we advocate for clinical trials to further evaluate its utility in and impact on treatment and survival outcomes in gynecologic malignancies.

7. Conclusion

Though a critical part of cancer care is the posttreatment period, there remains a lack of prospective studies on the impact of surveillance practices on survival outcomes. As the number of cancer survivors steadily increases, surveillance optimization should be a high priority. Across tumor types, detecting disease recurrences based on patient symptoms and clinical examinations has been the most impactful and low-cost strategy. Appropriate counseling of patients and access to prompt care if symptoms develop is key. However, the ideal interval for follow-up visits has not been established. Since advanced stage and high-risk histology are associated with an increased risk of recurrence, most cancer guidelines recommend quarterly visits in the first two years for high-risk patients and once or twice yearly for lower-risk patients with extended intervals over time.

Clearly, due to a lack of prospective data in cancer surveillance, guidelines and practices often differ. Surveillance tools should detect recurrences when earlier intervention results in improved survival outcomes. Regarding imaging, retrospective studies in ovarian, pancreatic, and colon cancer have reported that routine scans led to the detection of asymptomatic recurrences, allowing for interventions that may be beneficial; however, recognizing that these data are likely impacted by selection and lead-time bias is essential [4,35]. To date, studies across several major cancer populations have not demonstrated a clear role for imaging surveillance. In one of the few prospective trials, the TOTEM trial noted no survival improvement with routine imaging compared to clinical assessment (with limited or no imaging) in endometrial cancer patients [10]. Similarly, prospective randomized breast cancer trials compared intensive surveillance with imaging to clinical follow-up alone [4]. Not only did intensive surveillance fail to demonstrate a survival benefit, but it doubled the cost of care. Despite evidence to the contrary, likely impacted by provider bias and patient requests, excessive surveillance with imaging has become pervasive. Advocating for randomized and/or prospective trials that provide high-quality data will help determine if routine imaging translates into survival

benefit. In the interim, we recommend judicious imaging, typically reserving its use for clinical indications in surveillance.

The emerging data regarding liquid biopsies are exciting; however, liquid biopsy is relatively early in gynecologic cancers. Though there are some circumstances where this test may be useful, we advocate for clinical trials to inform best practice. It is important to remember that surveillance care aims to provide comprehensive survivorship care, including the early detection of cancer recurrence when interventions can provide long-term survival or curative outcomes. As data are lacking, recommendations are based on retrospective studies and expert opinion or simply guided by patient and physician preferences. Surveillance practices that do not improve patient survival or quality of life result in unnecessary costs and wasted healthcare resources. Adhering to recommended guidelines and eliminating high-cost, low-quality care should be encouraged until more evidence is obtained on optimal gynecologic cancer surveillance practices. As new diagnostic tools are developed and treatment advances improve outcomes, earlier intervention may impact survival. Thus, surveillance practices should constantly be re-evaluated to help guide up-to-date recommendations, particularly as new treatment and early detection paradigms emerge.

Disclaimer

SGO recommendations are intended to be educational devices that provide information that may assist in caring for patients. This clinical practice statement is not a rule and should not be construed as establishing a legal standard of care or as encouraging, advocating, requiring or discouraging any particular treatment. SGO clinical practice statements are not intended to supplant the judgment of the health care provider with respect to particular patients or special clinical situations. Clinical decisions in any particular case involve a complex analysis of a patient's condition and available courses of action with the ultimate determination to be made by the health care provider in light of each individual patient's circumstances. Therefore, clinical considerations may lead a healthcare provider to appropriately take a course of action that varies from this document.

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Declaration of competing interest

None.

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