

Master's Thesis

Barriers to using the Menstrual Cycle as a Preventative and Diagnostic Tool in Adolescent  
Primary Care Settings

Brooke Beermann

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Thesis Sponsor: Dr. Marni Sommer, DrPH, MSN, RN

Department of Sociomedical Sciences

Mailman School of Public Health

Columbia University

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## **I. Abstract**

Abnormal symptoms and irregularities of the menstrual cycle can be indicative of broader health disorders throughout the body, including those of endocrine, blood, or gynecologic pathologies. Complete menstrual history taking among adolescents in a primary care environment is a necessary tool to assess overall health during pivotal growth and development years. Additionally, delayed or missed diagnoses in adolescence can have long-term effects throughout the lifespan, including fertility difficulties, reduced bone health, and psychosocial effects. This review sought to investigate barriers to menstrual history documentation among adolescents by providers in the United States using an antecedent-structure-process-outcome model. PubMed and Web of Science were searched for peer-reviewed articles and gray literature relating to menstrual history documentation among adolescents. Broad findings suggest that several factors influence menstrual history taking (1) patient demographics and initial access to well child visits (2) provider gender, training, time, and specialty and (3) variability in menstrual history definitions, health professional obtaining the information, and electronic health records. Early and accurate diagnoses, positive menarche and menstruation experiences, and timely treatments improve reproductive, gynecologic, and overall health outcomes into adulthood. Therefore, pediatric-facing professionals including physicians, advanced practice providers, and ancillary staff must prioritize thorough and standardized menstrual history taking. Further research should explore a qualitative approach to explore provider barriers, as well as expand the diversity of participant demographics to those with earlier menarche, those living in rural regions, and those being served by small private practices. Additionally, research must investigate interventions to improve adherence to menstrual history taking, particularly the inclusion of menstruation questions in a pre-visit questionnaire prior to well-child visits.

## II. Introduction

The menstrual cycle is a biological marker for general health among adolescents. In 2006, the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) released a committee opinion titled *Menstruation in Girls and Adolescents: Using the Menstrual Cycle as a Vital Sign* (American Academy of Pediatrics, 2006; ACOG Committee Opinion No. 651, 2020). The report has been reaffirmed as recently as 2020 by AAP and ACOG (ACOG Committee Opinion No. 651, 2020). The Society of Adolescent Health and Medicine (SAHM) has not formally endorsed the ACOG report, or released their own position paper on the menstrual cycle, though lists the report as a resource for teaching materials in the Sexual and Reproductive Health module of the Adolescent Medicine Resident Curriculum (SAHM, 2020).

The committee opinion recommends anticipatory guidance for the use of the menstrual cycle as a vital sign, equivalent to obtaining metrics like heart rate, blood pressure, temperature, and respiratory rate to reaffirm its importance in general health (ACOG Committee Opinion No. 651, 2020). It has four major conclusions: (1) clinicians should educate girls<sup>1</sup> and their guardians about what to expect of a first menstrual period and the range of normal cycle length, (2) once girls menstruate, clinicians should ask at every preventative care or comprehensive visit for the patient's last menstrual period (LMP) and the pattern, and (3) clinicians should have knowledge of regular menstrual patterns in girls, with the ability to differentiate between regular and irregular, and the skill to evaluate the patients, due to the importance of (4) identification of abnormal menstrual cycles in adolescents to improve early diagnosis of potential health concerns in adulthood (ACOG Committee Opinion No. 651, 2020). The committee opinion's stance that the menstrual cycle should be used as a vital sign is meant to reinforce the importance of menstruation as a part of general health for adolescents.

Throughout the many changes that accompany adolescence, the menstrual cycle offers a diagnostic and informational tool for pediatric-facing clinicians, including pediatricians, family medicine physicians, adolescent medicine physicians, pediatric nurse practitioners, and family

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<sup>1</sup> Research on menstruation has largely focused on cisgender women and girls, with very little attention to the experiences held by transgender, non-binary, queer, or gender diverse individuals with periods. This review uses the gendered term "girls," though includes all adolescents with a period. More research is needed to explore the intersection of the menstrual cycle and clinical care to incorporate the unique background of those who do not identify as female.

practice nurse practitioners, to provide good preventative practices (Popat et al., 2008). The menstrual cycle can aid in diagnosis and early treatment of endocrine, gynecologic, and blood disorders or conditions that may present in early adolescence (ACOG Committee Opinion No. 651, 2020; Popat et al., 2008). Additionally, young girls who reported a positive menarche experience, including menstrual education and preparation for menarche, had reduced anxiety, fear, shame, and stress upon starting their cycle – as well as long-term positive menstrual attitudes, experiences, and body image (McPherson & Korfine, 2004). Recent although limited research has found that despite these reports, documentation among pediatricians and family medicine doctors remains low across the US (Brown et al., 2019; McShane et al., 2018; Roden et al., 2019; Singer et al., 2022; Tomlin et al., 2018). This review seeks to explore practices and perceptions of the complete documentation of an adolescent’s menstrual cycle by clinical staff in the United States through the lens of a revised structure-process-outcome model. By investigating patient, provider, and organizational barriers, I aim to reinforce ACOG and AAP’s position of the menstrual cycle as of vital importance to adolescent health and the related long-term impacts into adulthood.

### **III. Background**

#### *Menstrual Cycle and Adolescent Health*

In the United States, the median age of menarche is 11.9 years old, and 98% of females start their period by age 15 (ACOG Committee Opinion No. 651, 2020; Martinez, 2020). The onset of menarche is impacted by body mass, socioeconomic factors, nutrition, and access to preventative healthcare (ACOG Committee Opinion No. 651, 2020; Itriyeva, 2022; Martinez, 2020). A normal pattern of menses in adolescents occurs every 21-45 days, lasts less than seven days, and requires three to six pads or tampons each day (ACOG Committee Opinion No. 651, 2020; Popat et al., 2008; Roos et al., 2021). It is often difficult for adolescents to understand the regularities of a normal cycle, as they may not be informed, may not monitor their cycle, or may not be comfortable sharing concerns with a caregiver or provider (ACOG Committee Opinion No. 651, 2020; Stowers and Teelin, 2019; Wegienka & Baird, 2005). Some may seek medical care for normal bleeding, while others are unaware that they have irregularities that need medical attention (ACOG Committee Opinion No. 651, 2020; Roos et al., 2021).

Normal menstrual cycles reflect proper regulation and feedback loops of hormones along the hypothalamic-pituitary-ovarian axis (HPO-axis). Any disruption between the hypothalamus, pituitary gland, or ovaries can result in amenorrhea or irregular cycles (Cromer, 2008; Popat et al., 2008). While it is common for some variance in cycles as adolescents experience puberty, it is statistically unlikely for an adolescent to go longer than three months without their menses, those that do fall in the 90<sup>th</sup> percentile (ACOG Committee Opinion No. 651, 2020). This type of abnormality can have primary or secondary causes that warrant further evaluation by a provider. Primary diseases that may disrupt menstrual cycles include polycystic ovarian syndrome, Cushing disease, primary pituitary disease, thyroid dysfunction, premature ovarian insufficiency, ovarian adrenal prolactinoma, and chronic illnesses (Popat et al., 2008; Roos et al., 2021). Secondary causes include poorly controlled diabetes mellitus, stress-related hypothalamic dysfunction, and low energy intake associated with malnutrition, eating disorders, or the Female Athlete Triad (Popat et al., 2008).

Additionally, excessively heavy flow or prolonged bleeding, particularly when associated with anovulation, may indicate bleeding disorders including platelet function disorders, von Willebrand's disease, thrombocytopenia, clotting factor deficiencies, hepatic failure, uterine lesions, and malignancy (Popat et al., 2008; Roos et al., 2021). Approximately 20% of adolescent girls who express heavy menstrual bleeding have a blood disorder (ACOG Committee Opinion 785, 2017). Additionally, 75-80% of girls and women with a congenital bleeding disorder report having heavy menses (ACOG Committee Opinion 785, 2017). Expressions of pelvic pain associated with menstruation by an adolescent can be caused by inflammatory mediators prostaglandins and leukotrienes, as well as endometriosis (Popat et al., 2008). Earlier menarche and shorter menstrual cycles are risk factors for endometriosis, however it is common for providers to misinterpret endometriosis symptoms as normal cramps in adolescents, contributing to a delay in diagnosis, and missing a chance for early screening and intervention (Ahn et al., 2017; Parasar et al., 2017). Undiagnosed endometriosis leads to worsened disease progression, uncontrolled symptoms, infertility, and a lower quality of life (Della Corte et al., 2020).

In clinical settings, providers often ask for the date of the patient's last menstrual period (LMP), primarily used as an initial screening for pregnancy, as well as an indicator of cycle regularity (McShane et al., 2018). However, beyond the LMP, the key to proper diagnosis of menstrual cycle issues is thorough history taking of the age of menarche, cycle length, days

between cycles, quantity of blood by tracking the number of fully soaked pads or tampons per day, and the presence of cramping or clots to aid in accurate diagnosis and subsequent treatment in patients who fall outside of healthy ranges (Dawson, 2019). However, these questions are likely difficult for an adolescent to properly answer, as they may not regularly track any of these details.

Identifying cycle irregularities in an adolescent early provides a window of opportunity during development to diagnose and treat conditions. Undiagnosed or mismanaged conditions can cause complications and symptoms into adulthood, and even lead to more severe outcomes like infertility (Della Corte et al., 2020). Progression of painful symptoms pervade every aspect of life including daily activities, employment, productivity, mood, social and sexual relationships, and family planning (Della Corte et al., 2020). Although the value of the menstrual cycle is well documented, recent studies regarding the prevalence of menstrual history taking have found adherence among clinicians to be low. A self-report questionnaire completed by 462 AAP members with relatively even distribution across the South, West, Northeast, and Midwest US found that 58.2% of pediatricians were either “not at all” or only “slightly” familiar with the guidance (Singer et al., 2022). Singer et al. also found that 24.7% of sampled AAP members stated they do not routinely provide anticipatory guidance, 33.1% do not discuss menstruation with post-menarchal patients, and 28.4% do not ask the date of their LMP (Singer et al., 2022). In a separate study that analyzed Electronic Health Records (EHRs) of adolescents aged 12 to 21 years old who visited for a Well Child Visit (WCV), only 5.54% of family medicine doctors and 9.20% of pediatricians were found to document each of the four menstruation measures: menarche, LMP, usual length of cycle, and presence or absence of associated symptoms (McShane et al., 2018).

### *Structure-Process-Outcome Model*

Donabedian’s original structure-process-outcome model was created in 1966 as a conceptual framework used to evaluate the quality-of-care of health services and their patient outcomes (Donabedian, 1966). There are three main dimensions to this model (1) the structure, defined as the physical and organizational characteristics of the organization and provider (2) processes, which focus on the care delivered to patients, including diagnosis, treatment, preventative care, health counseling, technical style and interpersonal style and (3) outcomes, the

effect of the healthcare including clinical endpoints, functional status, general wellbeing, and satisfaction (Donabedian, 1966; Coyle & Battles, 1999). In 1999, Coyle and Battles added another dimension to this model to incorporate antecedents, which focus on patient personal characteristics and environments, including cultural, social, political, and personal factors. Table 1 outlines each component of the model (Coyle & Battles, 1999).

The revised Donabedian model was chosen for this review for several reasons. First, the model analyzes the patient-provider interaction, instead of components exclusive to community care or administrative quality control, which is the focus of this review. Second, Donabedian emphasizes that there should be no separation between means and ends, or the care and outcomes, but instead that there are ends within both processes and structure as well, reinforcing that these factors do not act in isolation. Additionally, the inclusion of antecedents by Coyle and Battles underscores the importance of patient demographics, access, and characteristics that precede and shape medical care. Donabedian's model has been used in many primary care settings to analyze outcomes of various interventions, including pediatric risk screenings, telehealth, integrative service models, satisfaction with elderly care, policy recommendations for home and community-based age care, and more (Foong et al., 2022; Cheong et al., 2022; Hellfritz et al., 2021; Hiott et al., 2018; Kajonius & Kazemi, 2016). Menstrual history documentation is a vital component of screening and history taking for adolescents in primary care settings that leads to life-long outcomes, however structure and process of this type of care is neglected and warrants further investigation for improvements.

There are limitations to the Donabedian Model that should be noted. Not all outcomes are appropriate to measure, though they may be significant. There may also be confounding factors that influence the outcomes measures that are entirely separate from the medical care given. Additionally, some outcomes, such as general well-being and satisfaction are difficult to measure. It may be especially difficult to measure outcomes related to menstrual history taking. Gynecologic care that is received in adolescence has life-long impacts, well into adulthood, and the outcomes may not be immediate. Though possible, longitudinal studies that measure long-term outcomes are expensive and dependent on continuous funding. Alternatively, the use of an existing surveillance system or study relies on other researchers' measures and design. Previous research has focused primarily on outcomes related to menstrual disorders or preparation for menarche, and not long-term health impacts of menstrual history documentation in primary care



settings. Lastly, while menstrual history taking plays an important role in healthcare, it is only one component of many that are required for quality reproductive care among adolescents.

Table 1. Coyle, Y. M., & Battles, J. B. (1999). Using antecedents of medical care to develop valid quality of care measures. *International Journal for Quality in Health Care: Journal of the International Society for Quality in Health Care*, 11(1), 5–12. <https://doi.org/10.1093/intqhc/11.1.5>

Antecedents	Structure	Process	Outcome
Environment	System characteristics	Technical style	Clinical end points
Cultural	Provider characteristics	Interpersonal style	Functional status
Social	Patient		General well-being
Political	characteristics		Satisfaction with care
Personal			
Physical			
Health professions			
Patient personal characteristics			

#### IV. Methods

The primary purpose of this review is to explore menstrual history taking among adolescents in the United States by analyzing relevant demographics, environmental influences of care, structural components, variation in processes, and patient outcomes.

##### *Search Strategy*

Preliminary exploratory research yielded several key articles, and a term harvesting document was created using keywords and MeSH terms identified from this stage. PubMed and Web of Science were searched using combinations of the following keywords: “well child visit” (also abbreviated to WCV), “adolescent medicine,” “preventative service,” “gynecology,” “menstrual history,” “menarche,” “pre-menarche,” “puberty,” “reproductive health,” “menstrual health,” “menstruation,” “last menstrual period,” “documentation,” “medical history taking,” “primary care” “feminine hygiene,” “pediatric and adolescent gynecology” (also abbreviated to PAG), “electronic medical record” (also abbreviated to EMR), and “electronic health record” (also abbreviated to EHR). ACOG was also searched for relevant articles using the same keywords.

Inclusion criteria included peer-reviewed articles and grey literature published since 2000 that explored pediatrician, adolescent medicine, family medicine, and obstetrician-gynecologist (OBGYN) practices, attitudes, and beliefs regarding menstruation documentation and anticipatory guidance in adolescents. Articles that explored the access, structure, and process of

care within well child visits were also included. Finally, studies that explored adolescent outcomes and experiences with menstruation, menarche, and menstrual disorders were included.

Exclusion criteria included studies that exclusively regarded sexual history and activity, sexually transmitted diseases, contraceptive use, HPV vaccinations, sexual abuse, and pregnancy in adolescents, without mention of menstruation documentation by providers. Studies with participants exclusively older than 21 years old were excluded.

## V. Results

The review of selected articles occurred between September 2022 to February 2023. Over 635 articles were identified, and 142 duplicates removed, leaving 493 unique articles. There were 29 articles that met inclusion criteria and included in this review. Articles included the following themes, categorized according to the Donabedian Model in Table 2: (1) general practitioners must gather menstrual history for diagnosis and treatment of menstrual disorders across organ systems (2) patient demographic factors influence both access to well child visits and menstrual history documentation (3) provider gender, training, time, and specialty influence clinical documentation of menstrual history (4) menstrual history definition, health professional, and electronic health record variabilities influence menstrual history-taking practices (5) and adolescents who receive timely and accurate diagnoses, proper anticipatory guidance, and treatment of conditions have improved clinical outcomes and quality of life across the lifespan.

Table 2. Summary of relevant findings from literature review.

Title, Author(s), Year, Design	Location (sample size), Demographics	Definition of Menstrual History // Survey Measure	Relevant Findings	Limitations
<u>Title:</u> Health Disparities in Rural Women <u>Authors:</u> ACOG Committee Opinion 586 <u>Year:</u> 2021 <u>Design:</u> Gray Literature	N/A	N/A	<p>In 2008, 6.4% of OBGYNs practiced in rural settings and 49% of US counties had no OBGYN.</p> <p>In some rural areas, without OBGYNs, primary care physicians are responsible for all care.</p>	N/A
<u>Title:</u> Menstruation in Girls and Adolescents: Using the Menstrual Cycle as a Vital Sign <u>Authors:</u> ACOG Committee Opinion 651 <u>Year:</u> 2020 <u>Design:</u> Gray Literature	N/A	N/A	<p>Framing the menstrual cycle as a vital sign reinforces its role in assessing overall health status and identifying potential health concerns for adulthood.</p> <p>Clinicians should provide education regarding first period and the range for normal cycle length.</p> <p>Following menarche, clinicians should ask at every preventative care visit/well child visit for the first day</p>	N/A

			of the LMP and the pattern of menses.	
<p><u>Title:</u> “Tomorrow I’ll Be Fine”: Impacts and Coping Mechanisms in Adolescents and Young Adults with Primary Dysmenorrhea  <u>Author:</u> Allyn et al.  <u>Year:</u> 2020  <u>Design:</u> Qualitative</p>	<p>Los Angeles, CA (n=39); participants aged 16-24 yrs, diagnosed with primary dysmenorrhea, and involved in a larger study through UCLA and surrounding areas examining pain processes.</p>	<p>Semi structured one-on-one, in-person interviews at UCLA, with an average time of 16.9 minutes.</p>	<p>Primary Dysmenorrhea impacts everyday life, including three subthemes: biological (physical functioning, daily functioning, and fatigue/sleep), psychological (body image, mood, anxiety), and social.</p> <p>Coping mechanisms for pain included primary coping (medication, physical positioning, heat application), secondary coping (acceptance and distraction), and passive coping (behavioral disengagement, self-isolation, and catastrophizing).</p>	<p>Interview questions, coding, and thematic analysis are all subject to researcher bias and predetermined frameworks.</p>
<p><u>Title:</u> Preventative Care/Periodicity Schedule  <u>Author:</u> Bright Futures  <u>Year:</u> 2022  <u>Design:</u> Gray Literature</p>	N/A	N/A	<p>Provides an abbreviated summary of recommended pediatric preventative health care for each age including history, measurements and exams, procedures, and development/social/behavioral/mental health, updated yearly.</p>	N/A
<p><u>Title:</u> Guidelines for Health Supervision of Infants, Children and Adolescents  <u>Author:</u> Bright Futures  <u>Year:</u> 2017  <u>Design:</u> Gray Literature</p>	N/A	N/A	<p>Provides anticipatory guidance and sample questions for providers for each age from 0-21 years old.</p>	N/A
<p><u>Title:</u> Provider Adherence to Preventative Health Care Guidelines in Adolescent Girls Presenting for Well Visit  <u>Authors:</u> Brown et al.  <u>Year:</u> 2018  <u>Design:</u> Retrospective cohort</p>	<p>Midwestern United States (n=124), EHRs of adolescent girls 13.0-19.9 years old, seen within five hospital-affiliated, pediatric and primary care clinics between July 1, 2014, and June 30, 2015.</p>	<p>Any note regarding bleeding patterns of menses</p>	<p>Rate of documentation of menstrual cycle characteristics was low and varied by insurance type, English speaking abilities, and race/ethnicity.</p>	<p>Small sample size of EHRs; some well-child visits included additional complaints which may have impacted time availability.</p> <p>Retrospective review of chart may not include verbal discussions.</p>
<p><u>Title:</u> The Role of the General Practitioner in Evaluation and Treatment of Girls with Menstrual-Related Complaints.  <u>Author:</u> Dawson  <u>Year:</u> 2019  <u>Design:</u> Mini review/education</p>	N/A	N/A	<p>Menstrual disorders are one of most common complaints in adolescent girls; and adequate diagnosis requires thorough history taking.</p> <p>History taking must include age at menarche, timing and duration of periods, quantity of bleeding by quantifying number of fully soaked pads, tampons, or menstrual cups per day, and the presence of cramping or clots.</p> <p>A review of systems should also be completed, including psychosocial stressors, weight changes, eating and exercise habits, medications, and symptoms of hyperandrogenism.</p> <p>Bleeding disorders and menstrual history of family members are also important in a diagnosis of abnormal menstruation.</p>	N/A
<p><u>Title:</u> Rural Disparities in Early Childhood Well Visit Attendance</p>	<p>Virginia (n=6349); claims paid through Virginia commercial health insurance and</p>	<p>Claims included the following information: date, diagnosis, Current</p>	<p>Rural children had significantly lower WCVs than children who live in urban areas.</p>	<p>Generalizability to other states and rural areas is difficult; the</p>

<p><u>Authors:</u> DeGuzman et al. <u>Year:</u> 2021 <u>Design:</u> Longitudinal correlation</p>	<p>Medicare and Medicaid of children born in 2011 in Virginia who had both a 12 month and a pre-K well child visit</p>	<p>Procedural Terminology (CPT) code(s), insurance type, zip code, and race.</p>	<p>Children on Medicaid had significantly fewer WCVs than those on private insurance.</p>	<p>definition and use of the term rural varies.</p>
<p><u>Title:</u> The Impact of Endometriosis on Quality of Life in Adolescents <u>Authors:</u> Gallagher et al. <u>Year:</u> 2018 <u>Design:</u> Cross sectional</p>	<p>Boston, MA (n=567); adolescents aged 10-24 years who are enrolled in the Women's Health Study: From Adolescence to Adulthood longitudinal study.</p>	<p>Quality of Life was measured using Medical Outcomes Study Short Form-36 which includes eight subscales: general health, bodily pain, physical role limitation, physical functioning, mental health, emotional role limitation, social functioning, and vitality.</p>	<p>Participants with endometriosis had lower scores on all eight SF-36 subscales (p=≤0.00).  QOL was impacted by difficulties completing daily activities due to physical and emotional health impairment, and trouble engaging in normal social activities.  There was a higher prevalence of mental health disorders, including anxiety and depression, requiring therapy or medication management among girls with endometriosis.</p>	<p>There may be undiagnosed endometriosis among the control group, as they were not screened for chronic pelvic pain.  The cross-sectional study design inhibits temporal relationship between endometriosis and QOL.</p>
<p><u>Title:</u> Resident Education Curriculum in Pediatric and Adolescent Gynecology: The Short Curriculum <u>Authors:</u> Gibson et al. <u>Year:</u> 2021 <u>Design:</u> Committee Document</p>	<p>N/A</p>	<p>N/A</p>	<p>One month of adolescent medicine training is required among PEDS residents, but the topics and curricula differ by program.  Residents report that they feel unprepared to provide reproductive healthcare.  The short curriculum is a two-week program for residents with limited PAG exposure.</p>	<p>The status of the curriculum's use is unknown and difficult to measure.</p>
<p><u>Title:</u> Amenorrhea and Bone Health in Adolescents and Young Women <u>Authors:</u> Gordon and Nelson <u>Year:</u> 2003 <u>Design:</u> Gray Literature</p>	<p>N/A</p>	<p>N/A</p>	<p>Amenorrhea due to estrogen deficiency or disturbances in the HPO axis in adolescence can lead to reductions in bone mass.  Conditions like anorexia nervosa or the Female Athlete Triad impact bone formation and resorption.  Adolescence is a critical period for bone accretion; amenorrhea without proper intervention can lead to poor bone health that may be irreversible.</p>	<p>N/A</p>
<p><u>Title:</u> Menstruation in Adolescents: What Do We Know? And What Do We Do with the Information? <u>Author:</u> Hillard <u>Year:</u> 2014 <u>Design:</u> Editorial Mini-Review</p>	<p>N/A</p>	<p>N/A</p>	<p>Just as vital signs like abnormal blood pressure, pulse, temperature, or respiratory rate signal a pathophysiological disorder, abnormalities in the menstrual cycle can also have undiagnosed underlying conditions.  Terms such as menorrhagia, metrorrhagia, menometrorrhagia, polymenorrhea, abnormal uterine bleeding, etc. are not standardized and have varying definitions and uses.  Popular websites that appear after a google search of menstruation and puberty have incorrect information.</p>	<p>N/A</p>
<p><u>Title:</u> Utilization of Health Services in Physician Offices and Outpatient Clinics by Adolescents and</p>	<p>U.S. (n unavailable) ambulatory and outpatient visits of females aged 9-26</p>	<p>National Ambulatory Medical Care Surveys and hospital outpatient clinic visits of primary care</p>	<p>Adolescents aged 9-10 years old had the largest proportion of pediatrician visits. By ages 17-18 years old, the number of OBGYN visits for well child visits surpasses pediatric visits.</p>	<p>Nonresponse bias; recall bias  Underreporting of reproductive</p>

<p><u>Title:</u> Young Women in the United States <u>Authors:</u> Hoover et al. <u>Year:</u> 2010 <u>Design:</u> Cross sectional</p>	<p>years from 2003 to 2006.</p>	<p>(family practice/general medicine, pediatrics, and OBGYN).</p>	<p>The trend of adolescent girls to switch to OBGYN providers may lead to a lack of exposure to PAG topics and a perception that menstruation falls under OBGYN scope-of-work instead of primary care.</p>	<p>healthcare services on medical record, due to multiple services or a desire to keep services confidential from parents or guardians.</p>
<p><u>Title:</u> Improving Resident Knowledge in Pediatric and Adolescent Gynecology: An Evaluation of the North American Society for Pediatric and Adolescent Gynecology Short Curriculum. <u>Authors:</u> Huguelet et al. <u>Year:</u> 2018 <u>Design:</u> Quasi-experimental</p>	<p>North America (n=68); medical residents in family medicine, PEDS, and OBGYN from 47 residency programs from September to December of 2016.</p>	<p>10-item retrospective pre and post-test survey regarding knowledge, skills, and/or attitudes of PAG topics.</p>	<p>Baseline knowledge of PAG was low across all specialties, and independent of level of residency training, type of program, and previous exposure to PAG lectures.  After a two-week PAG curriculum, self-reported knowledge improved among all specialties: pediatric residents had improvement in all 10 learning objectives, while family medicine and OBGYN improved in all except evaluation and management of blood disorders.</p>	<p>No control group; low response rate.  Researchers did not inquire into participant's PAG interest, lack of knowledge, or need for self-improvement.  Did not measure completion of the readings or if the survey was opened prior to readings.  No measure of long-term retention or clinical performance of topics.  Self-report biases.</p>
<p><u>Title:</u> The Effects of Obesity on the Menstrual Cycle <u>Author:</u> Itriyeva <u>Year:</u> 2022 <u>Design:</u> Review</p>	<p>N/A</p>	<p>N/A</p>	<p>Obesity in adolescents is associated with an earlier onset of menarche, as well as higher rates of irregular menses, amenorrhea, abnormal uterine bleeding, PCOS, dysmenorrhea, and premenstrual disorders in adolescence.</p>	<p>N/A</p>
<p><u>Title:</u> Disorders of Menstruation in Adolescent Girls <u>Author:</u> Jamieson <u>Year:</u> 2016 <u>Design:</u> Review</p>	<p>N/A</p>	<p>N/A</p>	<p>Menstrual complaints, blood flow, time between periods, and presence of ovulation (ie. breast tenderness, headache, cyclical mood changes without presence of blood) is necessary to accurately diagnose underlying conditions—to distinguish between a bleeding disorder, endocrinopathy or hypothalamic disruption, gynecological disorders, infection, obstructed outflow, or pregnancy.</p>	<p>N/A</p>
<p><u>Title:</u> Disparities in Primary Care EHR Adoption Rates <u>Authors:</u> Mack et al. <u>Year:</u> 2016 <u>Design:</u> Cross sectional</p>	<p>Georgia (n=3,964 providers); medical doctors, physician assistants, nurse practitioners in pediatric, family medicine, internal medicine, and OBGYN practices in metropolitan Atlanta and rural locations.</p>	<p>Measures include provider and practice demographics like specialty, provider numbers, and location; EHR implementation; technical assistance measures; zip code data</p>	<p>Providers in smaller offices (&lt;10), public hospital clinics, rural clinics, and providers with higher Medicaid patients had slower EHR adoption rates.</p>	<p>Some misclassifications of practice type and provider characteristics due to self-report and limited categories of data possible.  Did not address provider preference or other factors that may increase barriers.  Medicare and Medicaid had different adoption timelines.</p>
<p><u>Title:</u> Trends and Patterns in Menarche in the United States:</p>	<p>U.S (n=10,590); U.S. National Survey of Family Growth of</p>	<p>Measures included age at first menstrual period and demographic</p>	<p>The age of menarche has decreased from 12.1 years old in 1995 to 11.9 between 2013-2017.</p>	<p>Bivariate analysis may have confounding factors such as socioeconomic status,</p>

<p>1995 through 2013-2017  <u>Author:</u> Martinez  <u>Year:</u> 2020  <u>Design:</u> Longitudinal</p>	<p>women aged 15-44 years old</p>	<p>variables of mother’s education, living arrangement at age 14, race, and Hispanic origin</p>	<p>The cumulative probability of menarche at a young age is higher between 2013-2017 than it was in 1995.</p> <p>Hispanic adolescents, girls whose mothers had a GED or high school diploma as their highest level of education, and girls who were living with a biologic mother and stepfather at age 14, had a significantly higher probability of menarche at a younger age.</p>	<p>family structure, nutrition, and poverty level.</p>
<p><u>Title:</u> Menstruation across time: Menarche, menstrual attitudes, experiences, and behaviors  <u>Authors:</u> McPherson &amp; Korfine  <u>Year:</u> 2003  <u>Design:</u> Cross sectional</p>	<p>Cambridge, MA (n=84); female Harvard University students aged 18-24 years old</p>	<p>Menstrual Experiences and Behaviors Questionnaire containing 43 questions regarding frequency and quality of menses, menstrual product practices, sexual activity, parity, premenstrual changes, daily activities, and practice of pelvic exams.</p>	<p>Girls who had a negative menarche experience rated their periods as significantly more debilitating and more bothersome.</p> <p>Women who reported a positive menarche experience had a more positive view of menstruation, had a more positive body image, and slightly better positive health behaviors including regular pap smears (63% with a negative experience vs. 71% with a positive experience).</p>	<p>Retrospective analysis</p> <p>There may be confounding factors that misrepresent the relationships seen between initial menstrual experience and the outcomes measured.</p>
<p><u>Title:</u> Menstrual History-Taking at Annual Well Visits for Adolescent Girls  <u>Authors:</u> McShane et al.  <u>Year:</u> 2018  <u>Design:</u> Retrospective cohort</p>	<p>New Jersey (n=854), EHRs of adolescents aged 12-21 years old seen for a well child visit between January 1, 2010 and June 1, 2016 within the departments of Pediatrics, Adolescent Medicine, and Family Medicine of Cooper University Healthcare system.</p>	<p>Complete menstrual history defined as inclusion of four components (1) age of menarche (2) date of LMP (3) length of cycle (4) presence or absence of associated symptoms</p>	<p>Rate of complete menstrual history documentation and individual components varied by Adolescent Medicine, Family Medicine, and General Pediatric specialties.</p>	<p>Did not include ethnicity, age, or socioeconomic status of patients; study population of South New Jersey is not generalizable to rest of US.</p> <p>Ambiguity of terms such as “regular” or “normal” used to describe any of the four components.</p> <p>Did not record the title of clinician who completed the chart.</p> <p>Retrospective review of chart may not include verbal discussions.</p>
<p><u>Title:</u> Delivery of Well-Child Care: A Look Inside the Door  <u>Authors:</u> Norlin et al.  <u>Year:</u> 2011  <u>Design:</u> Observational</p>	<p>Utah (n=483); 43 pediatricians and 9 midlevel practitioners were directly observed during 483 well child visits of 0- to 19-year-old patients.</p>	<p>Several Bright Futures topics were measured; of relevance to this review is the topic “puberty/sex,” though it is not further defined by the authors.</p>	<p>The mean visit duration for a WCV was 20.3 minutes.</p> <p>Clinicians discussed only 42% of Bright Futures topics for the patients recommended age.</p> <p>For middle childhood, the mean amount of time spent discussing puberty or sex was 0.08 minutes. The congruence between recommended topic and observed discussion was 13%. For adolescents, the mean time of discussion was 0.95 minutes.</p>	<p>Publicly insured or uninsured patients were underrepresented.</p> <p>Generalizability may be low.</p> <p>Clinicians may have altered behavior in the presence of an observer, particularly addressing more Bright Futures topics than they would have unobserved.</p> <p>Observers may have missed topics in a fast-paced visit; and were</p>

					asked to leave for 7 of the visits which may underrepresent sensitive topics in that time.
<p><u>Title:</u> “If I wasn’t a girl”: Experiences of Adolescent Girls with Heavy Menstrual Bleeding and Inherited Bleeding Disorders  <u>Authors:</u> Parker et al.  <u>Year:</u> 2022  <u>Design:</u> Qualitative</p>	<p>Texas (n=9); adolescents within 3 years of menarche, enrolled in the Young Women’s Blood Disorders (YWBD) Program, and presenting for an annual visit at University of Texas Southwestern between June 2020 to August 2021</p>	<p>One-on-one semi structured interviews ranging 20-55 minutes.</p>	<p>Girls with heavier bleeding stated their periods were stressful, embarrassing, and anxiety provoking, especially at school.</p> <p>Missed activities due to heavy bleeding led to feelings of “otherness” and isolation from peers.</p> <p>Participants expressed the diagnosis of a bleeding disorder led to empowerment and identity formation.</p>		<p>Interviews were conducted with participants when their menses were well-controlled and with a formal bleeding disorder diagnosis, therefore does not include patient experiences on uncontrolled or undiagnosed disorders.</p> <p>Generalizability issues; participants were being treated at a tertiary care center in a high resource setting.</p>
<p><u>Title:</u> The menstrual cycle: a biological marker of general health in adolescents  <u>Author:</u> Popat et al.  <u>Year:</u> 2008  <u>Design:</u> Review</p>	<p>N/A</p>	<p>N/A</p>	<p>Proper evaluation of the menstrual cycle in adolescents can detect HPO axis disruptions, which plays a vital role in preventing osteoporosis and improving long-term bone health.</p> <p>Time constraints in office often prevent a full review of menstrual history. Clinicians may address this using the following methods: a secondary visit, a standardized history-taking instrument for the patient to complete prior to the visit, a menstrual calendar for the patient to complete for three months.</p> <p>It is abnormal for a patient to miss a period for greater than three months, though many parents and clinicians view amenorrhea as normal in adolescents.</p>		<p>N/A</p>
<p><u>Title:</u> Primary care provider adherence to reproductive healthcare guidelines in adolescents and young adults with disabilities: A retrospective matched cohort study  <u>Authors:</u> Roden et al.  <u>Year:</u> 2019  <u>Design:</u> Retrospective cohort</p>	<p>Columbus, OH* (n=84), records of young patients with physical or intellectual disabilities aged 12-26 years receiving health maintenance between January 1, 2011 and December 31, 2015, compared to gender-matched comparison cohort</p>	<p>Three components were evaluated for menstruation documentation (1) first date of LMP (2) menstrual regularity or pattern (3) any menstrual history other than LMP or regularity (e.g. heaviness of flow, pain)</p>	<p>LMP documentation was equal between patients with a disability and those without; menstrual regularity documentation and any other history besides LMP or regularity was lower among patients with a disability than the comparison cohort.</p>		<p>Retrospective review of chart may not include verbal discussions.</p> <p>Small sample size and few female patients.</p> <p>Single-site study of clinic that exclusively serves patients with disabilities limits the generalizability to other locations or specialties. The comparison arm to a primary care clinic that does not exclusively serve PWD may also include patients with an undiagnosed or undocumented disability.</p>

<p><u>Title:</u> Gynecological Care for Adolescents with Disability: Physician Comfort, Perceived Barriers, and Potential Solutions <u>Authors:</u> Shah et al. <u>Year:</u> 2005 <u>Design:</u> Cross sectional</p>	<p>Utah (n=136); all identifiable clinicians who provided any gynecological care (exclusive GYN care, GYN + primary care, or GYN + specialty)</p>	<p>Survey of eight hypothetical clinical scenarios rated on a five-point Likert scale of comfort level</p>	<p>Clinicians had general and consistent discomfort providing gynecological care to adolescents with a disability. Higher comfort level was expressed for preventative care.  Barriers listed by physicians include intensity of time, reimbursement issues, inadequate knowledge or skills, inadequate office setting due to disability related issues.</p>	<p>Defining disability is challenging as it includes a range of physical, intellectual, or mixed disabilities, though there were no patients with intellectual included.</p>
<p><u>Title:</u> Pediatricians' knowledge, attitudes and practices surrounding menstruation and feminine products <u>Authors:</u> Singer et al. <u>Year:</u> 2020 <u>Design:</u> Cross sectional</p>	<p>South, West, Northeast, and Midwest U.S. (n=462); American Academy of Pediatricians members.</p>	<p>Online questionnaire included questions regarding pediatrician practice, self-reported knowledge, ACOG/AAP required knowledge, and attitude of the menstrual cycle.</p>	<p>One in three pediatricians do not routinely discuss menstruation; one in four do not ask LMP.  Male pediatricians were less likely to provide anticipatory guidance, rate the guidance as important, ask about menses patterns, discuss tampon and pad safety, and overall rated their knowledge of the menstrual cycle as lower.</p>	<p>Low response rate may not be representative of all US primary care pediatricians.  An incentive of a "Feminine Hygiene Fact Sheet" upon completion may have encouraged pediatricians who were interested in the topic to participate.  Female pediatricians may have been overrepresented.  Social desirability bias may have impacted answers; instrument was not formally validated.</p>
<p><u>Title:</u> Factors Associated with Time to Endometriosis Diagnosis in the United States <u>Authors:</u> Soliman et al. <u>Year:</u> 2017 <u>Design:</u> Cross sectional</p>	<p>United States (n=638); women aged 18-49 years from August 2012-November 2012 with an endometriosis diagnosis within the previous 10 years.</p>	<p>Online survey containing an eligibility screening questionnaire and endometriosis-related outcomes</p>	<p>Adolescents and young adults &lt;18 years old had longer mean time from symptom onset to first physician visit (43.5 months) and longer mean time from first physician visit to diagnosis (34.5 months) than the following age groups: 18-29, 30-39, 40-49.</p>	<p>Self-report and recall bias.  Did not restrict subjects to surgically confirmed endometriosis diagnosis; possibility of misdiagnosis among sample which may contribute to delay in diagnosis.</p>
<p><u>Title:</u> Documentation of Sexual and Menstrual Histories for Adolescent Patients in the Inpatient Setting <u>Authors:</u> Stowers and Teelin <u>Year:</u> 2019 <u>Design:</u> Retrospective cohort</p>	<p>SUNY Upstate Medical University; 17 NY counties (n=344) female patients aged 11-18 years admitted to a tertiary referral center from January through July 2016.</p>	<p>Menstrual documentation defined as any record of information concerning menarche, menses frequency, menses duration, LMP, dysmenorrhea, or flow quantity</p>	<p>LMP was most documented aspect of menstrual history, though infrequent.  Menarche, menses frequency, menses duration, flow, or dysmenorrhea were rarely documented in an inpatient setting.  Rates of documentation did not differ by patient age or complaint, including abdominal pain, nor did they differ by admitting department.</p>	<p>Single institution limits generalizability.  Retrospective review of chart may not include verbal discussions.  The power used to determine significance was based on sexual history research due to limited menstrual history research.</p>



<p><u>Title:</u> Pediatric and gynecologic rates of documentation of last menstrual period in female adolescents</p> <p><u>Authors:</u> Tomlin et al.</p> <p><u>Year:</u> 2018</p> <p><u>Design:</u> Retrospective cohort</p>	<p>Phoenix, Arizona (n=50), female adolescents aged 10-16 years old seen in a general pediatrics (PEDS), adolescent medicine (AM), or pediatric and adolescent gynecology (PAG) ambulatory clinic at Phoenix Children’s Hospital between January 1, 2016 and March 31, 2016.</p>	<p>Primary outcome measure was date of LMP; secondary outcome was any description of menstrual flow</p>	<p>Rates of documentation of LMP and menstrual flow differed by PEDS, AM, and PAG, with the lowest in PEDS.</p> <p>There was a strong association between LMP and menstrual flow documentation on charts.</p> <p>Provider gender had a significant difference among specialties.</p>	<p>Charts were included from both well-child visits and “sick visits,” therefore providers may have deemed the history unnecessary to the primary complaint during a sick visit.</p> <p>Patients who visited PAG clinics were more likely to have a menstrual complaint, prompting menstrual history documentation.</p> <p>Retrospective review of chart may not include verbal discussions.</p>
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\*study location inferred using author affiliations or participant involvement in a larger study

Table 3: Menstrual history taking categorized according to a Revised Donabedian model.

Antecedents	Structure	Process	Outcome
Environment			
Geographic setting	Bright Futures and AAP Periodicity Schedule and Handbooks		Correct and early diagnosis and treatment
Patient characteristics			Physical functioning + pain management
Insurance type	Physician specialty and knowledge	EHR variability	Social functioning
Income	Residency training	Menstrual history definition variability	Mental health
Race	Gender of health professional	Staff variability in documentation	Body image
Immigration status	Time availability		Academic performance
English-speaking abilities	Inpatient vs. Outpatient setting		Healthy practices
Intellectual or physical disability			
Age			

**Antecedents**

A major theme found throughout this review is an association between patient demographics and menstrual history documentation. Variability across patients affects initial access to health care, the type of provider available, and the quality of care within the visit (DeGuzman et al., 2020; Brown et al., 2019; ACOG, 2021; Roden et al., 2019; Shah et al., 2005; Martinez, 2020).

Patients who live in rural areas tend to be poorer, lack health insurance, be less educated, and need to travel further for reproductive services (ACOG, 2021). In a report released by ACOG, 49% of counties in the United States lacked an OBGYN and in many rural counties, patients rely on primary care physicians or pediatricians for all of their obstetrics and gynecology care (ACOG, 2021). While access to specialty care is limited by the number of providers available in rural areas, the amount to which patients visit their primary care providers is also often reduced as well. In a longitudinal correlational study in Virginia analyzing 6349 claims data of children born in 2011 with at least one WCV since then, rural children had significantly fewer WCVs than urban children, (50% vs 67%;  $p < 0.0001$ ), and those with Medicaid had significantly fewer WCVs than those with private insurance (49% vs. 61.8%;  $p < 0.0001$ ) (DeGuzman et al., 2020).

Patients on public insurance and with a lower income than those with private may be less likely to have a menstrual history taken at their WCV. In a retrospective cohort study in the Midwestern United States, 124 EHRs of adolescent girls (13.0 to 19.9 years old) seen within hospital-affiliated, pediatric, and primary care clinics between 2014 and 2015 were analyzed for documentation of their menstrual cycle (Brown et al., 2019). Eight Current Procedural Terminology (CPT) codes that represent preventative visits and procedures often used to code WCVs were used as criteria for EHR inclusion in the study (Brown et al., 2019). While 50% of those with private insurance had documentation of LMP on their EHR, only 25% of those on public insurance had documentation, though it should be noted that the sample size of girls on private insurance vs public was much lower ( $n=6$  vs  $n=104$ ) because 85% of the sample used public insurance (Brown et al., 2019).

The likelihood of menstrual cycle documentation can be further stratified by race and ethnicity. In the same study, when 124 EHRs are analyzed by race and ethnicity, there is statistical significance between races, particularly with no Asian patients in the study having documentation at all, and less documentation among Black and Hispanic patients than White patients ( $p < 0.001$ ) (Brown et al., 2019). Some of the Asian girls had recently immigrated to the US, and it was hypothesized that their first visit to the doctor was dominated by infectious disease screenings and other health maintenance concerns, language barriers preventing physicians from discussing the matter, or cultural factors that may have made either the physician or patient uncomfortable (Brown et al., 2019). Additionally, though 57% of the sample

were non-Hispanic Black adolescents, only 26% had LMP documented on their EHR, while 40% of White patients did, though the authors did not hypothesize why (Brown et al., 2019).

One study found reduced menstrual history taking among adolescents with a physical or intellectual disability. In a matched cohort study of adolescents 12-26 years old in Ohio who appeared for a routine preventative appointment, those who visited a specialized neurodevelopmental clinic had significantly less menstrual cycle regularity recorded in their charts than a comparison group (11.8% vs. 47.1%;  $p=0.02$ ) (Roden et al., 2019). There was also less documentation of any menstrual history other than LMP or regularity among patients with a disability, though not significant (17.7% vs. 41.2%;  $p=0.13$ ) (Roden et al., 2019). However, there was no significant difference between adolescents with a disability and the comparison group in documentation of LMP; the authors hypothesized that this was likely due to a feature in Epic<sup>2</sup> that auto-populates a question asking about LMP (Roden et al., 2019). A second study explored physician comfort and perceived barriers of gynecologic care for adolescents with disabilities, and found that comfort level among physicians was low for routine screenings, delayed puberty, or symptoms like heavy menses or menstrual hygiene (Shah et al., 2005).

It is also important to consider the sample demographics of the research. Of the five studies that explicitly measured menstrual history as an outcome, the earliest age of subjects found in this review was 10 years old (Tomlin et al., 2018), with others starting between 11-13 years old (Brown et al., 2019; McShane et al., 2018; Roden et al., 2019; Stowers & Teelin, 2019). However, there is research to support that several groups of adolescents may experience menarche at earlier ages (Martinez, 2020). A CDC and HHS report through the National Center for Health Statistics conducted face-to-face interviews of girls and women from 2013-2017 in the US aged 15-44 years about their age of menarche, comparing data to 1995 values (Martinez, 2020). The report found that the median age of menarche decreased from 12.1 in 1995 to 11.9 years in 2013-2017, and results from the 2013-2017 time period found that 26% of women in this sample had experienced menarche by age 11, and 50% by 11 years and 10 months (Martinez, 2020). In this report, participants of Hispanic origin had a higher probability of experiencing menarche early, with 31% by age 11 (Martinez, 2020). Women whose mothers had

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<sup>2</sup> Epic Systems Corporation is an American private healthcare software company that develops, manufactures, licenses, and sells software that includes medical history templates (among other features like scheduling and billing), often called 'Epic'.

a GED or high school diploma had a higher probability of menarche at each age compared to participants whose mothers had a bachelor's degree, with 27% by age 11 (Martinez, 2020). Family structure also appears to play a role in onset of menarche, as women who were living with their biological mother and a stepfather had a higher probability of menarche at a younger age, with 32% by age 11, compared to women living with both of their biological parents at 14 (Martinez, 2020). Lastly, children and adolescents with obesity have earlier onset of menarche, as well as higher rates of irregular menses, amenorrhea, dysmenorrhea, and abnormal uterine bleeding (Itriyeva, 2022).

### ***Structure***

Several structural factors including provider specialty, training, and gender, as well as the ambulatory care setting, guidance by AAP and Bright Futures, and time constraints may have an influence on menstruation recording (Bright Futures, 2022; Bright Futures, 2017; Gibson et al., 2021; Hoover et al., 2010; Huguelet et al., 2018; McShane et al., 2018; Norlin et al., 2011; Shah et al., 2005; Singer et al., 2022; Stowers & Teelin, 2019; Tomlin et al., 2018).

Two studies focused on the relationship between variability of specialties and menstrual history documentation. A retrospective cohort study of 150 female patients aged 11 to 18 years seen at ambulatory care clinics affiliated with Phoenix Children's Hospital from January to March of 2016 analyzed the rates of LMP documentation by adolescent gynecologists (AG), general pediatricians (PEDS), and adolescent medicine (AM) providers (Tomlin et al., 2018). Only 14% of PEDS and 60% of AM charts had documented LMP, though adolescent gynecologists had 100% documentation (Tomlin et al., 2018). Additionally, AGs were more likely to document menstrual flow than both AM and PEDS ( $p < 0.001$ ) (Tomlin et al., 2018). This is a particularly significant finding due to the lack of gynecologists in rural areas across the US, as mentioned previously. A lack of adolescent gynecologists in rural areas also restricts the ability of PEDS or family medicine providers to refer patients if necessary. A second study of 954 EHRs of adolescents aged 12 to 21 years old who attended a WCV through Cooper University Healthcare in New Jersey expanded to include family medicine, in addition to AM and PEDS departments (McShane et al., 2018). AM providers were significantly more likely to take a complete menstrual history than both family medicine doctors and pediatricians (5.54% vs. 9.20%;  $p < 0.001$ ) (McShane et al., 2018). McShane et al. measured four aspects of menstrual

history, finding that LMP was the most documented aspect in all three specialties. The least likely aspect to be documented among family medicine providers was menarche and associated symptoms (McShane et al., 2018). The least likely component to be documented among PEDS was length of cycle and associated symptoms (McShane et al., 2018).

The age of an adolescent is a factor in the type of specialty provider they visit. Hoover et al. (2010) analyzed the National Ambulatory Medical Care Surveys from 2003 to 2006 for females aged 9-26 years old and stratified by type of provider or clinic type to determine healthcare utilization among female adolescents. Adolescents aged 9-10 years old had the largest proportion of pediatrician visits, and by ages 17-18 years old the number of OBGYN visits surpasses pediatric visits (Hoover et al., 2010). These patterns not only have implications for patients, but also for residents as it may result in a lack of exposure of pediatric and adolescent gynecology (PAG) topics, as well as a scope-of-work belief by residents and providers that the menstrual cycle needs to be referred to gynecologists (Huguelet et al., 2018).

Two articles discuss resident education of Pediatric and Adolescent Gynecology (PAG) topics. PEDS, AM, and family medicine residents have variable exposure to PAG and related education (Huguelet et al., 2018). One month of adolescent medicine training is required among PEDS residents, but the topics and curricula differ by residency program (Gibson et al. 2021). OBGYN, pediatric, adolescent medicine, and family medicine residents report that they feel unprepared to provide reproductive healthcare, likely due to limited clinical exposure to PAG topics among middle to late-aged adolescents (Gibson et al., 2021). The North American Society for Pediatric and Adolescent Gynecology (NASPAG) was established to create a curriculum for residents in programs without PAG faculty. It was created and disseminated in 2014 for NASPAG members. Gibson et al. (2021) provides the most updated curriculum that PEDS and AM may complete, which is a short two-week curriculum for residents regarding topics like precocious puberty, pelvic pain in adolescents, delayed puberty, and bleeding disorders. Huguelet et al. (2018) evaluated the short curriculum in 48 residency programs of the NASPAG members, and found improved self-reported knowledge in both pediatric residents (48% to 87%) and in family medicine residents (43% to 75%) (Huguelet et al., 2018). The NASPAG published an updated two-week curriculum in 2021, with the goal that all training programs incorporate it during the one month adolescent residency training, but at present it is not required, and the prevalence of its use is unclear (Gibson et al., 2021).

Provider gender was also associated with differing views of the importance and rate of menstrual history taking and anticipatory guidance (Singer et al. 2022). Gender differences were analyzed in a 53-item online self-report questionnaire completed by 462 AAP members with relatively even distribution across the South, West, Northeast, and Midwest US (Singer et al., 2022). In this sample, male pediatricians were less likely to provide anticipatory guidance, rate the guidance as important, ask about menses patterns, and overall rated their knowledge of the menstrual cycle as lower (Singer et al., 2022). Male pediatricians were also less likely to ask the date of patient's LMP, the pattern of their menses, and to discuss tampon and pad safety and usage (Singer et al., 2022). Male pediatricians also had less self-reported and measured knowledge than female pediatricians regarding menstruation (32.0% vs 68.1%) (Singer et al., 2022). It has been hypothesized that instead of female providers being more likely to ask about menses patterns, the patients themselves may be more likely to initiate the conversations surrounding menstruation or other sensitive topics in the presence of a female provider, due to increased comfort levels (Tomlin et al., 2018).

A study by Stowers and Teelin (2019) was included for comparison to an inpatient setting, specifically rates of documentation when adolescents presented with a chief complaint. In a retrospective chart review for female patients aged 11-18 years who were admitted to a tertiary referral center serving 17 New York counties, LMP was the most common aspect of menstrual history documented, though only in 29.1% of charts (Stowers and Teelin, 2019). The rate of documentation did not differ by age or among patients who presented with abdominal pain, though was non-significantly lower among patients with mental health symptoms (Stowers and Teelin, 2019). Only 39.5% of adolescent girls with abdominal pain had menstrual history documentation, and of those who required inpatient admission due to abdominal pain, only half had any menstruation documentation (Stowers and Teelin, 2019). The authors suggest that instead of explaining painful menstrual or gynecological symptoms, adolescents may have felt more comfortable framing it as general abdominal pain (Stowers and Teelin, 2019).

An analysis of AAP and Bright Futures materials gives insight into the expectations and guidance provided to clinicians in menstrual history taking. The AAP and Bright Futures release an annual periodicity schedule for providers containing theory and evidence-based guidance for all preventative well-visits of adolescents (Bright Futures, 2022). Each of the 31 age-based visits, from prenatal, infancy, early childhood, middle childhood, to adolescence, contains a checklist of

screenings or topics to address at each well-visit. The categories include the following: measurements, sensory screening, developmental/social/behavioral/mental health, physical examination, procedures, oral health, and anticipatory guidance. Although the AAP's anticipatory guidance frames the menstrual cycle as a vital sign, it is not listed within the "measurement" section of the periodicity schedule, which contains height, weight, BMI, and blood pressure. In fact, the schedule does not mention the words "period," "menstrual cycle," or "menstruation" anywhere on the document. The only recommendations related to gynecologic health are screenings for Sexually Transmitted Infections for those 11-21 years, and Cervical Dysplasia, only for those 21 years. Though not directly mentioned on the periodicity schedule, there is an "anticipatory guidance" section at the bottom of the document, which references handbooks that have further guidance for age-specific development that do have guidance on menstruation, outlined next. Topics included in the periodicity schedule are presented in Table 4.

In addition to the schedule, Bright Futures and AAP update four age-based handbooks (infancy, early childhood, middle childhood, and adolescence) which include health supervision and anticipatory guidance. Periods and menstruation are first mentioned in the 9- to 10-year-old section of the *Middle Childhood Visits* book, and then again in the 11- to 14-year-old section of *Adolescence Visits*, with varying degrees of comprehensiveness, presented in Table 4. The 9 to 10-year old book includes anticipatory guidance that providers should give to both caregiver and children regarding puberty, menarche, and menstrual hygiene products in three highlighted bullet points. During provider examination and review of systems, there is only one question that the provider is recommended to ask, which is "have you started your periods?" (*Bright Futures*, 2017). The review of systems in the 11- to 14-year-old section includes the previous question, and then asks "if you have started, when was your last period" and "do you have any problems with your period" (*Bright Futures*, 2017). The anticipatory guidance in the 11- to 14-year-old section suggests providers educate young girls and parents about "menarche, subsequent cycle length, as well as issues related to hygiene, dysmenorrhea, and irregular bleeding," and provides a sample question: "have you had your first period? If so, tell me more about your periods, such as how often they are and how heavy" (*Bright Futures*, 2017). There is no specific guidance or sample questions regarding the definition of a regular cycle length, time between cycles, associated symptoms or pain, or amount of blood the patient should expect in either the 9 to 10-year old or 11- to 14-year-old section (*Bright Futures*, 2017). Neither the Bright Futures

handbook nor the periodicity schedule suggests the use of the menstrual cycle as a vital sign in plain words, nor in the placement of these questions near other vital signs on the priorities of well-visits. It also relies significantly on provider interpretation and discretion in questions suggested.

Table 4. Bright Futures anticipatory guidance, recommended questions, and periodicity schedule information by age group.

	<b>Anticipatory Guidance in Handbook to provide caregivers and patients</b>	<b>Recommended Question (s) in Handbook</b>	<b>Recommended Preventive Topic in Periodicity Schedule related to gynecological health</b>
<b>9–10 years</b>	<p>“The next changes you will notice are that your breasts will start to get bigger. It’s normal for one side to be bigger than the other at first. As your breasts grow, you may be more comfortable wearing a bra.”</p> <p>“Hair will grow on your underarms and pubic area, becoming thicker, darker, and curlier over time. You also will start to grow taller at a very fast rate. This is called the growth spurt. Now is a good time to have pads available to use in your underwear when your periods start. Pads are also called sanitary napkins. Your periods generally start about a year after you see underarm and pubic hair.”</p> <p>“Girls can have their first period, or menses, as early as 10, but usually by 13. Every girl is different. Periods often come at unpredictable times at first, but they eventually will come about once every 4 weeks. A small amount of blood, sometimes more brown in color than red, will come from your vagina and appear on your underwear. Use the pads to catch the blood. Change your pad every few hours and wrap the used pad in toilet paper or place it in a small paper bag to be put in the trash can. Most pads cannot be flushed down toilets. Always wash your hands after changing your pad.”</p>	<p>“Have you started your periods?”</p>	<p><i>“Anticipatory guidance”, which references the handbook with the information on the left.</i></p>
<b>11-14 years</b>	<p>“Health care professionals should educate young girls and their parents about menarche and subsequent cycle length as well as issues related to hygiene, dysmenorrhea, and irregular bleeding.”</p>	<p>“Have you had your first period?</p> <ul style="list-style-type: none"> <li>▪ If so, when was your last period?</li> <li>▪ Do you have any problems with your periods?</li> </ul>	<p><i>“Sexually transmitted infections”</i></p> <p><i>“Anticipatory guidance”, which references the handbook with the information on the left.</i></p>



“Have you had your first period? If you have menstruated, tell me more about your periods, such as how often they are and how heavy.”

- Do you have any itching, burning, or discharge in your vaginal area?”

“I want to make sure you understand about your periods (your menstrual cycles). Please ask me if you have any questions.”

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The Bright Futures handbooks contain many subjects for discussion during adolescent well visits, including physical growth and development, school performance/extracurriculars, emotional well-being, risk reduction, safety practices, social development, vision/oral health and many more. Norlin et al. (2011) used direct observation to measure the duration of WCVs, as well as Bright Futures topics that were discussed. The mean time duration of a WCV was 20.3 minutes (Norlin et al., 2011). Of twenty-four age-recommended topics measured at each visit, only 42% of Bright Futures topics were discussed (Norlin et al., 2011). The topic of puberty/sex had a 13% congruence between recommended and observed among middle childhood (5-10 years) visits (Norlin et al., 2011). Additionally, the mean time spent discussing puberty/sex during middle childhood visits was 0.08 minutes (Norlin et al., 2011). The mean time spent discussing puberty/sex during adolescence (>11 years) was 0.95 minutes (Norlin et al., 2011). The limited amount of time, combined with the high volume of topics that clinicians are expected to cover, is a significant structural barrier to discussing the menstrual cycle at a WCV. Of the perceived barriers by physicians who provide care to adolescents with a disability outlined in Shah et al. (2005), the most common was the intensity of time (39%).

### ***Process***

The process of documenting menstruation is dependent on EHR use patterns and templates, interpretation of menstruation regularity, and the staff member who asks and records histories (Brown et al., 2019; Mack et al., 2016; McShane et al., 2018; Norlin et al., 2011; Roden et al., 2019; Stowers & Teelin, 2019; Tomlin et al., 2018).

Of the five articles that directly measured rate of documentation, each used different parameters for the measurement of a complete menstrual history. There were two studies that defined any record of information as a menstrual history (Brown et al., 2019; Stowers & Teelin, 2019). Tomlin (2019) evaluated history-taking using two components: LMP and “description of menstrual flow.” Roden et al. (2019) used three measures: LMP, menstrual regularity, and any

note other than LMP or regularity. Lastly, McShane et al. (2019) required the following four components to be considered a complete history: age of menarche, LMP, length of cycle, and associated symptoms. When measuring puberty/sex in Norlin et al. (2011), there was no definition of what constituted the topic of puberty. Stowers & Teelin (2019) posit that even patients with 120-day cycles will have a recent LMP 33% of the time (4 months of each year), therefore an isolated assessment of only LMP without further history-probing will lead to an incorrect diagnosis.

In addition to differences in menstrual history measurements, there exists broad variation in the terms “regular” or “normal” often used to describe the menstrual cycle. The term “regular” can be used to describe the length of a cycle, time between cycles, the absence of associated symptoms, or a different marker. In McShane et al.’s study, clinicians commonly marked “regular” on a patient’s EHR, without specifying which aspect of the menstrual cycle they were referencing (McShane et al., 2018). Without specific questions and answers to choose from on templates, providers often utilize this type of shorthand in the free text or notes section and give their own definitions and categories of “regular.” Other irregularities in charting included non-specification of LMP definition, like whether the date of LMP is the first day of the last LMP or last day (McShane et al., 2018). Additionally, symptom charting ranged from “no symptoms” to “no problem” to “normal,” furthering the incongruity of documentation and allowing for inconsistencies (McShane et al., 2018).

Furthermore, there is variability in the staff member responsible for taking LMP history and inputting it into the EHR. In Brown et al. (2019), nurses were responsible for documenting LMP, and it is hypothesized that providers rely on this documentation and do not probe further into menses patterns or problems. The exclusive documentation by nurses may lead to undiagnosed conditions by the provider (Brown et al., 2019). In the Tomlin et al. (2018) study, LMP documentation was input by the primary care provider only, and not ancillary staff. McShane et al. (2018) noted that the EHRs for their study did not include information on whether a doctor, resident, or mid-level practitioner filled in the chart. These variations may lead to differences in recording answers by physicians or ancillary staff and could cause an incomplete summary or no follow-up.

Of the five studies that measured EHRs, three utilized Epic (Brown et al. 2019, McShane et al. 2018, Roden et al. 2019), and two did not specify (Stowers and Teelin, 2019; Tomlin et al.,

2018). In one study of Epic EHRs, there was a combination of drop-down selections and free text, but physicians were able to choose from a variety of templates based on personal preference (McShane et al., 2018). A second study that used Epic hypothesized that the existence of an auto-populate feature that pulls the most recent documented LMP led to equal documentation between children with a disability and without, though had low adherence overall (Roden et al. 2019). Tomlin et al. (2018), though did not specify which EHR system was used, stated that a question regarding LMP was only included on the gynecology and pediatric well-child visit templates. The authors suggest that LMP be included in the vitals section of all pediatric EMR templates. Stowers and Teelin (2019) did not specify which EHR was used in their study but encouraged providers to check their EHR templates to ensure menstrual history prompts are included.

The AAP provides tools and assistance for members to integrate official recommendations by Bright Futures into their EHRs for age-based preventative services, screens, and tests (*Integrate Bright Futures Into Your Electronic Health Record System*, 2022). A second source for EHR contributions is the US Preventative Services Task Force (USPTF), which states that EHR vendors integrate the Task Force's recommendations into their EHRs (*U.S. Preventive Services | About Prevention TaskForce*, n.d.). However, the USPTF does not have any recommendations regarding menstrual history as a preventative service among adolescents (*U.S. Preventive Services | About Prevention TaskForce*, n.d.). Many larger hospital systems contract with private companies like Epic, as well as some private practices, however the rate of EHR uptake in smaller practices and its effective use varies. In a Georgia-based study of both rural and urban private practices of pediatric, family medicine, internal medicine, and OBGYNs, EHR adoption rates by medical doctors, physician assistants, and nurse practitioners varied (Mack et al., 2016). Providers in smaller offices (<10 providers), public hospital clinics, rural clinics, and those with a higher proportion of Medicaid patients had slower rates of adoption of EHRs (Mack et al., 2016).

### ***Outcomes***

The menstrual cycle is a critical part of an adolescent's growth, development, and overall health (Dawson, 2019; Hillard, 2014; Jamieson, 2015; Popat et al., 2008; ACOG, 2020). There are many positive outcomes of accurate and frequent menstrual history documentation and

anticipatory guidance by clinical providers. Proper discussions and questions guide the clinician to help the management of conditions and symptoms that may be underlying any menstrual cycle irregularities. Whereas other structure-process-outcome models may focus on more short-term and clear measures of recovery, restoration, and survival, such as surgical fatality rates resulting from specific procedural changes, outcome measures for this review are harder to define and measure in one dimension. Interventions among adolescents can have both a short-term effect and a delayed outcome into adulthood, which depend on complicated longitudinal studies to measure. Outcomes highlighted in this review likely have both short and long-term implications. Common themes of outcomes found in this review include diagnosis time, physical functioning and pain management, social functioning, quality of life (QoL), mental health, body image, healthy practices, and school absenteeism/academic performance (Allyn et al., 2020; Gallagher et al., 2018; Gordon & Nelson, 2003; McPherson & Korfine, 2004; Parker et al., 2022; Soliman et al., 2017).

Timely diagnosis is a central outcome, as it leads to both significant short-term outcomes like menstrual management as well as long-term outcomes like fertility. Diagnostic experiences among 638 adult women with endometriosis were compared by symptom presentation in adolescence vs. adulthood in Soliman et al. (2017). Patients who first experienced symptoms in adolescence waited longer to seek medical attention, with a mean time of 43.5 months from symptom onset to first physician visit, compared to 18-29, 30-39, and 40-49 age groups (26.0; 16.3; 14.2 months) (Soliman et al., 2017). Once adolescents did seek treatment, they waited longer from initial contact to receive a diagnosis (34.5 months) than those whose symptoms began in adulthood (12.4-23.0 months) (Soliman et al., 2017). The time from symptom onset in adolescence to diagnoses, at 6.5 years, is shorter than studies over the previous 15-20 years in the US with average delays of 8-10 years (Soliman et al., 2017). The shorter delay may be due to the inclusion of non-surgical diagnoses in this study or could represent increased awareness of endometriosis among primary care providers. Regardless of the improvement, adolescents face longer diagnosis delays than their adult counterparts. Timely diagnosis is also vital for long-term bone health. Adolescence is a critical period for bone accretion and resorption, with over half of peak bone mass achieved during the teen years (Gordon & Nelson, 2003). Amenorrhea due to estrogen deficiency or HPO axis disturbance that is not diagnosed and treated early can lead to

poor bone health such as osteopenia and osteoporosis that may be irreversible (Gordon & Nelson, 2003).

In addition to measuring diagnoses as a primary outcome, treatments as a secondary outcome can be measured. These treatments can include hormone therapy for restoring endocrine function, ovulation, and bone density; iron supplements and blood disorder medications; surgery or radiation therapy; referrals to psychiatry or nutrition specialists; and pain management (Ahn et al., 2017; Dawson, 2019; Popat et al., 2008).

Symptoms, both controlled and uncontrolled, resulting from primary dysmenorrhea, endometriosis, and heavy menstrual bleeding significantly affect QoL among adolescents (Allyn et al., 2020; Gallagher et al., 2018; Parker et al., 2022). In a study of 567 participants (<25 yrs) in Boston with and without an endometriosis diagnosis, adolescents with endometriosis scored significantly lower in every subscale measure of QoL, including general health, bodily pain, physical limitation, physical functioning, mental health, emotional limitation, social functioning, and vitality (Gallagher et al., 2018). These low scores have implications for school attendance, participation in social activities, and ability to exercise (Gallagher et al., 2018). Additionally, there was a higher prevalence of mental health disorders, including anxiety and depression that required therapy or medication management among girls with endometriosis (Gallagher et al., 2018). Two qualitative studies also explored the experiences of adolescents with primary dysmenorrhea and heavy uterine bleeding. First, among 39 adolescents and young adults aged 16-24 years in Los Angeles, CA with primary dysmenorrhea, one-on-one interviews revealed a biopsychosocial impact touching almost every aspect of their lives (Allyn et al., 2020). Biological impacts, spanning physical functioning, daily functioning, and sleep, and psychological and social impacts involving body image, mood, and anxiety, were associated with increased pain (Allyn et al., 2020). To cope with this pain, participants expressed methods that further intertwine the psychosocial involvement of menstruation symptoms, including coping mechanisms like acceptance, distraction, behavioral disengagement, self-isolation, and catastrophizing (Allyn et al., 2020). One-on-one interviews with 9 girls, within 3 years of menarche, and with a diagnosed and controlled inherited bleeding disorder in Texas revealed that girls with heavier bleeding stated that their periods were stressful, embarrassing, and anxiety provoking, especially at school (Parker et al., 2022). Missing activities, social and academic, led to feelings of “otherness” and isolation from peers (Parker et al., 2022). However, participants

expressed that receiving a formal bleeding disorder diagnosis led to empowerment and identity formation (Parker et al., 2022). The positive role of a formal diagnosis in this study has implications for the diagnoses of other menstrual related disorders and subsequent improvements in QoL among diagnosed adolescents.

Proper anticipatory guidance and education provided to patients increases an adolescent's preparation for menarche and their understanding of "normal" menses. Girls who are prepared and have accurate knowledge of menarche have reduced fear, anxiety, shame, and stress (McPherson & Korfine, 2004). These young patients may be more familiar with symptoms of their menses that are out of the ordinary and more likely to bring it up to a provider if they are properly educated. Additionally, there may be positive effects well into adulthood. Women who reported a positive menarche experience and had more accurate knowledge of menstruation facts reported that their current menstruation attitudes were more positive, they had a more positive body image, and slightly better (though not significant) positive health behaviors, particularly with regular pap smears (McPherson & Korfine, 2004). Adult women who reported having an extremely negative menarche experience and poor preparation rated their periods as significantly more debilitating than women who reported a positive experience (McPherson & Korfine, 2004).

## **VI. Discussion**

ACOG and AAP frame the menstrual cycle as vital to the health of an individual, yet one of the key findings of this review is that there are multiple checkpoints in which there are missed opportunities to explore and diagnose potential pathologies in an adolescent. The antecedent-structure-process-outcome model offers an organizational and chronological approach to categorizing the potential barriers from even before the visit begins, all the way through to the outcomes seen into adulthood.

First, well-child visits are an essential component of preventative care among adolescents, during which menstrual history and puberty should be addressed. However, geographic location and access to healthcare influences frequency of WCVs (DeGuzman et al., 2020). Those who live in rural areas also have compounding factors such as lower income and public insurance use (DeGuzman et al., 2020). Even for those who attend each WCV, the slower adoption and use of EHRs among rural physician offices likely contributes to prevalence of menstrual history documentation (Mack et al., 2016). While majority of the studies utilized Epic,

it is most often used among large hospital systems because of its higher cost, with financial reasons cited as the primary barrier to EHR adoption among smaller practices (Mack et al., 2016). Additionally, the studies that measured menstrual history documentation were also through hospital-affiliated clinics (Brown et al. 2019, McShane et al. 2018, Roden et al. 2019; Stowers and Teelin, 2019; Tomlin et al., 2018). For these reasons, it is difficult to assess the prevalence of menstrual history taking in rural areas, or by smaller private clinics.

Race, English-speaking ability, and disability status were all found to have an association with lower menstrual history documentation (Brown et al., 2019; Roden et al., 2019).

Documentation among Asian girls was nonexistent, and documentation among Hispanic and Black girls was lower than White girls, which warrants further exploration and attention (Brown et al. 2019). These findings appear congruent with previous research indicating health screening disparities which have found lower rates of Pap tests and HPV vaccination among Asian American and Pacific Islander (AAPI) young adults compared to non-Latina whites (Lee et al., 2019). Brown et al.'s hypothesis that the low menstruation question screening rate among Asian girls is due to recent immigration is consistent with Lee et al.'s finding that AAPI girls who were foreign-born were also significantly less likely than US-born AAPI girls to have a Pap test because of cultural barriers, modesty, racial discrimination, insurance status, or limited English proficiency (Lee et al., 2019). Language and cultural barriers in clinical settings may significantly reduce the provision of necessary care and effectiveness of preventative approaches. Efforts should be made to improve translation and cultural sensitivity to provide the same level of care to each adolescent. The lower rates of menstruation-related screening documentation among Black and Hispanic girls is also consistent with research highlighting racial disparities in reproductive healthcare, including contraceptive use, STI treatment, HPV vaccinations, reproductive cancers, and maternal outcomes (Sutton et al., 2021). Lastly, adolescents with a disability, physical or intellectual, often have complex needs, as well as a higher likelihood of comorbidities like increased BMI or genetic conditions which impact menstruation, yet have lower rates of menstrual history taking (Roden et al., 2019).

Despite Bright Futures recommendation to begin anticipatory guidance on puberty at 7 years old and to start asking about menarche at 9 years old, there was no representation of girls younger than age 10 found in this review, which could indicate a gap in data for girls with a higher probability of earlier onset of menarche, including Hispanic or Black girls, those with

lower income, higher BMIs, and non-traditional living situations (Itriyeva, 2022; Martinez, 2020).

Another principle finding of this review is the variability in EHR use within office, particularly the type, staff-member that documents it, questions regarding the menstrual cycle, and terms used to describe them. In the absence of questions on the EHR, providers must use a textbox and write short-hand, or brief notes, regarding the menstrual cycle. If an EHR has a question regarding menstrual history, it may only include the date of LMP, and neglect cycle length, associated symptoms, or flow (Tomlin et al., 2018). Using shorthand may lead to confusing and inaccurate notes within the EHR. Particularly, definitional inconsistencies can have an impact on diagnoses among adolescents, even if providers do take a complete menstrual history. A note of “regular menses” on an EHR may prove unhelpful, particularly because diagnoses of many conditions specify a length of time in which a symptom must be present or a period missing (eg: secondary amenorrhea may be diagnosed after only three months of no menstruation if previous cycle occurred every 21-45 days). Using broad terms like “regular” and “normal” on EHRs leads to a heavy reliance on individual provider interpretation and can interfere with accurate assessments of previous menstrual history. An intervention addressing EHR practices may be an effective approach to menstrual history documentation.

Based on this review, there is variation of drop-down and free text throughout EHRs, with the most likely drop-down being the date of LMP (Tomlin et al., 2018; McShane et al., 2018). Many studies have explored the use of best practice alerts (BPA) on EHRs, in which a pop-up box will appear on the EHR during the visit to remind a provider that the patient is appropriate for a specific test or screening. Several studies have found that BPAs lead to the recommended intervention, like patients initiating HPV vaccination and staying on schedule for all three doses, or increased Hepatitis C testing among older adults (Federman et al., 2017; Ruffin et al., 2015). However, some BPAs are proposed and included in EHRs in excess, and they have been criticized to generate alert burden among providers, leading to provider annoyance, unnecessary time-consumption, and a distraction from patient needs (Baron et al., 2021). Alert fatigue, particularly duplicate and inappropriate BPAs, causes providers to ignore them, undermining the entire goal (Baron et al., 2021). Instead of a BPA, menstrual history questions may have more success if located in the patient history section of an EHR, or among



other vital signs taken by ancillary staff, to match the language and positioning of the menstrual cycle by ACOG and AAP.

However, the most efficient and time-saving solution may be a pre-visit questionnaire (PVQ) for the patient to complete prior to the office visit. Answering menstrual history questions before the appointment may allow patients more time to recall the date of their LMP, reflect on regularity, symptoms, and flow. Electronic PVQs regarding sensitive health topics like mental health, risky behaviors, and gun violence prompt increased disclosure and improve engagement between health professionals and adolescents (Bradford & Rickwood, 2012; Gadowski et al., 2015; Glasner et al., 2021; Riese et al., 2015). Because menstruation is still viewed by many as taboo, patients may feel more comfortable completing a PVQ prior to the visit, while simultaneously improving office efficiency and provider care (Glasner et al., 2021). However, a PVQ is only as effective as the action it prompts by the clinician, and in certain scenarios non-reaction to a problem found upon screening may be more harmful than not screening at all (Glasner et al., 2021). Additionally, some caregivers prefer to answer PVQs on behalf of their child, citing time constraints, a desire to be involved, or concerns that topics are not age appropriate for adolescents, which may hinder accuracy and the improved engagement with health professionals that a PVQ can offer (Ferrin et al., 2019).

Adolescents experience significant changes during puberty, requiring physicians to cover many topics during well-child visits. Pubertal changes are further compounded by growing threats to adolescent health, such as social media, digital screen-time, bullying, COVID-19, and mental health. Bright Futures spans many topics that the provider simply cannot cover in a short visit, and by default the provider must use discretion to which topics are most salient for the patient. In the absence of a clear method to document menstrual history on an EHR, and clarity within Bright Futures on the components and definitions of a full history, there is a significant amount of interpretation on the part of the provider. A PVQ may assist in obtaining a menstrual history prior to the visit and save time in-office, but time constraints of a WCV may still inhibit follow-up or anticipatory guidance on the topics. Additionally, adolescent girls may feel uncomfortable mentioning a concern they have without being prompted, either feeling that the subject is too taboo, or feeling uncomfortable by the provider's gender (Stowers and Teelin, 2019; Tomlin et al., 2018). In the inpatient setting, even if an adolescent is experiencing menstrual related pain, they may describe vague abdominal pain to avoid discussing

menstruation (Stowers and Teelin, 2019). Adolescents may also not have accurate records or understanding of their own periods and require further probing by a provider. In a study of adult women, 25% underreported the length of time since their LMP, and 19% overreported the length of time (Wegienka & Baird, 2005). Recall by adolescents is likely more difficult as it is common to have irregular intervals at the start of menarche, particularly the interval between the first and second cycle, and younger girls may have a harder time tracking, recording, and relaying their cycle information to providers (ACOG, 2020). There are several digital applications widely used to assist in tracking menstrual cycles and ovulation patterns, however younger adolescents without access to a cell phone may not benefit from these tools. The recent 2022 decision by the Supreme Court in *Dobbs v. Jackson Women's Health Organization* has brought controversy to these apps as well, as many users are apprehensive to log any intimate health data, because if hacked or sold, it may be used in an abortion accusation.

This review explores several themes across the patient, provider, office, and organization that may lead to missed opportunities for early diagnosis and intervention of many pathologic disorders of the adolescent. The primary care provider is positioned to explore and address many preventative tasks and provide anticipatory guidance throughout childhood and adolescence on proper growth and development. In an age where young girls still do not have adequate health education regarding menses, whether it be internet misinformation, inadequate menstrual health and hygiene (MHH) education in schools, family or cultural challenges, or stigma surrounding periods in general, a pediatrician or family medicine provider may represent the only source of accurate information that an adolescent can access (Hillard, 2014; Schmitt et al., 2021). A regular assessment of menstrual history is a vital tool for the provider to evaluate and diagnose their patients, establish a relationship with them, and empower them to understand their own bodies.

## **VII. Limitations**

There are several limitations to this review. Many of the articles rely on retrospective analysis of medical records as their primary data source. It is possible that menstrual cycle history is discussed between provider and patient, but not documented. Donabedian and others have critiqued this method as rating the quality of the record, not the quality of care—and differences across EHR templates also introduce variability. Provider surveys were also subject

to social desirability and recall biases. Further, drawing inferences on provider practice based on their knowledge and attitudes has its own limitations. Many of the studies had generalizability issues, and it is difficult to make claims across the US when variability touches each facet of medical care, from structure to process. Lastly, there is limited research that exists in the field to analyze the prevalence of menstrual history documentation and discussion, thus several unique groups of patients were excluded from this review.

## **VIII. Conclusion**

The menstrual cycle can act as a window into the health of a young patient with a period – to understand their overall health and give the appropriate medical care. Periods are not segregated from the rest of the body, but instead are one of the most central aspects of a healthy life. Proper and early diagnosis and treatment of conditions, as well as proper guidance, improves both physical and psychological outcomes, at the onset of menarche and well-into adulthood. However, without the necessary tools to discuss and document menstruation, the necessary knowledge of cycle components, proper time to ask, and inconsistencies in definitions, providers face many barriers.

Future direction should expand to include qualitative research. A qualitative approach may highlight structural barriers like time constraints, competing priorities, staffing roles, ease of EHR use, or Bright Futures and AAP communications. Additionally, as the average age of menarche has become younger in recent years, future research should expand to include girls aged 7-10 years old to capture the experiences of those with earlier menarche, as well as provider adherence prior to onset of menstruation as outlined in Bright Futures. A methodology that expands to younger ages would include more information on girls with different family incomes, family structure, race and ethnicity, and health status. Additionally, there must be a focus on location and smaller practice sizes that are unaffiliated with larger health systems to incorporate more physician practices. Not every adolescent visits a pediatrician through a university health system or large hospital affiliation, and their experiences are likely different. Finally, future research should focus on possible interventions to improve adherence, such as the use of a PVQ regarding menstrual history. While the language of ACOG and AAP reports emphasize the menstrual cycle as a central component of an adolescent's general health, this review highlights several barriers to the actions taken in clinical settings to reflect this guidance.

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