



Published in final edited form as:

Obstet Gynecol. 2022 May 01; 139(5): 898–906. doi:10.1097/AOG.0000000000004722.

Clinician Knowledge and Practices Related to a Patient History of Hypertensive Disorders of Pregnancy

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Abstract

Objective: To describe clinician screening practices for prior hypertensive disorders of pregnancy (HDP), knowledge of future risks associated with HDP, barriers and facilitators to referrals for cardiovascular disease risk evaluation in women with prior HDP, and variation by clinician- and practice-level characteristics.

Methods: We used data from Fall DocStyles 2020, a cross-sectional, web-based panel survey of currently practicing US clinicians. Of 2,231 primary care physicians, obstetrician–gynecologists, nurse practitioners, and physician assistants invited to participate, 67.3% (n=1,502) completed the survey. We calculated the prevalence of screening, knowledge of future risks, and barriers and facilitators to referrals, and assessed differences by clinician type using Chi-square tests. We evaluated associations between clinician- and practice-level characteristics and *not* screening using a multivariable log-binomial model.

Results: Overall, 73.6% of clinicians screened patients for a history of HDP; obstetrician–gynecologists reported the highest rate of screening (94.8%). Overall, 24.8% of clinicians correctly identified all cardiovascular risks associated with HDP listed in the survey. Lack of patient follow-through (51.5%) and patient refusal (33.6%) were the most frequently cited barriers to referral. More referral options (42.9%), patient education materials (36.2%), and professional guidelines (34.1%) were the most frequently cited resources needed to facilitate referrals. In the multivariable model, primary care physicians and nurse practitioners and physician assistant

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Financial Disclosure

The authors did not report any potential conflicts of interest.

Each author has confirmed compliance with the journal's requirements for authorship.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention

were more likely than obstetrician–gynecologists to report not screening (adjusted prevalence ratio [aPR] 5.54, 95% Confidence Interval [CI]: 3.24, 9.50 and aPR 7.42, 95% CI: 4.27, 12.88, respectively). Clinicians seeing <80 patients per week (aPR 1.81, 95%CI: 1.43, 2.28) were more likely to not screen relative to those seeing 110 patients per week.

Conclusion: Three-quarters of clinicians reported screening for a history of hypertensive disorders of pregnancy; however, only 1 out of 4 clinicians correctly identified all of the cardiovascular risks associated with HDP listed in the survey.

Précis:

Three-quarters of clinicians reported screening for a history of hypertensive disorders of pregnancy; however, only 25% correctly identified the cardiovascular risks associated with these disorders.

Introduction

Hypertensive disorders of pregnancy (HDP), including chronic and gestational hypertension, preeclampsia, and eclampsia, are associated with increased risk of future cardiovascular disease (CVD).^{1,2} Compared to those without, individuals with histories of preeclampsia have double the CVD risk³ and 75% higher risk of subsequent CVD mortality.⁴ Rates of HDP are increasing in the US; from 1993–2014, HDP nearly doubled from 528.9 to 912.4 cases per 10,000 delivery hospitalizations.⁵

Higher risk of CVD subsequent to HDP is largely mediated through the development of traditional CVD risk factors (e.g., chronic hypertension, type 2 diabetes mellitus, and obesity).⁶ All women might benefit from CVD screening; however, those with prior HDP require continued monitoring of cardiovascular risk factors postpartum and beyond.⁷ The American College of Obstetricians and Gynecologists (ACOG) recommends cardiovascular risk evaluation and lifestyle modification (e.g., smoking cessation) for people with a history of HDP.⁷

Effective long-term management of women with prior HDP likely requires coordinated communication and collaboration between clinicians such as obstetrician–gynecologists, primary care, and specialists (e.g., cardiologists). However, clinician screening and referral practices of women with histories of HDP are not well understood.

This article aims to describe clinicians' screening practices related to assessing history of HDP, their knowledge of future risks associated with HDP, and reported barriers and facilitators to making referrals for ongoing cardiovascular disease risk evaluation and monitoring in women with history of HDP. Further, we evaluated clinician- and practice-level characteristics associated with *not* screening for history of HDP to identify potential implementation support and clinician education needs.

Methods

We used data from Fall DocStyles 2020, a cross-sectional web-based panel survey of currently practicing US clinicians. The DocStyles sample, administered by Porter

Novelli Public Services,⁸ is drawn from Sermo's Global Medical Panel – a database of approximately 75,000 medical professionals.⁹ For the DocStyles survey, potential respondents were screened to include only those who practice in the US, were actively seeing patients, work in a group or individual outpatient or inpatient practice, and have been practicing for at least three years. Quotas were set to reach 1,000 primary care physicians (family practitioners and internists), and 250 of each clinical specialty (obstetrician–gynecologists, and nurse practitioners and physician assistants). Porter Novelli does not report the specialty in which nurse practitioners or physician assistants work (e.g., obstetrics or other field). Respondents were verified using a double opt-in sign up process with telephone confirmation at place of work. Invitations to participate included a link to a web-based survey. Respondents were paid an honorarium of \$54-\$72, based on the number of questions and specialty.

A flowchart of participant response information by clinician type is presented in Figure 1. The overall analytic sample included 1,502 clinicians (67.3% response rate).

Porter Novelli developed the survey instrument with technical assistance from federal public health agencies and other non-profit and for-profit clients. The questionnaire was designed to provide insight into clinicians' attitudes and counseling behaviors and to assess their use of available health information sources. Respondents also provided information about clinician- and practice-level characteristics.

We assessed clinician screening practices for history of HDP by asking, "Which populations do you typically screen for a history of hypertensive disorders of pregnancy (e.g., gestational hypertension, preeclampsia, and eclampsia)?" Respondents selected all applicable population groups from the following options: "pregnant women, postpartum women, non-pregnant women of reproductive age, perimenopausal or menopausal women, others, or do not typically screen for this."

We evaluated awareness of future risks associated with HDP by asking, "Hypertensive disorders of pregnancy can increase risk of which of the following conditions?" Respondents selected all applicable responses from the following options: "chronic hypertension, stroke, heart attack, other cardiovascular disease, future pregnancy problems, infertility, and none of these /not sure." Apart from "infertility" and "none of these/not sure," all response options were aligned with current evidence of the effects of HDP.¹⁰

We identified barriers to making referrals to other health care professionals for ongoing CVD risk evaluation and monitoring in women of reproductive age who are at risk of future CVD by asking, "From your experience, what are the barriers to referring patients to other medical care providers for women of reproductive age who are at risk of future cardiovascular disease?" Respondents selected all applicable responses from the following options: "concern related to cost of the referral, lack of patient follow-through, patient refusal, lack of communication between providers, problems with transfer of medical records, lack of time to facilitate the referral, lack of staff support, lack of local referral sources/specialists, and other/none of these."

We evaluated resources needed to improve clinicians' ability to make referrals for women with histories of HDP by asking, "What resources would improve your ability to make referrals for women of reproductive age with histories of hypertensive disorders of pregnancy?" Respondents selected all applicable responses from the following options: "professional recommendations or guidelines, medical provider training, patient education materials, more community referral options (e.g., primary care, cardiology, nutrition counseling), additional staff to facilitate referrals, technology changes or support to facilitate transfer of medical record information, other, and/or no changes are needed."

Self-identified clinician-level characteristics included clinician type (primary care physician, obstetrician–gynecologist, nurse practitioner and physician assistant), age (25–35 years, 36–45 years, 46–55 years, >55 years), gender (male, female), region of residence (Northeast, South, Midwest, West), years in practice (3–10 years, 11–20 years, 21–48 years), weekly patient volume (<80 patients, 80–109 patients, 110 patients), and estimated household income of majority of patients (<\$25,000, \$25,000–\$49,999, \$50,000–\$99,999, \$100,000–\$249,999, \$250,000). Practice-level characteristics included practice type (inpatient, individual outpatient, group outpatient), size (<5 practitioners, 5–14 practitioners, 15 practitioners), and location (rural, suburban, urban).

We calculated prevalences of outcomes (described above) and assessed differences by clinician type using Chi-square tests. We evaluated associations between clinician- and practice-level characteristics and *not* screening for history of HDP using a multivariable log-binomial model, producing adjusted prevalence ratios (aPR) and 95% confidence intervals (CI). Characteristics hypothesized *a priori* to be associated with not screening included clinician type, years in practice, practice type, practice size, patient volume, geographical region, and clinician location. We assessed multicollinearity using conditionality indices, eigenvalues, and variance decomposition proportions. All analyses were conducted using SAS v.9.4 (Cary, North Carolina, USA). Two-sided $P < .05$ was considered statistically significant.

The Centers for Disease Control and Prevention (CDC) licensed the deidentified data from Porter Novelli Public Services. Porter Novelli is not subject to CDC IRB review; however, they adhere to all professional standards and codes of conduct set forth by the Council of American Survey Research Organizations. Respondents are informed that their answers are being used for market research, and they may refuse to answer any question at any time. Completion of the survey was voluntary.

Results

Data were collected from September 14, 2020 to October 26, 2020. The overall analytic sample included 1,502 clinicians (67.3% response rate, Figure 1). Most respondents were male, older than 45 years, and had been practicing for more than ten years (Table 1). Gender, age group, years in practice, patient income, practice type, and patient volume varied by clinician type.

Overall, 73.6% of responding clinicians reported screening patients for a history of HDP. For each patient population with only one exception (i.e., Others), a larger percentage of obstetrician–gynecologists screened for history of HDP, followed by primary care physicians, and nurse practitioners and physician assistants (Figure 2). Variation in prevalence of screening was statistically different by clinician type and highest for pregnant women (range: 49.0% to 90.8%), followed by postpartum women (range: 33.5% to 74.5%), non-pregnant women of reproductive age (range: 26.3% to 61.4%), and lowest for perimenopausal or menopausal women (range: 20.3% to 44.6%) and Others (range: 1.2% to 4.0%). Similarly, *not* screening varied by clinician type, with 5.2% of obstetrician–gynecologists, 27.9% of primary care physicians, and 41.4% of nurse practitioners and physician assistants indicating they do not screen for history of HDP.

Correct identification of risks associated with HDP differed by clinician type (Figure 3). Most clinicians (93.9%) correctly selected at least one future risk associated with HDP; however, only 24.8% selected all correct answer options (data not shown). Nineteen percent of nurse practitioners and physician assistants missed four or more identifications of risk compared to 13.9% of primary care physicians and 4.4% of obstetrician–gynecologists (data not shown). Twelve percent of nurse practitioners and physician assistants, 5.6% of primary care physicians, and 0.8% of obstetrician–gynecologists selected “none of these/not sure.” Approximately one in five clinicians (23.4%) incorrectly selected that HDP increases risk of infertility.

There was some variation by clinician type in reported barriers to making referrals to other clinicians for women who are at risk of future CVD. However, the rank order of the responses did not vary across the specialties, so we present overall results (Figure 4); findings by clinician type are available in Appendix 1 online at <http://links.lww.com/AOG/C630>. Lack of patient follow-through (51.5%), patient refusal (33.6%), and concerns related to cost of referral (30.4%) were the most frequently selected barriers to referring patients. Other barriers such as lack of communication between clinicians and lack of referral sources were also reported (24.2% and 23.2%, respectively). Roughly one in five clinicians (22.4%) reported no barriers to making referrals.

More community referral options (42.9%), patient education materials (36.2%), professional guidelines or recommendations (34.1%), and additional staff support (30.4%) were the most frequently selected resources needed to improve clinicians’ ability to make referrals for women with histories of HDP (Figure 5). One in five clinicians indicated that no additional resources are needed. Apart from patient education materials, resources did not vary by clinician type.

In the multivariable model assessing clinician- and practice-level characteristics and screening practices, nurse practitioners and physician assistants were more than seven times (aPR 7.42, 95% CI: 4.27, 12.88) and primary care physicians more than five times (aPR 5.54, 95% CI 3.24, 9.50) as likely as obstetrician–gynecologists to report not screening for history of HDP (Appendix 2 online at <http://links.lww.com/AOG/C630>). Relative to clinicians seeing 110 patients per week, those seeing <80 patients per week (aPR 1.81, 95% CI: 1.43, 2.28) were more likely to report not screening.

Discussion

Approximately three-quarters of responding clinicians reported screening for a history of HDP. Compared to obstetrician–gynecologists, primary care physicians and nurse practitioners and physician assistants were more likely to not screen for history of HDP, as were clinicians seeing fewer patients per week, relative to those with higher patient volume. Only one in four clinicians correctly selected all CVD risks associated with HDP. Strategies to improve evidence-based screening may include increasing clinician awareness,¹¹ clear clinical guidance,¹² or implementation support¹³ (e.g., standardized clinical algorithms, standardized screening protocols, or referral assistance).

Beyond the immediate postpartum period, there is a lack of clear guidance on CVD evaluation and ongoing monitoring in women with history of HDP.¹⁴ The ACOG recommends annual CVD risk factor screening for individuals with prior preeclampsia who gave birth preterm or who had recurrent preeclampsia,⁷ which may explain higher prevalence of screening by obstetrician–gynecologists in our analyses. A 2021 scientific statement from the American Heart Association (AHA) suggests screening women with prior HDP beginning in their fourth decade¹⁰; however, the 2011 guidelines on CVD prevention in women have not been updated.¹⁵ Neither the US Preventive Services Task Force guideline for hypertension screening nor the 2017 American College of Cardiology/AHA Task Force on Clinical Practice guidelines for hypertension address when and how to assess risk in individuals with prior HDP.^{16,17} Licensing bodies for nurse practitioners and physician assistants generally do not release practice guidance, and recommend guidelines from a variety of sources, which may partially explain lower screening rates among this group.

We found that most clinicians correctly selected at least one future risk associated with HDP. However, more than one in ten nurse practitioners and physician assistants and primary care physicians did not correctly select most or all correct CVD risks, and 11.6% of nurse practitioners and physician assistants and 5.6% of primary care physicians selected “none of these/not sure”, suggesting need for clinician awareness. Our findings are consistent with a study reporting that 26% of obstetricians and gynecologists and 45% of internists did not identify preeclampsia as a component of cardiovascular risk, also suggesting gaps in clinician knowledge.¹⁸ Strategies to improve knowledge may include continuing medical education (CME) such as self-directed learning modules, webinars, or interactive workshops.¹⁹

Our findings may have potentially important implications for patient care, specifically counseling related to future pregnancies and risk factor reduction beyond the postpartum period.⁷ Recognizing HDP as a risk factor for CVD may allow clinicians to identify women requiring early evaluation and intervention. Cardiovascular risk subsequent to HDP is largely mediated through traditional CVD risk factors.^{20–22} Lifestyle interventions, such as smoking cessation, decrease odds of CVD following preeclampsia by 9%.⁶ Hypertension treatment in women has been shown to reduce cardiovascular events by 25%.²³

The spectrum of patient care sometimes necessitates referrals,⁷ and our findings suggest more community referral options, patient education materials, and professional guidelines and recommendations may facilitate referrals. In this study, clinicians most frequently cited patient-level concerns, such as patient refusal, lack of patient follow-through, and cost, as barriers to referring patients to other clinicians. One study of women visiting the Preeclampsia Foundation website found that only 30% of women were aware of the future CVD risk associated with HDP.²⁴ Improving patient knowledge may promote acceptance and follow-through on referrals. From the patient perspective, the perceived future clinical benefits of additional medical visits may not justify the immediate costs,²⁵ especially for individuals with limited resources. Importantly, individuals may face substantial barriers to accessing follow-up care due to transportation²⁶ or other factors.²⁷

Though less frequently reported, clinicians also cited clinician-level barriers to referral, including lack of communication between clinicians. Where care is team-based, guidance and coordination of care could be built into electronic health record systems, standardizing care, and creating a shared burden for following guidelines.²⁸

Strengths of these analyses include recent data from several clinician types that address the evidence gap in clinician screening and referral practices related to CVD evaluation in individuals with prior HDP. Our findings are subject to limitations. Social desirability bias may have led to biased estimates of screening practices. Because DocStyles is a convenience sample, our study is subject to selection bias and limited generalizability.²⁹ We focused on literature that refers to their participants as women; however, we acknowledge the importance of HDP and risk of CVD among transgender, intersex, and non-binary people.

Clarifying clinical guidelines related to screening individuals with a history of HDP, increasing clinician and patient education about the future risks associated with HDP, and addressing patient- and clinician-level barriers to referral might improve cardiovascular risk assessment and referral practices.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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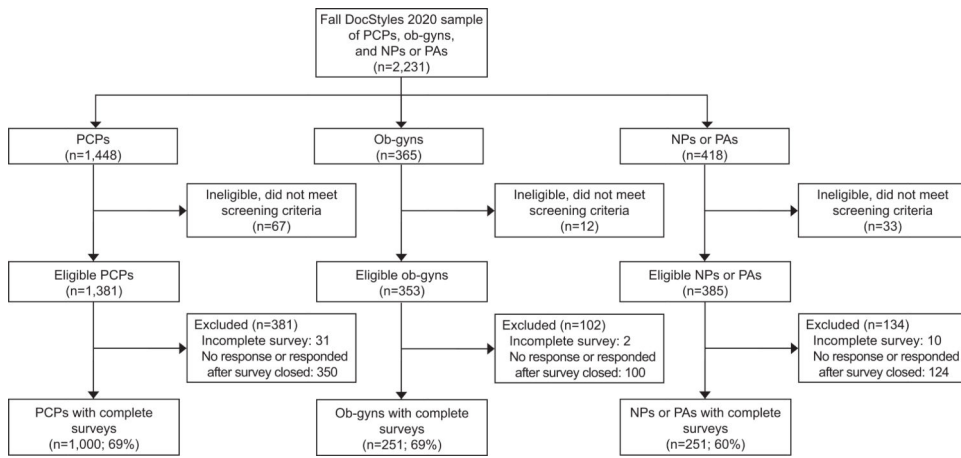


Figure 1. Fall DocStyles 2020 flowchart of participants. PCP, primary care physician; ob-gyn, obstetrician–gynecologist; NP, nurse practitioner; PA, physician assistant.

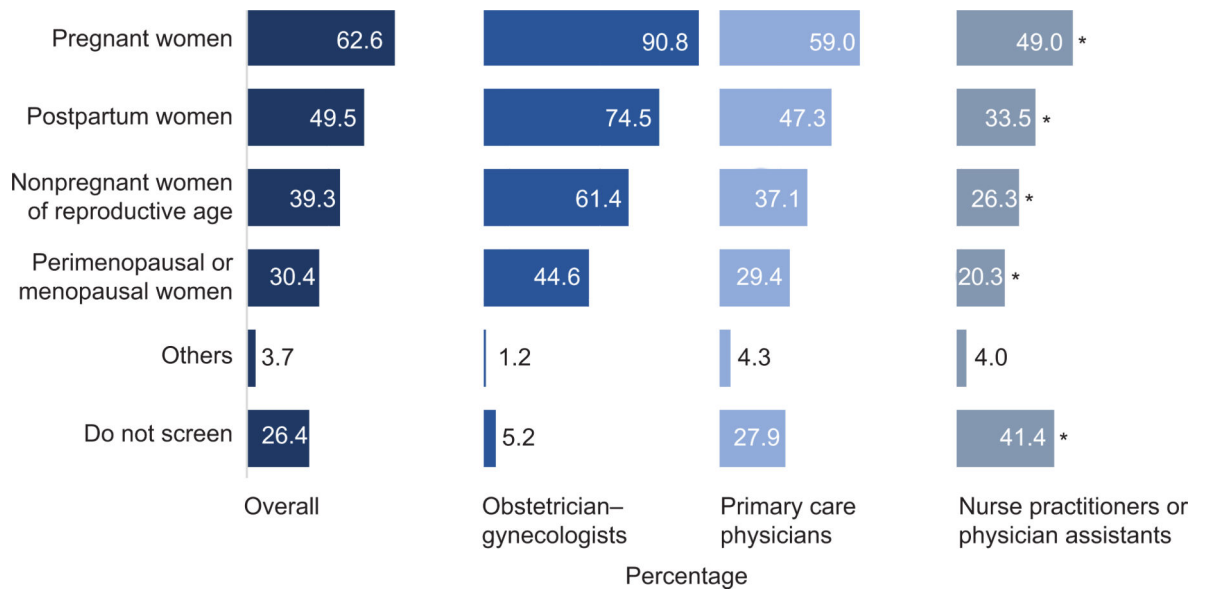


Figure 2. Screening for history of hypertensive disorders of pregnancy, by clinician type (n=1,502). **P*<.05. *P* values calculated for chi square tests of differences among the clinician types for each type of patient.

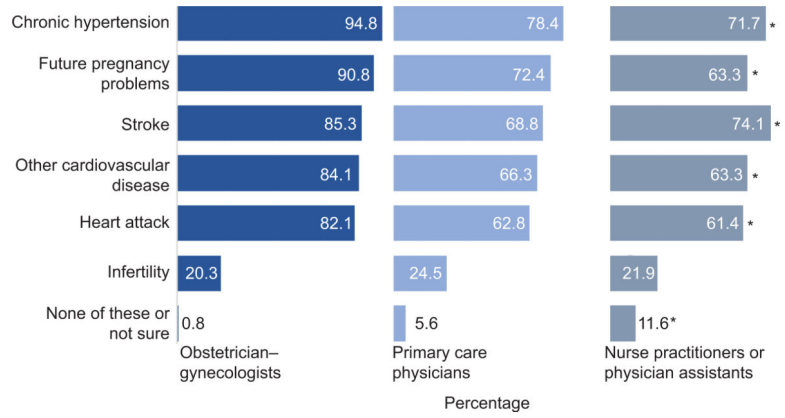


Figure 3. Clinician awareness of future risks associated with hypertensive disorders of pregnancy, by clinician type (n=1,502). **P*<.05. *P* values calculated for chi square tests of differences among the clinician types for each risk factor.

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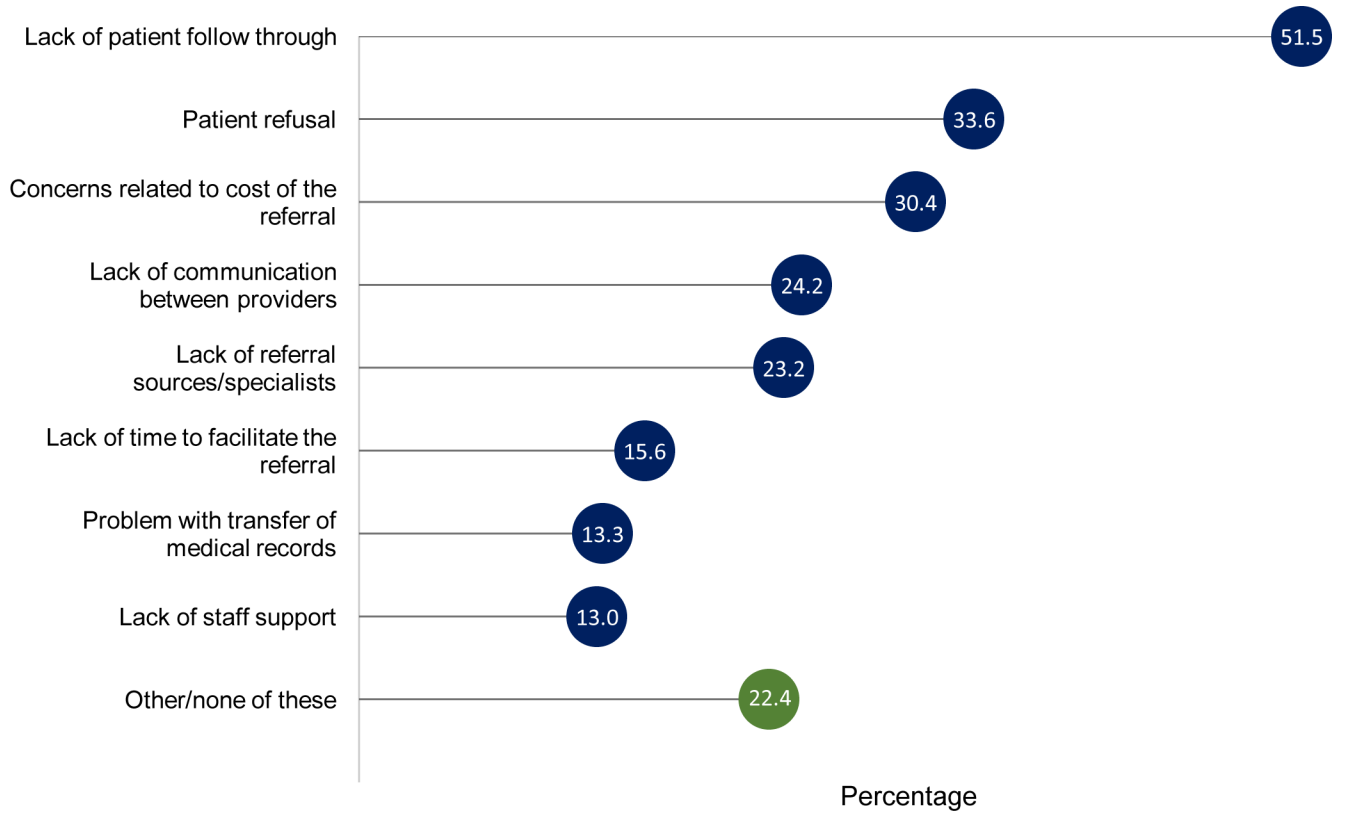


Figure 4. Barriers to referral for ongoing cardiovascular disease risk evaluation and monitoring for women of reproductive age at risk for future cardiovascular disease (n=1,502).

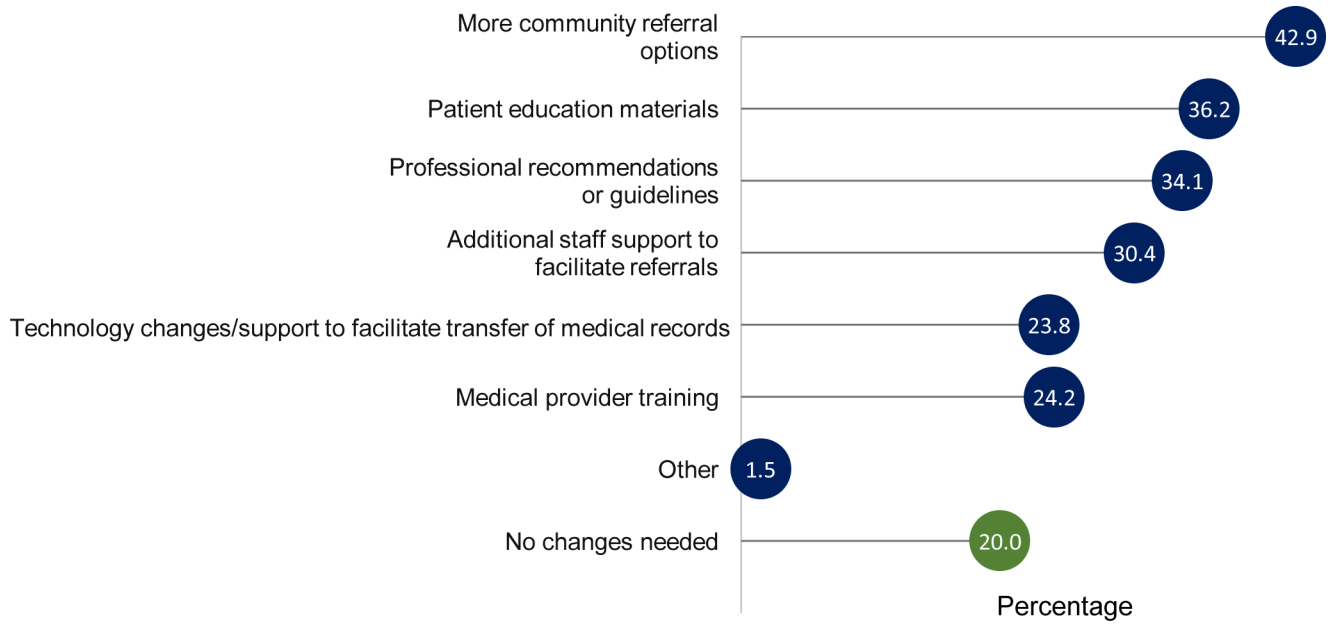


Figure 5. Resources needed to improve clinician ability to make referrals for women of reproductive age with history of hypertensive disorders of pregnancy (n=1,502).

Table 1.

Prevalence of Clinician and Practice Characteristics by Clinician Type*

Characteristics	Overall (n=1,502)		Primary Care Physicians [†] (n=1,000)		Obstetrician–Gynecologists (n=251)		Nurse Practitioners and Physician Assistants (n=251)	
	n	Percent	n	Percent	n	Percent	n	Percent
Age, years								
25–35	279	18.6	159	15.9	28	11.2	92	36.6
36–45	466	31.0	328	32.8	57	22.7	81	32.3
46–55	407	27.1	289	28.9	70	27.9	48	19.1
56+	350	23.3	224	22.4	96	28.2	30	11.9
Years in Practice								
3–10	516	34.4	331	33.1	54	21.5	131	52.2
11–20	534	35.6	384	38.4	75	29.9	75	29.9
21–48	452	30.1	285	28.5	122	48.6	45	17.9
Gender								
Female	605	40.3	301	30.1	116	46.2	188	74.9
Male	897	59.7	699	69.9	135	53.8	63	25.1
Approximate household income of majority of patients (dollars)								
<\$25,000	97	6.5	52	5.2	17	6.8	28	11.2
25,000–49,999	338	22.5	232	23.2	50	19.9	56	22.3
50,000–99,999	571	38.0	387	38.7	101	40.2	83	33.1
100,000–249,999	320	21.3	199	19.9	43	17.1	78	31.1
250,000	176	11.7	130	13.0	40	15.9	6	2.4
Geographical Region								
Northeast	335	22.3	221	22.1	61	24.3	53	21.1
Midwest	325	21.6	225	22.5	43	17.1	57	22.7
South	515	34.3	322	32.2	97	38.6	96	38.2
West	327	21.8	232	23.2	50	19.9	45	17.9
Clinician Location								
Urban	526	35.0	363	36.3	79	31.5	84	33.5
Suburban	792	52.7	522	52.2	146	58.2	124	49.4
Rural	184	12.3	115	11.5	26	10.4	43	17.1
Practice type								
Inpatient	211	14.0	147	14.7	27	10.8	37	14.7
Individual outpatient	278	18.5	168	16.8	50	19.9	60	23.9
Group outpatient	1,013	67.4	685	68.5	174	69.3	154	61.3
Practice size (# of practitioners)								
<5	509	33.9	335	33.5	89	35.5	85	33.9
5–14	568	37.8	368	36.8	105	41.8	95	37.8
15	425	28.3	297	29.7	57	22.7	71	28.3

Characteristics	Overall (n=1,502)		Primary Care Physicians [†] (n=1,000)		Obstetrician–Gynecologists (n=251)		Nurse Practitioners and Physician Assistants (n=251)	
	n	Percent	n	Percent	n	Percent	n	Percent
Patient volume (patients per week)								
<80	496	33.0	297	29.7	85	33.9	114	45.4
80–109	598	39.8	401	40.1	104	41.4	93	37.1
110	408	27.2	302	30.2	62	24.7	44	17.5

* Data source is the Fall DocStyles 2020 Survey (<https://styles.porternovelli.com/docstyles>). Clinician type differs by: age group, years in practice, gender, patient income, practice type, and patient volume (P<.05 for all comparisons). P values calculated for chi square tests.

[†] Defined as Family Practitioners or Internists.

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