

Vaccination Practices Among Obstetrician/ Gynecologists for Non-pregnant Patients



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Introduction: Many non-pregnant women see obstetrician-gynecologists as their sole source of medical care, yet little is known about vaccination practices of obstetrician-gynecologists for non-pregnant patients. The objectives were to assess, among a national sample of obstetrician-gynecologists, practices related to vaccine delivery in non-pregnant patients and factors associated with stocking and administering more than three different vaccines to non-pregnant patients.

Methods: E-mail and mail surveys were administered July–October 2015, with analyses performed during October–November 2015 and April–June 2018.

Results: The response rate was 73% (353/482). Human papillomavirus (92%); influenza (82%); and tetanus, diphtheria, acellular pertussis vaccines (50%) were the vaccines most commonly assessed, with the remaining vaccines assessed by <40% of respondents. Vaccines most commonly administered by obstetrician-gynecologists to non-pregnant patients included human papillomavirus (81%); influenza (70%); and tetanus, diphtheria, acellular pertussis (54%). The remaining vaccines were administered by <30% of obstetrician-gynecologists. Factors associated with routinely administering more than three vaccines to non-pregnant patients included working in a hospital-, public health-, or university-associated clinic (RR=1.87, 95% CI=1.35, 2.58, referent to private practice); a larger practice (more than five providers; RR=1.54, 95% CI=1.05, 2.27); perceiving fewer financial barriers (RR=0.74, 95% CI=0.57, 0.96); fewer practice-associated barriers (RR=0.71, 95% CI=0.55, 0.92); and greater patient barriers (RR=1.62, 95% CI=1.33, 1.98).

Conclusions: Human papillomavirus; influenza; and tetanus, diphtheria, acellular pertussis vaccines are the only vaccines routinely assessed and administered to non-pregnant patients by most obstetrician-gynecologists. Given their role as the sole source of care for many women, obstetrician-gynecologists could make a positive impact on the vaccination status of their non-pregnant patients.

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INTRODUCTION

The U.S. childhood vaccination program is often cited as one of the greatest public health achievements in history.¹ In the last few decades, there has been increasing recognition of the importance of adult vaccination in the prevention of infectious diseases, with expansion of recommendations for vaccination of adults. Twelve vaccines are now routinely recommended for adults depending on clinical circumstances.² However, uptake has been consistently suboptimal for essentially all adult vaccine recommendations.³

At the same time, the role of the obstetrician-gynecologist (OB/GYN) as a vaccination provider has expanded.⁴ Because both pregnant women and their young infants are at high risk for complications from influenza, and pertussis is most severe in newborns, vaccination of pregnant women with influenza and tetanus, diphtheria, acellular pertussis (Tdap) vaccines has become a priority, with the Advisory Committee on Immunization Practices and the American College of Obstetricians and Gynecologists (ACOG) both strongly recommending these vaccines in pregnancy.^{5,6} Uptake of these two vaccines among pregnant women, although not optimal, has increased significantly in the last several years, primarily because of OB/GYNs stocking and recommending these two vaccines.^{7–9}

A previous study reported immunization practices of OB/GYNs for their pregnant patients.¹⁰ For many OB/GYNs, though, the majority of their time is spent seeing non-pregnant patients, and many patients view their OB/GYN as their primary care provider.^{11–15} Because adult vaccination rates overall are low,³ every contact with a medical provider should be viewed as an opportunity to vaccinate.¹⁶ Among pregnant patients, the Centers for Disease Control and Prevention (CDC) reports have shown that if a woman does not receive a recommendation and an offer of vaccination from her obstetrical provider, she is much less likely to be vaccinated than a pregnant woman who receives both.⁷ The same is likely true for non-pregnant patients seen by these providers, particularly those women who do not have another source of care. For these reasons, ACOG recommends that all OB/GYNs integrate immunizations as a routine part of practice.⁴ Therefore, this study seeks to assess, among a national sample of OB/GYNs, (1) current practices related to assessment of vaccination status and vaccine delivery in non-pregnant patients; (2) overall importance of vaccination for pregnant versus non-pregnant patients; and (3) factors associated with stocking and administering more than three different vaccines to non-pregnant patients.

METHODS

Between July and October 2015, an Internet and mail survey was administered to a national network of OB/GYNs representative of ACOG membership. The human subjects review board at the University of Colorado Denver approved this study as exempt research not requiring written informed consent.

Study Population

This study was conducted by the Vaccine Policy Collaborative Initiative,¹⁷ a program designed collaboratively with CDC to perform rapid turnaround surveys to assess physician practices and attitudes about vaccine issues. As part of the Vaccine Policy Collaborative Initiative, a national network of OB/GYNs was developed by recruiting from ACOG membership. Quota sampling was conducted to ensure that network physicians were similar to ACOG membership with respect to region, urban versus rural location, and practice setting. Previously, it was demonstrated that survey responses from network physicians compared to those of physicians randomly sampled from American Medical Association physician databases had similar demographic characteristics, practice attributes, and attitudes about a range of vaccination issues.¹⁷ OB/GYNs who reported that they only cared for pregnant and post-partum patients were excluded from this study.

Measures

This survey was developed jointly with CDC with input from experts in vaccination and obstetrics and gynecology. The survey was pretested with a panel of six OB/GYNs and then piloted among 38 OB/GYNs from different regions of the country. Responses to questions regarding current practices for assessment of vaccination status, vaccine administration, and use of evidence-based strategies for increasing vaccination uptake were either *yes/no*, so that responders could respond *yes* to more than one question, or selections from a list of possible options, specifically asking about their practices for their non-pregnant patients. Questions about recording of vaccine information were asked about patients in general. Four-point Likert scales were used to assess overall importance of vaccination for both non-pregnant and, for comparison, pregnant patients (*not at all important to very important*). Practices regarding referral of patients for receipt of vaccines elsewhere were also asked using a 4-point scale (*never/rarely to always*). The survey instrument also contained questions regarding care of pregnant patients, which are reported elsewhere.¹⁰

Physicians were surveyed by the Internet or, if they preferred, by mail. A web-based program (Verint®, www.verint.com) was used to administer the Internet surveys, and mail surveys were sent by the U.S. Postal Service. The Internet group was sent an initial e-mail with up to eight e-mail reminders, and the mail group was sent an initial mailing and up to two mailed reminders. Internet survey nonrespondents were sent a cross-over mail survey in case of problems with e-mail. The mail protocol was patterned on Dillman's tailored design method.¹⁸

Statistical Analysis

Internet and mail surveys were pooled for analyses because other studies have found that physician attitudes are similar when

obtained by either method.¹⁹ Respondents were compared with nonrespondents on all available characteristics using Wilcoxon and chi-square analyses. Because almost all OB/GYNs administer human papillomavirus (HPV) vaccine and most administer influenza and Tdap vaccines to pregnant patients, to better understand which OB/GYNs have a more active vaccination program, physicians who reported administering more than three vaccines to non-pregnant women were compared with those who reported giving three or fewer. Independent variables included sex, age, practice setting, practice location, practice region, practice size, level of financial decision making (independently or at a system level), whether physicians were involved with decision making about purchasing vaccines, and perceived barriers. Perceived barriers to vaccination were previously reported.²⁰ Perceived barriers were evaluated and grouped using a Principal Component Analysis with varimax rotation. Groupings of barriers are shown in [Appendix Table 1](#) (available online). Factors were retained if their eigenvalue was ≥ 1 . A cut off of $p < 0.25$ was used for inclusion of independent variables in the model. The multivariable model used a backwards elimination procedure in which the least significant predictor in the model was eliminated sequentially. At each step, estimates were checked to make sure other variables were not affected by dropping the least significant variable. This resulted in retention of only those factors that were significant at $p < 0.05$ in the final model. Analyses were performed October to November 2015 and April to June 2018 using SAS software, version 9.4.

RESULTS

The response rate was 73% (353/482). After excluding respondents who reported seeing only pregnant and postpartum patients, the final analytic sample was $n=316$. Nine percent ($n=29$) of the study population reported they did not provide prenatal or obstetric care. Characteristics of respondents are shown in [Table 1](#). In the overall sample, respondents were more likely than nonrespondents to be female (70% vs 58%, $p=0.01$) and less likely to work in private practice (65% vs 77%, $p=0.03$).

Physicians were asked, regarding their non-pregnant patients, *When a patient is seen in your practice, who determines the need for vaccination?* Sixty percent reported it was the physician, 9% a medical assistant or licensed practicing nurse, 3% a registered nurse, and 3% an advanced care provider (nurse midwife, nurse practitioner, or physician assistant). Twenty-five percent of OB/GYNs reported no routine assessment of vaccination status for non-pregnant patients. There were multiple methods reported for assessing vaccination status, including checking their own medical records (76%); physician (70%) and staff (46%) asking the patient verbally; physician reviewing outside records (46%); asking patients using a standard questionnaire (46%); staff reviewing outside records (20%); and using an immunization information system (8%). Physicians reported routinely assessing vaccination status (other than

influenza) most often at initial visits (62%), followed by yearly routine visits (61%), with few (12%) assessing vaccination status at every visit. Physicians most commonly reported assessing vaccination status for HPV (92%); influenza (82%); and Tdap (50%) vaccines ([Figure 1](#)). Other vaccines were routinely assessed by <40% of physicians.

Table 1. Description of Responders ($n=316$)

Variable	Responder, % (n) (n=316)
Gender	
Male	29 (91)
Female	71 (223)
Setting	
Private practice	68 (214)
Hospital or clinic	23 (72)
HMO	9 (27)
Census location	
Urban	54 (170)
Suburban	43 (137)
Rural	3 (9)
Region	
Midwest	22 (68)
Northeast	20 (63)
South	36 (113)
West	23 (72)
Decision-making	
Independent	58 (184)
Larger system level	42 (131)
Age, years, M (SD) / median	48.7 (10.7) / 49
Number of providers, M (SD) / median	13.4 (26.6) / 7
Proportion of patient population aged <19 years	
0–9%	64
10%–24%	31
$\geq 25\%$	5
Proportion of patient population aged 19–49 years	
0%–9%	0
10%–24%	8
$\geq 25\%$	92
Proportion of patient population aged 50–64 years	
0%–9%	11
10%–24%	38
$\geq 25\%$	51
Proportion of patient population aged ≥ 65 years	
0%–9%	52
10%–24%	41
$\geq 25\%$	7

Physicians reported a variety of ways of recording vaccine information. Few reported recording vaccine information received either in the office (13%) or outside the office (10%) in an immunization information system. For vaccines received outside of the office, the most common method of recording information was in a progress note in an electronic medical record/electronic health record (68%), followed by a summary sheet in the electronic medical record/electronic health record (62%); progress notes in a paper-based record (19%); and a summary sheet in a paper-based record (12%). Ten percent reported not recording this information anywhere.

Vaccines most commonly administered to non-pregnant patients include HPV (81%); influenza (70%); and Tdap (54%; Figure 1). Other vaccines were administered by <30% of OB/GYNs. In cases where a patient is identified as eligible for a vaccine that the practice does not stock, most physicians reported always (23%) or often (47%) referring them to another primary care site to receive the vaccine, with fewer referring to a public health department (10% always, 29% often) or a pharmacy (5% always, 18% often).

Regarding use of evidence-based strategies for increasing vaccination uptake among non-pregnant patients, the majority of OB/GYNs (51%) reported using standing orders for influenza vaccine although only 37% reported doing so for the Tdap vaccine. Forty percent reported using standing orders for all other CDC/ACOG-recommended vaccines and 28% for some but not all other recommended vaccines (32% reported not using standing orders for any other vaccines). The only other strategy commonly used was electronic clinical decision support systems for determining vaccination need (38%) with few reporting use of paper-based clinical decision support tools (10%) or reminder/recall (9%).

Physicians were asked, *For [non-pregnant or pregnant] patients, how important are vaccines as a part of overall care?* For non-pregnant patients, 36% responded *very important*, 47% *somewhat important*, 16% *not very important*, and 2% *not at all important*. By contrast, for pregnant patients, 88% responded *very important* and 11% *somewhat important*.

Of the 100 respondents who reported giving more than three vaccines in their practice, 93% reported giving Tdap, influenza, and HPV in addition to other vaccines.

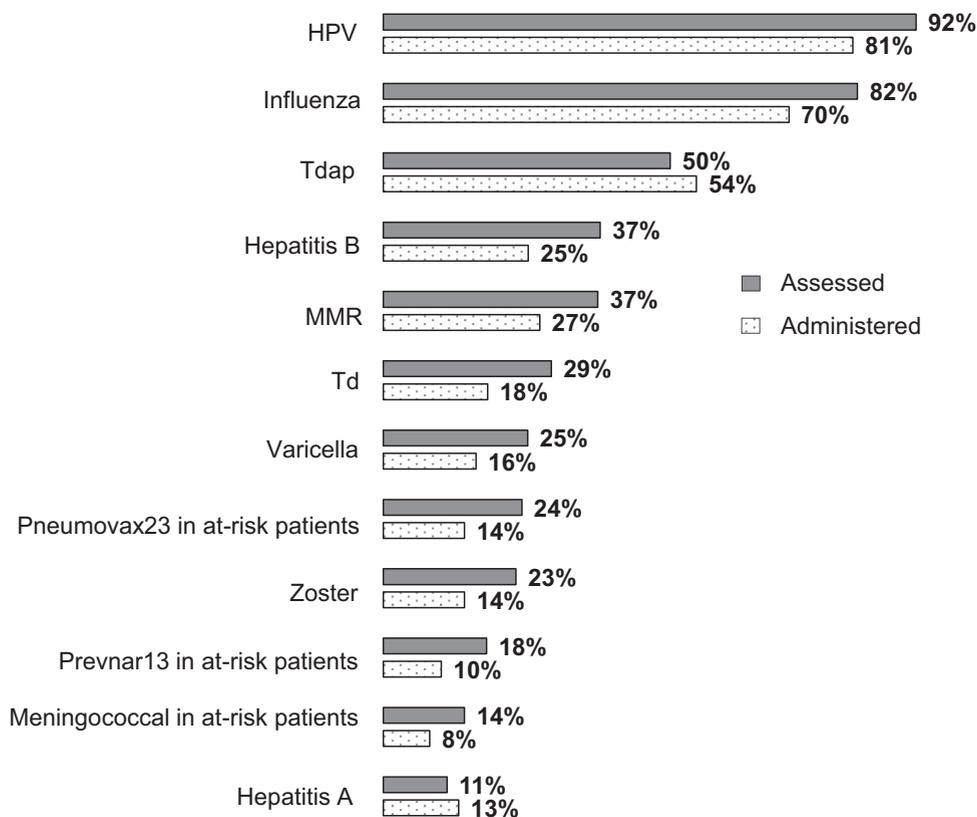


Figure 1. Vaccinations routinely assessed and administered for non-pregnant patients among obstetrician-gynecologists ($n=316$). Tdap, tetanus, diphtheria, and pertussis vaccine; MMR, measles, mumps, and rubella vaccine; HPV, human papillomavirus vaccine; Td, tetanus and diphtheria vaccine.

In bivariate analysis, associations with stocking and administering more than three vaccines included working in a hospital-, public health-, or university-associated clinic; practicing in the Midwest; working in a setting where decisions regarding vaccine purchase are made at a system level, and working in a larger practice (more than five; Table 2). Barrier-related associations

included decreasing perception of financial and practice-associated barriers and increasing perception of patient barriers. After adjustment, working in a hospital-, public health-, or university-associated clinic (RR=1.87, 95% CI=1.35, 2.58, referent to private practice); working in a larger practice (RR=1.54, 95% CI=1.05, 2.27); and perceiving fewer financial barriers (RR=0.74, 95% CI=0.57,

Table 2. Factors Associated With Giving >3 Vaccines to Non-pregnant Patients Among Obstetrician-Gynecologists (n=287 With Non-missing Outcome)

Variable	Gives 0–3 vaccines, % (n=100 [35%])	Gives ≥4 vaccines, % (n=187 [65%])	Biv p-value	Biv RR (95% CI)	MV RR (95% CI)
Provider gender			0.96		
Male	29	29		0.99 (0.69, 1.41)	
Female	71	71		ref	
Provider age in years			0.79		
30–40	28	30		1.11 (0.75, 1.65)	
41–55	43	39		ref	
≥56	29	32		1.13 (0.77, 1.66)	
Setting			<0.0001		
Private practice	76	48		ref	ref
Hospital/clinic/PH/Univ	16	40		2.28 (1.66, 3.13)	1.87 (1.35, 2.58)
HMO	9	11		1.60 (0.96, 2.69)	1.10 (0.65, 1.86)
Practice location			0.62		
Urban, inner city	55	52		ref	
Urban, non-inner/rural ^a	45	48		1.08 (0.79, 1.49)	
Region			0.03		
Midwest	18	28		1.71 (1.12, 2.61)	
Northeast	21	16		1.10 (0.65, 1.86)	
South	40	27		ref	
West	21	29		0.61 (1.05, 2.46)	
Decisions made			<0.0001		
Independently	67	40		ref	
At a larger system level	33	60		2.01 (1.45, 2.79)	
Number of providers			<0.0001		
≤5	51	24		ref	ref
≥6	49	76		2.20 (1.49, 3.27)	1.54 (1.05, 2.27)
Who usually makes decisions about vaccine purchase for your practice?			0.28		
Physician involved	63	56		ref	
Administrator/pharmacist/other	37	44		1.19 (0.87, 1.63)	
Percent of patient population aged 50–64 or ≥65 years			0.89		
0%–24%	48	49		ref	
≥25%	52	51		0.98 (0.70, 1.36)	
Factor 1 Finance (per point), M (SD)	1.6 (0.8)	1.0 (0.8)	<0.0001	0.60 (0.50, 0.72)	0.74 (0.57, 0.96)
Factor 2 Patient (per point), M (SD)	1.2 (0.7)	1.5 (0.8)	0.003	1.38 (1.13, 1.68)	1.62 (1.33, 1.98)
Factor 3 Practice (per point), M (SD)	1.4 (0.9)	0.8 (0.7)	<0.0001	0.59 (0.49, 0.73)	0.71 (0.55, 0.92)
Factor 4 Visit (per point), M (SD)	1.4 (0.7)	1.3 (0.7)	0.12	0.85 (0.68, 1.05)	

Note: Factor 1: alpha=0.88; Factor 2: alpha=0.88; Factor 3: alpha=0.79; Factor 4: alpha=0.65.

^aRural combined with urban/non-inner city as there were only 7 total rural providers.

Biv, bivariate; MV, multivariable; PH, public health; Univ, university.

0.96, per point); fewer practice-associated barriers (RR=0.71, 95% CI=0.55, 0.92, per point); and greater patient barriers (RR=1.62, 95% CI=1.33, 1.98, per point) were associated with giving more than three vaccines to non-pregnant patients.

DISCUSSION

This study reports the results of a national survey among OB/GYNs regarding their immunization practices for their non-pregnant patients. For certain vaccines, such as HPV, influenza, and Tdap, many providers report assessing and administering these to their non-pregnant population. Beyond these three, however, both assessment and delivery of recommended vaccines falls off, particularly for vaccines traditionally only given to the elderly, such as pneumococcal polysaccharide and zoster vaccines, and vaccines recommended for adults only in certain circumstances, such as meningococcal vaccines, hepatitis A and B vaccines, and *Haemophilus influenzae* type b vaccine. A minority also provide indicated vaccines for healthy adults who have not previously received them, such as measles, mumps, and rubella and varicella.

It may not be surprising that OB/GYNs most commonly assess for and administer HPV vaccine, because the impact of HPV disease is so salient to these providers. However, this vaccine is indicated for a limited subset of their patient populations—those younger than 27 years who have not previously received it. Although the burden of HPV disease is high,²¹ so too is the burden of diseases like pneumococcal and hepatitis B disease.²² These vaccines would also be indicated for certain subsets of OB/GYNs' patient populations, yet few administer them, suggesting that an OB/GYN's decision to stock and administer vaccines is influenced by more than just the burden of disease. It is also not an eligibility issue, as the majority of respondents reported sizable patient populations aged more than 50 years. Certainly, as these data show, some providers refer their patients to other sites for vaccination, most often primary care providers, when they determine a vaccine is needed. However, for routinely recommended vaccines in the adult immunization schedule, most providers are not even assessing vaccination status.

For the vaccines OB/GYNs administer to non-pregnant patients, it is not clear from this study to what degree vaccinating this population is a priority. For example, many providers report not using evidence-based strategies to increase vaccination uptake, such as standing orders or clinical decision support (provider prompts) for influenza or Tdap vaccines, even though they administer influenza and Tdap vaccines to non-pregnant patients. Indeed, only 36% of OB/GYNs

reported that vaccines are very important in the care they provide to their non-pregnant patients. Contrast this with the degree of importance they place on vaccinating pregnant patients, with 88% reporting it as very important. Although many of the providers report that they administer Tdap and influenza vaccines to their non-pregnant populations, future work should examine the degree to which this is consistently happening in OB/GYN practices.

A concerning finding was that relatively few providers offer measles, mumps, and rubella vaccine, and even fewer, varicella vaccine. Many do not even assess vaccination status for these vaccines. It is important that women be up-to-date for these vaccines (or immune to these diseases) prior to pregnancy, as these vaccines are contraindicated in pregnancy, and varicella and particularly rubella carry substantial risks to a developing fetus.²³ Although some OB/GYNs may view these vaccines as post-partum vaccines given to susceptible women, it is important to remember the need to assess vaccination status even prior to pregnancy. Fortunately, because of high compliance with the childhood vaccination schedule, rubella is currently eliminated from the U.S.,²⁴ and varicella is much less common than it once was.²⁵ However, as evidenced by recent outbreaks where measles was introduced into communities with poor vaccination coverage,²⁶ it is conceivable that outbreaks of rubella may not be far behind if vaccination coverage falls too low.

It is not surprising that OB/GYNs who work in larger practices and are affiliated with hospital systems are more likely to give four or more vaccines, as shown in the multivariable analysis, because both of these situations offer economies of scale that make vaccine purchasing easier. This may also explain the finding regarding perceived financial and practice-associated barriers: providers who stock more vaccines perceive fewer of these barriers. It may also be that getting started stocking a new vaccine is difficult, but once incorporated into routine practice, barriers decrease. On the other hand, the perception of patient barriers was higher among those giving more vaccines, likely representing experience with patient barriers to vaccination.

It is important to note that this study was conceived in the context of vaccination. OB/GYNs have many competing demands and their primary focus is reproductive health. As such, placing greater emphasis on vaccination of non-pregnant patients could take away from other priorities. To address this, promotion of team-based care for provision of vaccinations in this setting could offer a solution, so that responsibility for vaccination is taken out of the provider's hands. Such team-based care has been shown to achieve high vaccination rates in the OB/GYN setting in a large safety-net system.²⁷

Limitations

This study has limitations. Respondents may have differed from nonrespondents. Also, questions about administering vaccines to non-pregnant patients were asked as simple yes/no questions, so it is impossible to assess how frequently these vaccines are given. For example, OB/GYNs may prioritize pregnant patients for influenza vaccine, and it is only given to non-pregnant patients if there is vaccine left over at the end of the season. Providers were also not asked to answer questions in the context of whether they knew a patient had a primary care provider. OB/GYNs who know they are a patient's sole source of care may make greater efforts to provide vaccinations. Also, although the study offers some data regarding the reported ages of the respondents' patient population, there are not data regarding the proportions of this population that were non-pregnant. Finally, this study reflects reported practice; actual practice was not observed.

CONCLUSIONS

There are some important implications to this study. First, for women whose OB/GYN is their sole source of care, these providers and their staff represent the best chance for them to be vaccinated. The precise proportion of women who use their OB/GYN as their sole source of care is unclear, as estimates vary depending on the source of data, but most estimates are more than 20% of women,^{11–15} and these women may be disproportionately from underserved populations.¹³ In one estimate based on the National Health Interview Survey, among American women aged 18–64 years who had seen a physician in the prior year, 62% saw only a gynecologist.²⁸ Thus, whatever the actual proportion, this represents an important population to consider in the context of vaccination. Second, it is clear that OB/GYNs prioritize their pregnant population for vaccination despite the fact that their professional society, ACOG, recommends they take every opportunity to vaccinate their entire patient population and has developed extensive resources to increase the likelihood that they will do so.²⁹ Moving this needle may take a paradigm shift in the way all adult vaccinations are delivered. For example, even many internists, who see older and chronically ill adult patients, do not routinely stock and administer many adult vaccines.³⁰ To optimize protection of the U.S. population from preventable infectious diseases, barriers to adult immunization in general must be addressed, while at the same time continuing to foster and sustain efforts to promote a culture of vaccination within OB/GYN practices.

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All authors conceptualized and designed the study, participated in data acquisition and analysis and interpretation of the data, and gave final approval of the submitted manuscript. O'Leary drafted the manuscript; all remaining authors revised the manuscript for intellectual content.

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SUPPLEMENTAL MATERIAL

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