



Modern Approaches to Teaching Pediatric and Adolescent Gynecology

Tania Dumont^{1,2,3} · Jennifer E. Dietrich⁴ · Anna Torres⁵

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Abstract

Purpose of Review To examine global gaps in Pediatric and Adolescent Gynecology (PAG) education and assess how limited curricular exposure contributes to disparities in care. This review also explores emerging educational strategies, including simulation, virtual learning, and artificial intelligence, to strengthen PAG training.

Recent Findings Despite its clinical importance, PAG remains underrepresented across undergraduate and residency programs. Professional societies have expanded teaching resources, yet formal subspecialty recognition is limited. Innovations such as simulation-based education, digital platforms, and AI enhanced tools increasingly support competency development where clinical exposure is scarce.

Summary Significant educational gaps continue to hinder the PAG workforce. Modern educational approaches offer promising solutions to improve competency-based training and expand access to high-quality care. Strengthening international collaboration and standardizing curricula will be essential to advancing PAG education and guiding future research.

Key Points

- **PAG is an under-recognized specialty globally:** Despite its importance, Pediatric and Adolescent Gynecology is not widely acknowledged as a distinct subspecialty in most countries, leading to gaps in specialized training and care.
- **Educational gaps persist:** Fellowship programs are expanding, but medical and residency-level exposure remains limited, leaving many clinicians ill-equipped to manage PAG conditions.
- **Modern educational strategies are essential:** Simulation-based education, virtual learning platforms, and emerging technologies such as AI can bridge gaps in clinical exposure and improve competency.
- **Global collaboration is critical:** Professional societies (NASPAG, EURAPAG, FIGIJ, etc.) play a key role in standardizing curricula and advocating for subspecialty recognition.
- **Competency-based assessment is the future:** Tools like Entrustable Professional Activities (EPAs) and technology-driven evaluations will ensure measurable proficiency and standardization of skills.

Keywords Pediatric and adolescent gynecology · Medical education · Simulation-based education · Competency-based assessment · Curriculum development · Artificial intelligence

✉ Tania Dumont
tdumont@cheo.on.ca

✉ Jennifer E. Dietrich
jedietri@texaschildrens.org

¹ Division of Pediatric and Adolescent Gynecology, Department of Surgery, CHEO, Ottawa, ON, Canada

² Division of General Obstetrics and Gynecology, Department of Obstetrics, Gynecology, and Newborn Care, The Ottawa Hospital, Ottawa, ON, Canada

³ Department of Obstetrics and Gynecology, University of Ottawa, Ottawa, ON, Canada

⁴ Division of Pediatric and Adolescent Gynecology, Department of Obstetrics and Gynecology and Department of Pediatrics, Baylor College of Medicine Texas Children's Hospital Houston, Houston, TX, USA

⁵ Department of Pediatric and Adolescent Gynecology, Medical University of Lublin University Children's Hospital of Lublin, Lublin, Poland

Introduction

Diseases of the reproductive tract in the individuals assigned female sex at birth can occur at any stage in life, starting as early as during the prenatal period. Gynecological problems require specific diagnostic and therapeutic approaches in pediatric and adolescent patients to ensure that their unique healthcare needs are met, including psychological, social, and cultural aspects [1]. General gynecology practitioners may not be sufficiently prepared to take care of this specific population, which may lead to suboptimal care and long-term reproductive health consequences [1].

Due to the global shortage of Pediatric and Adolescent Gynecology (PAG) providers, innovative educational strategies—extending beyond reliance on expert specialists—are crucial to enhance training, increase exposure, and guide appropriate referrals for patients in underserved areas. A 2022 The North American Society for Pediatric and Adolescent Gynecology (NASPAG) survey of 120 North American PAG practitioners (39.2% response rate) revealed uneven distribution: 89.2% in the US (concentrated in populous states like Texas, California, and New York) and 9.2% in Canada (mainly Quebec, Ontario, and Alberta), with 14 US states and 10 Canadian provinces/territories lacking any PAG surgeons. Most providers operate in academic settings (68.3%) and focus full-time on PAG (60.4%), offering services like surgery for ages ≥ 12 (>95%), ambulatory care (>95%), and multidisciplinary care (>85%) [2]. However, survey limitations (e.g., response bias) suggest underreporting, and in Canada, >50% of OBGYN generalists—who handle most PAG care—prefer to avoid it. This access gap stems from limited PAG content in medical training, its under-recognition as a distinct OBGYN subspecialty in most countries, and reliance on PAG societies for education. Drawing from other OBGYN subspecialty fields, broader tools like curricula, guidelines, and referral protocols are essential to bridge disparities and improve outcomes for adolescents.

This gap in healthcare is due to many factors, including limited exposure to pediatric and adolescent gynecology (PAG) content during pre and postgraduate medical training and the lack of acknowledgment of PAG as a distinct subspecialty of Obstetrics and Gynecology in most countries. In general, PAG education is under-recognized by general medical curricula worldwide, and is primarily driven by local, regional, and international PAG societies [3]. PAG has taken note of efforts from other OBGYN subspecialties. An important consideration for the subspecialty of PAG is the need to address the unique reproductive conditions in this underserved population, which differ significantly from those in adult women and require care distinct from routine adult OB/GYN practices.

PAG related health issues may manifest as common, bothersome symptoms in children and adolescents, who may present to a wide variety of specialists including general practitioners (family physicians, nurse practitioners, advanced practice providers, etc.), pediatricians, pediatric endocrinologists, pediatric surgeons, pediatric urologists, nephrologists, adolescent medicine specialists, gynecologists and emergency medicine doctors. PAG competencies should be acquired by learners not only during fellowship, but also at the pre-graduate and post-graduate level of education. Teaching PAG in clinical settings is extremely challenging due to the small number of specialized centers, specialists and patient access limitations [4].

For these reasons, it is essential to use modern educational techniques that may overcome these difficulties which can include using simulation techniques, virtual patient and provider education tools, and artificial intelligence.

Current State of PAG Education and Training of OB/GYNs

PAG fellowship programs are growing in numbers in developed countries, but many patients still lack access to a PAG provider in both developed regions and low resource settings. While education has expanded at the fellowship level, educational opportunities are still quite limited when it comes to residency programs and medical student education exposure. A 2022 study of Canadian Ob/Gyn Residency Program directors found that most Ob/Gyns, not PAG specialists, care for PAG patients with minimal training, and only feel comfortable with managing adult-like pathology [5]. Over half report not wanting to treat this population and more than two-thirds felt ill equipped to care for this population as they had no PAG training during residency [5, 6]. Residency training in Canada, the United States, Europe, and other countries in the world have objectives, entrustable professional activities (EPAs), standards and/or milestones related to PAG [7–9]. A summary of available societies with their respective website and courses/conferences can be found in Table 1 and details are found in the sections below.

NASPAG Curricula

NASPAG has long been an advocate of resident PAG education since the inception in 2012 of the NASPAG Residency Education Committee which has recently published its fourth edition of the Short Resident Education Curriculum [10, 11]. This manuscript is designed as a 2-week residency curriculum that introduces key pediatric and adolescent gynecology concepts using NASPAG online resources and identifies supportive PAG book chapters. It complements, but does not replace, the comprehensive Long Curriculum

Table 1 Summary of available societies with their respective website and courses/conferences

Organization	Region	Website	Key Educational Resources and Activities	References
NASPAG	North America	https://www.naspag.org	Annual Clinical & Research Meeting, monthly webinars, podcasts (PAG over Pastries), online learning platforms	[16]
EURAPAG	Europe	https://www.eurapag.com	Biennial congresses, specialized trainee programming, published curricula	[17]
BritSPAG	United Kingdom	https://britspag.org	Annual updates, contributions to European and international initiatives	[18]
ISRAPAG	Israel	https://israpag.mednet.co.il/	Annual scientific meetings, continuing-education courses, clinical update days, Hebrew-language resources for clinicians and patients, collaborations with national OB/GYN society and international initiatives	[19]
AOSPAG	Asia–Oceania	https://aospag.com	Regional congresses (e.g., Kuala Lumpur 2025), workshops	[43]
ALOGIA	Latin America	https://alogiaonline.org	Continental congresses (e.g., Buenos Aires 2024), FIGIJ-recognized webinars and educational partnerships	[20]
SAGIJ	Argentina	https://sagij.org.ar	Structured courses, conferences, clinical guidelines	[21]
FLASOG PAG Committee	Latin America	N/A	Structured courses, conferences, clinical guidelines	[22]
ANZSPAG	Australia & New Zealand	https://www.anzspag.org.au	Targeted tutorials, webinars, podcasts, structured training pathways including fellowships and observerships	[23]
FIGIJ	International	https://figij.org	Triennial World Congress, regional scientific meetings, global collaboration among societies and practitioners, focus on education, research, service development, sexual and reproductive health/rights, support for resource-limited settings	[24]
FIGO Adolescent and Young Adult Committee	International	https://www.figo.org/committee-adolescent-youth-health	PAG-focused curriculum at biennial global conferences, online cases for OB/GYNs, adolescent gynecology health care passport, podcasts on key PAG topics	[25]

NASPAG North American Society for Pediatric and Adolescent Gynecology, *FIGIJ* International Federation of Pediatric and Adolescent Gynecology, *EURAPAG* European Association of Paediatric and Adolescent Gynaecology, *BritSPAG* British Society for Paediatric & Adolescent Gynaecology, *ISRAPAG* Israeli Society of Gynecology of Girls and Adolescents, *AOSPAG* Asia–Oceania Society for Paediatric and Adolescent Gynecology, *ALOGIA* Asociación Latinoamericana de Obstetricia y Ginecología de la Infancia y Adolescencia, *SAGIJ* Sociedad Argentina de Ginecología Infante Juvenil, *FLASOG* Federación Latinoamericana de Sociedades de Obstetricia y Ginecología, *ANZSPAG* Australian and New Zealand Society of Paediatric and Adolescent Gynaecology, *FIGO* International Federation of Gynaecology and Obstetrics

which is in its 3rd edition [12]. The Long Curriculum is comprehensive covering all PAG objectives from formal training guidelines (CREOG, ABP, RCPSC) and includes surgical topics for OB/GYN, expanded content on sexual and gender-diverse youth, COVID-19 care, and the most updated references for further education and expertise. Table 2 demonstrates the key differences between the short and long curriculum.

PAG Education in Europe

The status of PAG education varies throughout Europe. The recent literature provides information on few European countries; a formal assessment of PAG education across Europe has not been investigated. According to available data, the Czech Republic and Ukraine are the only European countries which recognize PAG at a national level as a sub-specialty of Ob/Gyn [13, 14]. In the United Kingdom specialist PAG training, called Advanced Training Skills Module (ATSM), exists with the status of an elective module for senior trainees, which also requires maintaining an

electronic portfolio [13, 14]. An electronic portfolio is a digital, structured collection of a learner's work, achievements, reflections, and assessments that demonstrates their progress, competencies, and professional development over time. It usually includes cases managed by the learner. In other countries including Germany, Netherlands, Italy, Poland, Latvia, Lithuania, and Serbia there are no standardized PAG training curricula, however, provision of training exists in the form of PAG courses, annual meetings, national seminars, or focused courses within OB/GYN residency [14].

In 2014 the European Board & College of Obstetrics and Gynecology took an initial step to formalize the delivery of PAG care by including a PAG section in the document on Standards of Care for Women's Health in Europe [9]. The section on basic PAG competencies was then included in the EBCOG-PACT project, the first curriculum for European trainees in Obstetrics and Gynaecology containing the postgraduate knowledge and skills required of general European gynaecologists [15]. Following the publication of the two documents, EURAPAG developed a post-specialty

Table 2 Comparison of NASPAG pediatric & adolescent gynecology short vs. long curriculum

Feature	Short Curriculum (PAG Short Curriculum 4.0) [11]	Long Curriculum (Long Curriculum 3.0) [12]
Purpose	Concise, high-yield overview of essential PAG topics	Comprehensive, in-depth coverage of all PAG objectives
Duration/Structure	~2 weeks (≈ 12 days), 1–3 h/day	4–6 week intensive rotation or longitudinal delivery across residency
Scope of Objectives	Highlights key points; does NOT cover all training objectives	Covers ALL topics required by CREOG, ABP, RCPSC
Target Audience	Ob/Gyn residents, Pediatric residents, Adolescent Medicine Fellows, and Family Medicine residents	Ob/Gyn, Pediatrics, and Adolescent Medicine trainees seeking more in depth PAG exposure
Integration into Training	Designed to fit within existing rotations (e.g., adolescent medicine, REI, outpatient gynecology)	Can be used as a dedicated PAG block rotation or integrated longitudinally
Emphasis/Modality	Practical ‘nuts & bolts’; strong emphasis on online resources (NASPAG PAG WebEd cases, ACRM lectures, podcasts)	Extensive reading and reference framework; includes psychosocial care, gender-diverse youth, COVID-19 updates
Surgical Content	Not required	Included for Ob/Gyn trainees (not listed separately; program discretion)
Representative Learning Resources	NASPAG WebEd case modules, ACRM recorded lectures/podcasts, concise supplementary readings	Textbook chapters (Emans/Laufer/DiVasta; Sanfilippo, NASPAG PAG Essentials), journal articles, committee opinions, WebEd cases
Updates & Revisions	Updated to prioritize accessible online content; standardized key points	Updated references; expanded sections on sexual minority and gender diverse youth; current COVID-19 guidance
Outcome Expectation	Foundational competence in common pediatric/adolescent gynecologic concerns	Completion of ALL formal PAG training objectives across CREOG, ABP, RCPSC

CREOG Council on Resident Education in Obstetrics and Gynecology, ABP American Board of Pediatrics, RCPSC Royal College of Physicians and Surgeons of Canada

Online resources referenced include NASPAG’s PAG WebEd case-based modules and recordings from the Annual Clinical and Research Meeting (ACRM)

PAG training curriculum aiming to unify and standardize PAG education at the subspecialist level across Europe [13]. The curriculum uses a Delphi method, a structured technique involving anonymous, iterative expert surveys to build consensus on key elements like educational priorities and competencies in PAG training. The curriculum consists of 17 chapters covering all aspects of PAG and has been divided into three sections: baseline, medical, and surgical skills. Such an approach allows for flexibility in teaching and involvement of allied pediatric specialties providing opportunity for both pediatric and OBGYN specialists to participate. The curriculum recommends several workplace-based assessment methods, like direct observation (DO) of clinical task performance, Objective Structured Assessment of Technical Skills (OSATS), mini-clinical evaluation exercise (Mini-CEX), or case-based discussion (CBD). The process also requires the trainee to maintain a clinical portfolio, which includes a section for each of the 17 chapters of the curriculum, otherwise known as the 17 entrusted professional activities (EPA’s) [13].

Global PAG Educational Resources

Pediatric and adolescent gynecology is supported by a robust network of professional societies promoting education, research, and clinical excellence on a global scale. In North America, NASPAG provides foundational resources such as

its Annual Clinical & Research Meeting (ACRM), monthly webinars, podcasts (PAG over Pastries) and online learning platforms [16]. In Europe, the European Association of Paediatric and Adolescent Gynaecology (EURAPAG) organizes biennial congresses and offers specialized trainee programming and published curricula [17]. The British Society for Paediatric & Adolescent Gynaecology (BritSPAG) in the UK conducts annual updates and contributes to wider European and international initiatives [18]. The Israeli Society of Gynecology of Girls and Adolescents (ISRAPAG) was established in 1995 as a national pediatric and adolescent gynecology society under the umbrella of the Israeli Medical Association [19]. ISRAPAG organizes annual scientific meetings, continuing-education courses, and clinical update days focused on PAG, and develops Hebrew-language educational resources for both clinicians and patients. It collaborates closely with the national obstetrics and gynecology society and contributes to international PAG initiatives through congress participation and invited lectures. Within Latin America, the Asociación Latinoamericana de Obstetricia y Ginecología de la Infancia y Adolescencia (ALOGIA) hosts continental congresses (e.g., Buenos Aires, 2024) and partners on educational activities such as FIGIJ-recognized webinars [20]. Additionally, the Sociedad Argentina de Ginecología Infante Juvenil (SAGIJ) and the regional Pediatric and Adolescent Gynecology Committee of the Federación Latinoamericana de Sociedades de

Obstetricia y Ginecología (FLASOG) deliver structured courses, conferences, and clinical guidelines [21, 22]. In Australasia, the Australian and New Zealand Society of Paediatric and Adolescent Gynaecology (ANZSPAG) fosters clinical excellence through targeted tutorials, webinars, podcasts, and structured training pathways including fellowships and observerships [23].

Internationally, the International Federation of Pediatric and Adolescent Gynecology (FIGIJ) convenes the World Congress of Pediatric & Adolescent Gynecology triennially and regional scientific meetings to facilitate global collaboration [24]. The FIGIJ is a global non-profit organization dedicated to advancing evidence-based gynecological care for children and adolescents, with a strong focus on sexual and reproductive health. Central to its mission is fostering international collaboration among national societies, individual practitioners, and allied organizations to promote education, research, and service development. FIGIJ works inclusively across regions and cultures, partnering with societies worldwide to uphold sexual and reproductive rights, share best practices, and support clinicians, particularly in resource-limited settings, through joint initiatives, congresses, and training programs. The newest addition to the global PAG network is the International Federation of Gynaecology and Obstetrics (FIGO) Adolescent and Young Adult committee building and sharing PAG focused curriculum at their every 2 year global conferences, developing internationally minded PAG focused online cases for OB/GYNs, the FIGO adolescent gynecology health care passport and podcasts pertaining to key PAG topics [25].

Table 3 summarizes the North American, European, and Global educational resources which are available in different formats to meet the needs of a variety of learners.

Current Innovative PAG Educational Approaches

Historically, PAG trainees, as with most other specialists, would learn PAG education via didactic courses and “on the job” or apprentice-like training. Over the last decade, however, advances in medical education techniques have infiltrated the education of PAG trainees to better optimize and standardize learning. In 2022, Dumont and Torres performed an impactful systematic review of PAG simulation [26]. It was clear that simulation-based education (SBE) in pediatric and adolescent gynecology (PAG) is essential for improving patient safety and addressing gaps in clinical exposure, particularly for rare or sensitive conditions. Simulation training encompasses both technical and non-technical skills (see Fig. 1), guided by educational theories and is structured through phases of preparation, briefing, simulation, debriefing, and evaluation. Various models, from low-fidelity, part-task trainers to high-fidelity, hybrid

simulations, have demonstrated positive impacts on learner confidence, knowledge, and procedural competence [27–30]. The Global Library of Women’s Medicine chapter on Pediatric and Adolescent Gynecology Simulation has a table that summarizes simulation research through 2022, providing an excellent resource for educators in the field (Fig. 1) [26]. Future directions include research on knowledge retention, integration of interprofessional training, and exploration of advanced technologies such as screen-based simulation and virtual reality. SBE should be embedded within PAG curricula and tailored to institutional resources to ensure sustainable, high-quality training.

As few centers around the world have experience with SBE PAG education the international cooperation may facilitate organizing SBE-based courses. Experience from the COVID-19 pandemic era has shown that simulation-based teaching of patient encounter and management, including clinical reasoning process and communications skills, can be carried out remotely with facilitators, learners and simulated patients located in various parts of the world [31].

As addressed earlier, the limited exposure to pediatric and adolescent gynecology during medical training results in low awareness of the specialty among physicians and educators and may contribute to the global shortage of specialists. Therefore, incorporating core PAG content into undergraduate medical education is essential for expanding the workforce as well. This can also be achieved with SBE. High-fidelity scenarios, which incorporate PAG specific health problems (severe anemia/juvenile menorrhagia, abdominal pain/ovarian torsion), can be successfully implemented for large student cohorts and are well received and positively evaluated by learners (unpublished data).

Since 2022, while no new PAG simulation articles have been published, numerous workshops have been launched at the NASPAG ACRM, focusing on surgical simulation tools for PAG fellows and PAG surgery providers in practice. In 2025, workshops focused on both low fidelity models (Simulated Surgical Management of Vaginal Stenosis: Simulated Buccal Graft Patch and Tissue Reconfiguration Techniques with Z-plasty (Fig. 2)) and high-fidelity 3D-printed models (Surgical Simulation: Resection of the Transverse Vaginal Septum (Fig. 3)) [32]. Hybrid models, utilizing a task-trainer with a simulated patient, have also been designed for simulation education (Fig. 4). Institutional models have also been created specifically for fellows training. Examples of these range from laparoscopic oophorectomy in a child (Fig. 5), to more practical skills such as CO2 laser (Fig. 6) and laparoscopic trocar box (Fig. 7). With the creative approaches utilized for many of these low fidelity simulation models, there is also opportunity for further simulation model building with 3D printing and other innovative bio-engineering strategies.

Table 3 Educational resources: from textbooks, to podcasts, and other on-line tools

Type/Location	Resource	What it is	How to access	Notes
TEXTBOOKS				
Core	NASPAG Essentials of Pediatric and Adolescent Gynecology (De Silva & Tyson, Elsevier, 1st ed., 2024) [44]	Curriculum-aligned core text based on NASPAG Short/Long Curricula.	Elsevier: https://www.us.elsevierhealth.com/naspag-essentials-of-pediatric-and-adolescent-gynecology-9780443105128.html	eBook included with print purchase; tables/algorithms great for teaching.
Comprehensive	Emans, Laufer, Goldstein's Pediatric & Adolescent Gynecology, 7th ed. (2020) [45]	Gold-standard multidisciplinary PAG textbook; 19 new chapters in latest edition; Doody's Core Title for 2025.	LWW Store: https://shop.lww.com/Emans--Laufer--Goldstein-s-Pediatric-and-Adolescent-Gynecology/p/9781975107468	Covers full spectrum of PAG, from newborn anatomy to adolescent gynecologic surgery; updated LGBTQ+ and transgender care chapters; includes surgical videos.
New edition	Sanfilippo's Textbook of Pediatric and Adolescent Gynecology (CRC Press, 3rd ed., 2026) [46]	Updated comprehensive PAG reference; new edition adds legal/practice updates + online resource center (videos, MCQs).	Routledge Store: https://www.routledge.com/Sanfilippos-Textbook-of-Pediatric-and-Adolescent-Gynecology/Sanfilippo-Lara-Torre-Gomez-Lobo/p/book/9781138551572	Good for advanced topics and program building; release Feb 2026 (print/eBook).
Surgical Atlas (New release)	Pediatric and Adolescent Gynecologic Surgery: Management, Surgical Approaches, and Post-Operative Care (Dietrich et al., Academic Press/Elsevier, 2025) [47]	Step-by-step atlas with pre-op planning, intra-op pearls, and postop care; richly illustrated.	Elsevier: https://shop.elsevier.com/books/pediatric-and-adolescent-gynecologic-surgery/dietrich/978-0-443-15940-4?country=CA&format=print&utm_source=google_ads&utm_medium=paid_search&utm_campaign=capmax&gclid=CjwKCAjw687NBhB4EiwAQ645dhboALbcxP6AUpAVnAx6hTtEcRQznX7QFEcL5jlaYr24PPskB-BaHRoCSvgQAvD_BwE	Useful for case-based OR teaching and skills sessions.
Practical/Clinical	Practical Pediatric and Adolescent Gynecology (Editor: Paula J. Adams Hillard, MD; 1st ed., 2013) [48]	Pragmatic, case-based clinical reference focused on real-world management of common PAG presentations; emphasizes office-based care, adolescent communication, menstrual disorders, contraception, pelvic pain, and confidentiality.	Wiley Online Library: https://onlinelibrary.wiley.com/doi/book/https://doi.org/10.1002/9781118538555	Older but still highly practical; excellent companion text for residents and non-PAG specialists; strong emphasis on clinical reasoning and adolescent-centered care.

Table 3 (continued)

Type/Location	Resource	What it is	How to access	Notes
Clinical Management/Protocols	Clinical Protocols in Pediatric and Adolescent Gynecology (Hertweck & Dwiggins, 1st ed., 2022) [49]	Protocol-driven reference providing standardized approaches to evaluation, diagnosis, and management of PAG conditions; designed to support consistent, evidence-based care across settings.	Routledge/CRC Press: https://www.routledge.com/Clinical-Protocols-in-Pediatric-and-Adolescent-Gynecology/Hertweck-Dwiggins/p/book/9780367483098	Ideal for fellows, early-career faculty, and program development; useful for creating local guidelines, pathways, and teaching algorithms.
International multi-author	Pediatric and Adolescent Gynecology: A Problem-Based Approach (Editors: S. Creighton, A. Balen, L. Breech, L-M. Liao; Cambridge University Press; 2018) [50]	Problem-based international text: stepwise diagnostic/management pathways; includes laparoscopic techniques, psychosocial elements, and a dedicated safeguarding chapter.	Cambridge University Press: https://www.cambridge.org/core/books/pediatric-and-adolescent-gynecology/593DA301208FF97FFDD8BB2F0AECC3F0	Useful for case-based teaching; reflects collaboration across UK/Europe/U.S. experts.
Europe/international; English edition	Paediatric and Adolescent Gynaecology (V. Bruni & M. Dei, OEO Firenze, Firenze, 2023) [51]	568-page, full-color, highly illustrated practical guide written by internationally recognized European experts; designed for students, trainees, fellows, and specialists.	OEO Firenze: https://oeofirenze.com/shop/paediatric-adolescent-gynaecology/?srsltid=AfmBOopTOvYbXvUdbZWxt6uXvOxBtoEkv7g-aqniLrQi9pggk0Tsp2_	Strong European academic pedigree; integrates clinical, psychosocial, and pedagogical perspectives.
Europe	EURAPAG PAG Textbook (European Association of Paediatric & Adolescent Gynaecology, 2023) [52]	Comprehensive European reference endorsed by the EURAPAG Academy ; step-by-step coverage of history, physical exam techniques, diagnostics, and treatment plans; includes worksheets to deepen understanding of physiology/pathogenesis.	EURAPAG Shop: https://www.eurapag.com/eurapag-shop/	Built for European trainees/clinicians; emphasizes multidisciplinary and psychosocial approaches across EU contexts.
PODCASTS				
From the JPAG Journal	The JPAG Podcast 2.0 [53]	Official podcast of the <i>Journal of Pediatric and Adolescent Gynecology</i> ; monthly issue highlights, interviews.	https://www.naspag.org/jpag-podcast	Fast way to keep trainees current with JPAG content.
Education	PAG over Pastries [54]	NASPAG-supported, bite-size PAG review episodes aligned to NASPAG Essentials; monthly releases since Jan 27, 2025.	https://www.naspag.org/podcast	Episode library includes exam skills, RED-S, anomalies, laparoscopy—great for flipped classroom.

Table 3 (continued)

Type/Location	Resource	What it is	How to access	Notes
United Kingdom/Global	ISUOG Podcast – Pediatric & Adolescent Gynecology Episode (2024) [55]	An international PAG-focused episode featuring UK consultants Dr. Jemma Johns and Dr. Maya Al-Memar. Covers core PAG clinical considerations: history-taking, adolescent-appropriate communication, ultrasound decision-making, and nuances of caring for young patients.	https://www.isuog.org/resource/newest-podcast-episode-dives-into-pediatric-and-adolescent-gynecology.html	Only global PAG-specific podcast episode; high-quality international content and an excellent supplement for trainees learning cross-cultural PAG care.
ON-LINE EDUCATIONAL PORTALS				
North America	NASPAG Online Learning (LMS) [56]	Central hub for PAG-WEBED (35+ interactive cases), ACRM archives, Fellows Bootcamp, surgical videos (incl. Sanfilippo 2nd/3rd ed.).	https://naspag.mclms.net/en/	Many assets require membership/login; ideal for longitudinal curricula.
Global	FIGIJ Clinical Resources Library [57]	International library of clinical guidelines, societal guidelines, and patient information leaflets produced or curated by global PAG experts; includes educational materials from multiple countries.	https://figij.org/resources/clinical-resources/	Provides global guideline comparisons; encourages clinicians to adapt guidance to their local context.
Europe	EURAPAG Academy [58]	European PAG training hub offering the PAG Post-Specialty Curriculum, learning modules, trainee resources, and access to their official PAG textbook.	https://www.eurapag.com/eurapag-academy/	Primary European educational platform for PAG training and credentialing.
United Kingdom	BritSPAG Resources [59]	UK-focused PAG educational site with clinician resources, training updates, event recordings, and UK-specific guidance.	https://britspag.org/resources/	Strong clinical community with annual updates + national specialist network.
Australia and New Zealand	ANZSPAG [60]	Offers professional training resources, patient/family information, and educational links for providers across Australia and New Zealand.	https://www.anzspag.org.au/information-for-professionals	Good for understanding PAG training + cultural considerations in Australia/NZ.
ON-LINE CLINICAL TOOLS				
North America	Tools for the Clinician [61]	One-page links to NASPAG clinical recommendations, JPAG mini-reviews, ACOG resources, coding, transition care.	https://www.naspag.org/toolsfortheclinician	Handy for quick links during teaching clinics.
Global	FIGIJ Clinical Guidelines & Tools [62]	Collection of international PAG guidelines, consensus statements, and educational documents; includes global clinical assessment guidance (2025).	https://figij.org/clinical-practice-points/	Most comprehensive non-U.S. global PAG resource repository.
United Kingdom	RCOG Special Interest Training Module (SITM): PAG [63]	Competency-based PAG clinical training module with clear capabilities, evidence requirements, and educator guidance.	https://www.rcog.org.uk/careers-and-training/training/curriculum/2024-og-curriculum/resources/special-interest-training-modules-sitms/gynaecology-curriculum-guides/paediatric-and-adolescent-gynaecology-pag/	Excellent for structured education; widely used in UK postgraduate training.

Table 3 (continued)

Type/Location	Resource	What it is	How to access	Notes
Europe	EURAPAG Post-Specialty Curriculum [64]	European PAG training curriculum including clinical competencies, diagnostic guidelines, and learning frameworks.	https://www.eurapag.com/meetings-congresses/eurapag-presentation-curriculum/	Harmonizes PAG education across Europe; pairs well with their textbook.
PATIENT HANDOUTS				
North America	Patient Handouts (multi-language) [65]	Printable handouts on common PAG topics (AUB, PCOS, LS, vulvovaginitis, contraception, etc.)	https://www.naspag.org/patient-handouts	Great for learner OSCEs and clinic after-visit education.
Global	FIGIJ Patient Leaflets [66]	Internationally sourced PAG patient information leaflets, covering a variety of gynecologic conditions affecting children and adolescents.	https://figij.org/patient-handouts/	Includes materials from multiple societies; adaptable across countries.
Europe	EURAPAG Publications/Links [67]	Offers PAG educational publications and linked patient-friendly materials; curated to support European practice.	https://www.eurapag.com/publications/	Some handouts vary by country; useful for cross-regional comparison.
United Kingdom	BritSPAG Patient Resources [68]	UK-focused patient information on common pediatric and adolescent gynecology concerns.	https://britspag.org/resources/	High-quality, written for families, commonly used in NHS settings.
Australia and New Zealand	ANZSPAG Patient & Family Info [69]	Provides patient education materials, links, and PAG explanations tailored for Australian & New Zealand families.	https://www.anzspag.org.au/information-for-patients	Includes region-specific cultural considerations (e.g., Māori health frameworks).

Educational Assessments are Critical

Although teaching and disseminating knowledge about PAG is essential, medical educators must not overlook the importance of assessment of learning [33]. This is particularly important given that PAG is not recognized as a separate subspecialty in most countries worldwide, resulting in little or no oversight of who practices in the field. Therefore, the international PAG community should work toward developing effective and standardized methods to assess not only theoretical knowledge, but also PAG-related clinical skills. Such assessments will help ensure that individuals who wish to practice in this field have mastered essential PAG competencies [34].

Entrustable Professional Activities (EPAs) have recently been advocated as an effective means of assessing competencies across many medical specialties and have been successfully implemented in numerous curricula [35]. At the medical student level, colleagues from Yale conducted a prospective evaluation cohort of 9 medical students based on their rotation in PAG comparing pre and post rotation knowledge assessments. Solotke et al. reported on the usefulness of EPAs in this novel approach to teaching PAG at the pre-graduate level, which was well received by both

educators and learners. They noted that clinical knowledge improved significantly over the course of the rotation from 67% to 75.2%. They also noted that EPAs increased and rotation and faculty evaluation scores improved [36]. Although this approach has been implemented and reported by only a single center, EPAs are a promising tool for assessing PAG competencies. Therefore, the development of core PAG EPAs should be considered by the international PAG community as an essential step toward the advancement of future PAG curricula.

While assessment of competencies in Pediatric and Adolescent Gynecology (PAG) is essential for ensuring high-quality training in OB/GYN residencies, significant limitations exist at the resident level in the United States.

Specifically:

- PAG competencies are restricted to those outlined in the APGO-CREOG 13th Edition document, which exclusively addresses certain elements of gynecology ambulatory care.
- No surgical aspects of PAG are defined as competencies.
- Tables detailing achieved privileges do not incorporate any components of PAG surgical care [8].

Table 3 Summary of current literature of simulation-based education in pediatric and adolescent gynecology (PAG).

Year, location and first author	Competency evaluated	Type of trainer used	Outcomes of the study
2009, Israel, Beyth ⁵⁶	Communication with adolescents	Simulated patients	Satisfaction rate of the participants was so high that they recommended this program be expanded to all gynecologists and residents in gynecology.
2011, USA, Loveless ⁵⁷	PAG gynecological exam, collection of microbial cultures, vaginal lavage, vaginoscopy	Simulated pelvis	Significant improvement in scores pre- and post-training and this improvement in knowledge and scores was found to be consistent amongst all years of residency.
2014 and 2016, Canada, Dumont ^{58,59}	PAG history taking, genital examination, Tanner staging, vaginal sampling and flushing, hymenectomy, vaginoscopy, laparoscopic adnexal detorsion	Part-task trainers: breasts, pelvis, abdomen	All residents agreed that they gained self-perceived knowledge and that the simulation curriculum should be implemented as a recurrent part of their curriculum; all resident agreed that a simulation scenario focussed on child/adolescent communication should be included in the curriculum; mean OSCE score increased from 54.6% to 78.1% thus concluding the positive impact of this simulation curriculum on resident history taking, examination skills, operative techniques and approach to the PAG population
2015, USA, Damle ⁶⁰		Pediatric mannequin with anatomic pre-pubertal genitalia	Residents who were in the simulation group did as well as those on rotation and better than the controls. This reinforces the need to implement PAG simulation curriculums into all residency training programs as simulation can palliate the lack of PAG clinics, OR exposure and clinical rotations.
2019 and 2020 Poland, Torres ^{61,62}	Self-assessed skills in PAG examination	High-fidelity hybrid model (pelvic trainer + simulated patient + simulation gynecology office	All participants recommended the hybrid model; residents valued the hybrid model in all three components that were assessed (cognitive, affective and behavioral). This was a mixed-methods study the qualitative assessment of which from interviews uncovered six themes that affect the PAG simulation learning environment: physical realism and perceived difficulty, emotional realism of the patient, emotional states, comparison of difficulty between the two simulation types, engagement with the patient and perception of higher fidelity with the hybrid model. This led to the development of a conceptual model influencing learning with high-fidelity hybrid models in PAG simulation (Figure 1).

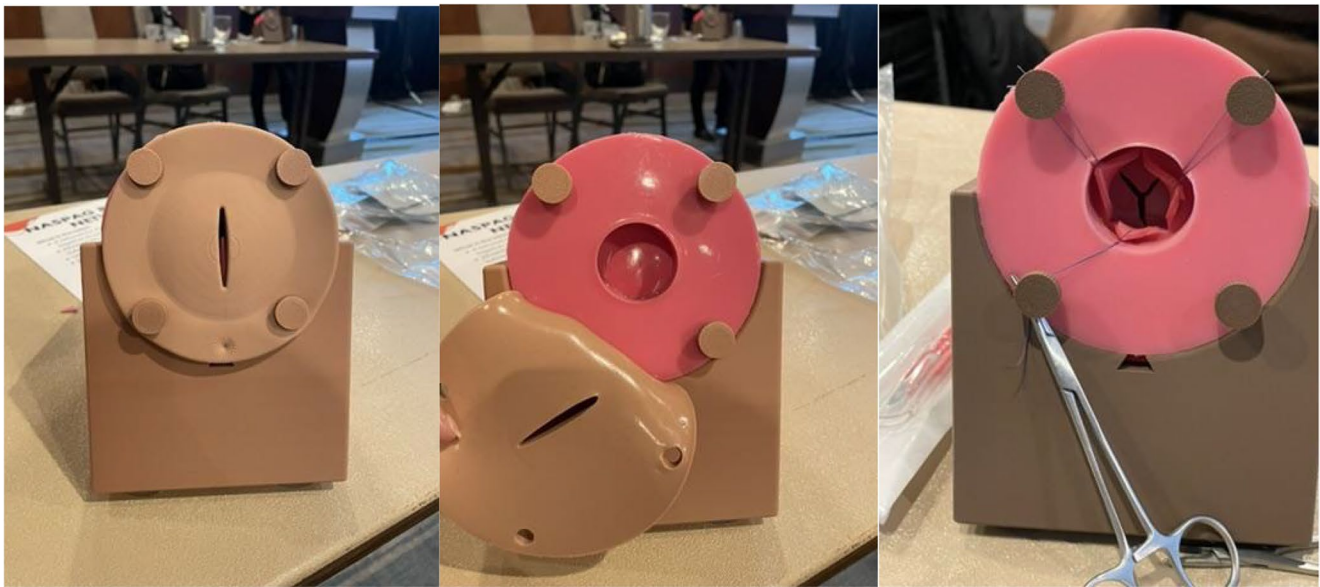
Fig. 1 Summary of current literature in SBE in PAG (reproduced with permission)

Fig. 2 Surgical Simulation Models for Vaginal Stenosis Management (A: Buccal Graft Approach, B: Z-Plasty Approach. Courtesy of Dr. Dietrich)



A Buccal Graft Model

B Z-plasty Model



A

B

C

Fig. 3 3D-printed, silicone casted, transverse vaginal septum (TVS) (A: intact model, B: model with vulva removed demonstrating the TVS, C: model with TVS resection completed. Courtesy of Dr. Dumont)



Fig. 4 Hybrid model for adolescent gynecological examination with simulated patient sitting on the reduced size pelvic trainer. Courtesy of Dr. Torres

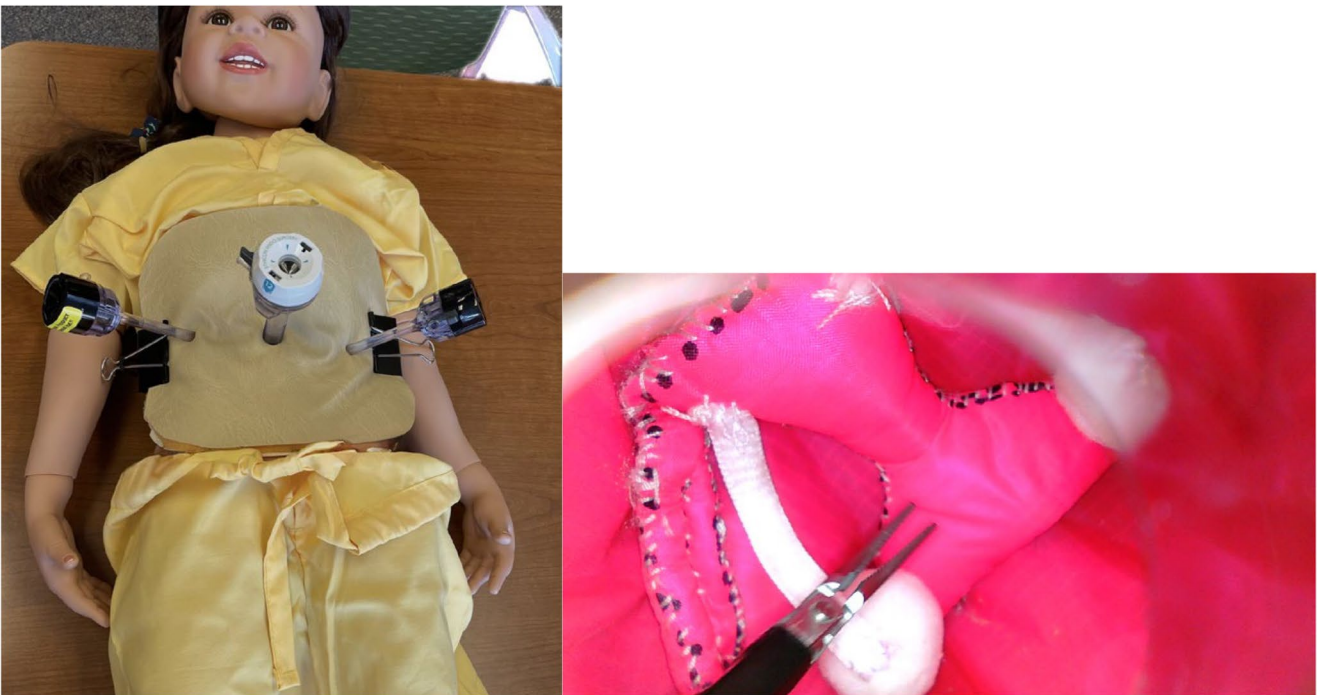


Fig. 5 Laparoscopic Oophoropexy Simulation Model. Demonstrates simulation doll and simulated laparoscopic pelvic structures. Courtesy of Dr. Dietrich



Fig. 6 Surgical Simulation with CO2 laser using a bell pepper to test various energy settings for coagulation and cut features. Courtesy of Dr. Dietrich



Fig. 7 Trocar Insertion Simulation Box. Courtesy of Dr. Dietrich

However, the PAGWEBED tool, provided by NASPAG, offers a more comprehensive approach. It evaluates knowledge in ambulatory topics and extends to formative assessment of PAG surgical conditions [16]. During fellowship training, however, fellows can acquire PAG-focused surgical experience, develop the ability to serve as subspecialty consultants, pursue research and teaching opportunities and achieve competency in the subspecialty.

Growth of PAG Subspecialists and Educators

In the US, PAG has been a focused practice recognized by the American Board of Medical Specialties and the American Board of Obstetrics and Gynecology since 2017. Further steps toward full subspecialty recognition will undoubtedly result in expansion of the workforce and PAG educators with planned expansion of fellowship programs and PAG employment opportunities that fill gaps in PAG deserts. Initially, expanding PAG access may take the form of expansion of virtual learning opportunities and patient care. Telehealth and online platforms are currently enabling this expansion in many programs that lack a dedicated PAG faculty. They have significantly improved access for patients while also supporting providers without PAG expertise, helping to facilitate visit scheduling, overcome geographic limitations and address time constraints they may otherwise prevent obtaining PAG specialized care [37].

Artificial Intelligence and PAG

As the workforce expands, attention will be needed to ensure its sustainability. Artificial intelligence (AI) will certainly be a tool with unimaginable possibilities in this realm, including expanding provider access by handling simple instructional algorithms that benefit training teams and managing other administrative electronic medical record tasks that may lead to educator burnout [38].

As the subspecialty expands worldwide, practitioners experience- measured by years in practice, education, and patient volume – builds comfort in treating this population and secures hospital privileges. While fellowship programs offer formalized training, there is opportunity for enhanced summative evaluations to streamline credentialing. Current competency assessments rely on subjective performance metrics tied to written objectives. For example, a team at Stanford used simulation models with sensor-based haptic feedback to objectively evaluate clinical breast exams, an innovative method PAG could adopt [39].

Looking ahead, the reimagined PAG skill assessment with technology may enable microcredentials to verify competencies in PAG.

Many surgical specialties and subspecialties have followed an apprentice model of education, where trainees gain skill and experience through surgical cases under direct supervision. There are certainly technical challenges and ethical challenges that this model poses. Pugh and colleagues thought of ways to improve this historical approach to better understand how residents approach surgery through use of motion sensor feedback on specific surgical tasks, using prediction models. These models were used to assess 96 learners, consisting of medical students, residents and attending faculty [40]. Using motion sensor data, they automatically identified surgical gestures and the tools used during an open surgery suturing simulation. The use of such kinematic tools, could benefit PAG surgical education as well, building confidence early on for all learners in sophisticated, complex surgical tasks [41]. Many medical educators have turned to video tools to augment learner feedback. However, this tool is time consuming as it requires expert review. Surgical experts from Stanford University, studied video feedback directed by AI algorithms to detect surgical workflows and technical approaches. Two hundred learners participated in a simulated bowel surgical task to identify an injury and perform a repair. Their AI algorithms identified performance of precision, injury identification and suture repair. This study highlights the potential of AI to automate surgical video assessments to evaluate both the procedural phases and technical approaches to surgical performance. These deep learning algorithms can effectively segment surgical workflows and identify techniques beneficial for both self-assessment and peer assessment [42]. As video-based and AI based assessments evolve, PAG educators will undoubtedly benefit.

Conclusion

Pediatric and Adolescent Gynecology (PAG) represents a critical yet under-recognized area of healthcare that demands specialized knowledge and skills to address the unique needs of children and adolescents. Despite progress in PAG fellowship training and the development of structured curricula by organizations such as NASPAG and EURAPAG, significant gaps persist in medical and residency education worldwide. These gaps contribute to disparities in access to care, particularly in regions without dedicated PAG providers.

Modern educational strategies, including simulation-based education, virtual learning platforms, and emerging technologies such as artificial intelligence, offer promising solutions to overcome challenges related to limited clinical exposure and geographic workforce distribution. Furthermore, the integration of competency-based assessment

tools, such as Entrustable Professional Activities (EPAs), will be essential to ensure that learners achieve measurable proficiency in both medical and surgical aspects of PAG.

Global collaboration among professional societies, educators, and policymakers remains paramount to harmonize curricula, expand training opportunities, and advocate for formal subspecialty recognition. As the field evolves, leveraging innovative educational approaches and robust assessment frameworks will not only enhance the quality of training but also improve access to safe, evidence-based care for this vulnerable population. Ultimately, investing in PAG education today will shape a future where all children and adolescents receive the specialized gynecologic care they deserve.

Future Research Directions

Future research in Pediatric and Adolescent Gynecology education should focus on evaluating the long-term impact of simulation-based education (SBE) on knowledge retention and clinical performance, as well as comparing the effectiveness of low-resource versus high-fidelity models. The integration of advanced technologies, including artificial intelligence for surgical coaching and automated competency assessment, and augmented or virtual reality for immersive learning experiences, represents a promising frontier. Additionally, the development and global adoption of PAG-specific Entrustable Professional Activities (EPAs) and technology-driven assessment tools, such as haptic feedback and motion sensors, will be essential to standardize competency evaluation. Research should also address workforce challenges by exploring telehealth and AI-assisted care as strategies to mitigate PAG deserts and improve access in underserved regions. Finally, efforts to standardize curricula internationally and assess the scalability of blended learning approaches in low-resource settings will be critical to ensuring equitable, sustainable education worldwide.

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- Tyson NA, Bhuinneáin MN, Divakar H, Mauger L, Cendan JS, Labovsky M, et al. Elevating and empowering reproductive futures: Pediatric and adolescent gynecology's specialized care across the globe. *Int J Gynaecol Obstet.* 2025.
 - This recent global review provides an updated landscape of PAG care and training worldwide,

highlighting persistent inequities and underscoring the need for standardized educational efforts.

- Lawson AA, Barlow E, Brookhart C, Sophie Gibson ME, Golub S, ImboNloga C, et al. Resident Education Curriculum in Pediatric and Adolescent Gynecology: The Short Curriculum 4.0. *J Pediatr Adolesc Gynecol*. 2024.
 - This updated curriculum offers a modernized, accessible PAG teaching framework for residency programs, reflecting current competency expectations, and emphasizing online learning resources.
- Dumont T, Torres A. Simulation Training in Pediatric and Adolescent Gynecology. *Global Library of Women's Medicine (GLOWM)*0.2022.
 - This chapter provides a comprehensive, up-to-date overview of simulation-based education in PAG, summarizing current models, evidence, and future directions—all essential for advancing modern PAG training.

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Informed consent No identifiable patient data are included in this article; therefore, informed consent was not required.

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