
Obstetrician–Gynecologists’ Practices and Perceived Knowledge Regarding Immunization

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Background: Obstetrician–gynecologists can play a key role in providing appropriate vaccinations to women of childbearing age.

Purpose: This study investigated immunization knowledge and practices, and opinions concerning potential barriers to immunization, among obstetrician–gynecologists.

Methods: In 2007, surveys were sent to Collaborative Ambulatory Research Network members, a representative sample of practicing Fellows of the American College of Obstetricians and Gynecologists; 394 responded (51.2%). Data analysis was completed in 2008.

Results: Most responding obstetrician–gynecologists disagreed that “routine screening for vaccine-preventable diseases falls outside of the routine practice of an ob/gyn.” A majority (78.7%) stock and administer at least some vaccines. Among those who stock vaccines, 91.0% stock the human papillomavirus vaccine, and 66.8% stock the influenza vaccine. All other vaccines were stocked by <30% of practices that stock vaccines. A majority of physicians agreed that financial factors (e.g., inadequate reimbursement) were barriers to vaccine administration. Most were aware that the influenza (89.8%); hepatitis B (64.0%); and tetanus, diphtheria, pertussis (58.6%) vaccines are safe to administer during pregnancy, and that the measles, mumps, rubella (97.5%); and varicella (92.9%) vaccines are not. Most (84.5%) were in concordance with recommendations that all pregnant women should receive the influenza vaccine. A majority believed their immunization training was less than adequate and believed their practice would benefit from continuing medical education courses.

Conclusions: Immunization is an important part of women’s health care and has been, at least partially, incorporated into obstetrician–gynecologist practice. Financial burdens and knowledge regarding vaccine recommendations remain barriers to vaccine administration. Additional training and professional information may benefit obstetric–gynecologic practice. (Am J Prev Med 2009;37(3):231–234) © 2009 American Journal of Preventive Medicine

Introduction

Vaccines have been a public health success. In the U.S., morbidity for nine diseases for which universal childhood immunization is recommended has decreased by 95%–100%.¹ The use of vaccines is not without controversy, however. There are active anti-vaccine movements.^{2,3} A notable minority of parents are requesting vaccine exemptions for their children, with public health consequences. A recent

upsurge in measles cases in the U.S. occurred predominantly in unvaccinated individuals.⁴ The incidence of pertussis is highest in states that more easily grant exemptions.⁵

The CDC has suggested that women of childbearing age should receive a risk assessment of infectious diseases and appropriate vaccinations.⁶ Obstetrician–gynecologists can and should play a key role in this effort. For example, influenza infections produce a disproportionate morbidity and mortality among pregnant women. Disconcertingly, only 13% of pregnant women received the influenza vaccine in 2003.⁷ Previous studies⁸ have shown that obstetrician–gynecologists perceive that providing vaccinations is part of their clinical responsibilities. However, obstetrician–gynecologists do not appear to incorporate immunization into routine patient care; less than half screen patients for vaccination status, and few provide the full complement of vaccines appropriate for pregnant women. Potential

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barriers include inadequate training in the provision of vaccinations and the costs of obtaining and storing vaccines.⁹ In this study, an assessment was made of respondents' vaccination practices and knowledge, and potential barriers to providing immunizations.

Methods

Surveys were designed and pilot-tested within the Department of Obstetrics and Gynecology at the University of Louisville in Kentucky. Survey mailings were sent in June 2007 with up to three reminder mailings, ending in October 2007. Participants were 769 members of the Collaborative Ambulatory Research Network (CARN), practicing members of the American College of Obstetricians and Gynecologists (ACOG). ACOG members make up at least 90% of the practicing obstetricians and gynecologists in the U.S. The ACOG Research Department actively manages CARN membership in order to maintain demographic similarity between CARN and ACOG Fellows as a whole. Several surveys per year include both CARN and non-CARN ACOG Fellows as participants.^{10,11} Over the past 14 years, differences in responses between CARN and non-CARN Fellows have been rare and usually of little consequence.

The survey was approved by the IRB of the University of Louisville. Question topics included demographic characteristics, practice regarding specific vaccines (Table 1), opinions of immunization education, which vaccines are safe to administer during pregnancy, and perceived barriers to vaccine administration.

Data Analysis

Data analysis was completed in 2008. Descriptive and frequency data were computed for primary analysis. Analyses were done using chi-square tests. Significance was evaluated at $p < 0.05$. Principal component analysis with varimax rotation was used to construct categories of perceived barriers to vaccine administration. Ten survey items (all with 5-point scales from strongly agree to strongly disagree) were extracted; components with eigen values > 1 were selected. ANCOVA was used to examine the relationships among

perceived barrier components and the number of vaccines offered by physicians.

Results

Demographics

A total of 394 surveys were returned (response rate of 51.2%). There was no evidence of participation bias. Men (50.1%) and women (52.4%) did not differ in their response rates ($p = 0.527$); there was no difference in the year of birth between responders (median = 1958) and nonresponders (median = 1960; $p = 0.207$). The median age of responders and the proportion of women did not differ across the four mailings; neither did the mean number of vaccinations offered, nor the physicians' opinions regarding whether vaccinations were outside of their usual practice ($p > 0.1$).

Vaccine Administration

A majority (78.7%) responded that they stock and administer at least one vaccine. The most common vaccines administered were human papillomavirus (HPV) and influenza (Table 1). Individuals who provide primary care were more likely to administer vaccines (85.5% vs 75.4%, $p = 0.015$). Of the immunizations of particular importance to pregnant women, physicians who provide primary care were more likely to administer influenza (61.4% vs 48.2%, $p = 0.009$); tetanus, diphtheria, pertussis (Tdap; 29.5% vs 14.0%, $p < 0.001$); and measles, mumps, rubella (MMR; 26.5% vs 14.0%, $p = 0.002$), but they were not significantly more likely to administer varicella (15.7% vs 10.5%, $p = 0.130$). Although female physicians were not more likely to provide primary care ($p = 0.404$), they were more likely to administer vaccines (85.0% vs 74.4%, $p = 0.009$). Providing primary care was a significant factor in administering vaccines among female physicians (92.3% vs 80.0%, $p = 0.019$) but not among men (79.1% vs 70.6%, $p = 0.181$). Women who provide primary care were more likely to provide vaccines than were men who provide primary care ($p = 0.017$).

Regarding the statement: *Routine screening for vaccine-preventable diseases falls outside of the routine practice of an ob/gyn*, most respondents either disagreed (40.9%) or strongly disagreed (24.6%). Those who agreed were less likely to administer vaccines (73.2% vs 81.5%, $p = 0.045$). A majority indicated that access to free or low-cost vaccines (75.4%) and to informational material for patients (65.1%) would be helpful.

Training

Obstetrician-gynecologists primarily reported that their immunization training during medical school and residency was barely adequate (39.8% and 34.9%, respectively). Most physicians (86.2%) indicated that their practice would benefit from continuing medical education

Table 1. Administration rates of specific vaccines among those who administer vaccines ($n = 310$)

Immunization	Those who administer this type of vaccine as a % of those who administer vaccines	Number of administrations per month (M [SD])
HPV	91.0	20.6 (28.0)
Influenza	66.8	30.07 (31.19)
Tdap	29.9	8.78 (11.50)
MMR	28.1	4.25 (5.05)
Varicella	19.1	5.16 (8.15)
Pneumococcal	14.3	1.90 (2.59)
HAV	11.0	2.06 (3.24)
Herpes zoster	8.5	3.09 (5.75)
Meningococcal	7.3	0.71 (0.76)

HAV, hepatitis A; HPV, human papillomavirus; MMR, measles, mumps, rubella; Tdap, tetanus, diphtheria, pertussis

on immunization; a majority indicated that educational tools for clinicians and patient educational materials should be a priority of ACOG (79.6% for both).

Knowledge

Most responding physicians were aware that the influenza (89.8%); hepatitis B (64.0%); and Tdap (58.6%) vaccines are safe to administer during pregnancy, and that MMR (97.5%) and varicella (92.9%) are not. Those physicians that agreed or strongly agreed with the statement: *We still do not know enough about the effects of vaccines on the fetus to administer them safely in pregnancy* were significantly less likely to consider influenza (83.2%, $p=0.013$); hepatitis B (50.4%, $p=0.001$); and Tdap (43.2%, $p=0.001$) vaccines safe to administer during pregnancy. Most responding physicians (84.5%) were in concordance with CDC and ACOG recommendations that all pregnant women receive the influenza vaccine; those physicians were more likely to stock the influenza vaccine (57.7% vs 32.8%, $p=0.001$).

Barriers

Barriers to vaccine administration can be factored into three categories: financial, not usual practice, and safety concerns (Table 2). Financial barriers include inadequate reimbursement and high costs of ordering vaccines and of storing and maintaining an inventory of vaccines. The most common form of reimbursement reported was insurance claims submitted and paid (59.6%), followed by payment by the patient (40.6%). More than one in four physicians (26.6%) reported that they have submitted insurance claims but were not paid. About one in five physicians (18.3%) did not know how they were reimbursed for vaccine administration.

The second factor, which is vaccination not being a usual practice, was defined by four survey items (Table 2); however, of those, only *Patient demand for vaccines in my practice is low* was agreed to by a majority of responding physicians. The third factor, safety concerns, was

defined by the statement: *We still do not know enough about the effects of vaccines on the fetus to administer them safely in pregnancy*. About one in three responding physicians agreed. Those that agreed, on average, administered fewer vaccines from the list provided (1.1 ± 0.1 vs 1.5 ± 0.1 , $p=0.014$).

Of the original ten survey items, only eight contributed significantly to these factors. The two excluded items were: *Availability of vaccines is a barrier* and *Routine screening for vaccine preventable diseases falls outside of the routine practice of an ob/gyn*. In an ANCOVA model of the number of vaccines offered by a practice, with gender and the provision of primary care as dichotomous factors, all three barrier categories were significant covariates ($p<0.001$). Providing primary care was a significant factor ($p<0.001$); gender was not ($p=0.195$).

Discussion

These data indicate that a majority of obstetrician-gynecologists provide at least some vaccines in their practice. The HPV and influenza vaccines in particular appear to have become well established (Table 1).

The financial burden of ordering and storing vaccines, as well as inadequate and occasional lack of reimbursement for vaccinations, were perceived as major impediments. A greater proportion of physicians agreed that there was a financial burden to administering vaccines than has been found previously,^{8,9} indicating that concerns regarding cost may be increasing. In addition, obstetrician-gynecologists' belief that they are inadequately trained may be a barrier to the implementation of immunization in their practice. A majority of physicians responded that they would benefit from continuing medical education courses and other educational materials for physicians and patients.

There are limitations to the study presented here. All surveys were filled out retrospectively, potentially subjecting responses to errors of recall. Also, these data are self-reported and could not be checked through chart

Table 2. The three primary categories of barriers to vaccine administration, as determined by principal component analysis

Vaccine administration barrier category	Financial component	Not usual practice component	Safety concerns component	Agreed or strongly agreed (%)
Financial				
The up-front costs of ordering vaccines are too high	0.900	0.097	0.051	55.8
Storing and maintaining vaccine inventory costs too much	0.854	0.135	-0.107	55.0
Inadequate reimbursement	0.807	-0.045	0.164	59.5
Not usual practice				
Giving vaccines is not part of my usual patient-care activities	0.016	0.782	0.223	43.2
Not comfortable with vaccine administration	0.174	0.759	-0.108	8.5
Uncertain of current recommendations	0.053	0.744	-0.142	13.6
Patient demand for vaccines in my practice is low	-0.031	0.644	0.283	55.2
Safety concerns				
We still do not know enough about the effects of vaccines on the fetus to administer them safely in pregnancy	0.083	0.069	0.909	32.1

review or other methods. Finally, CARN members are a self-selected group within ACOG. The ACOG Research Department actively manages CARN membership by sending out periodic invitations to selected physicians based on age, gender, and geographic location. Several surveys per year include both CARN and non-CARN ACOG Fellows as participants.^{10,11} Over the past 14 years, differences in responses between CARN and non-CARN Fellows have been rare and usually of little consequence. Still, it is possible that CARN members differ from general ACOG Fellows in their knowledge and practice regarding vaccination.

Vaccine-preventable infections remain a significant health concern for mothers and their infants.⁹ Although this study found that obstetrician-gynecologists have incorporated some vaccines into practice, most notably HPV and influenza, barriers to providing immunizations remain. Strategies that provide increased training and more reliable reimbursement may increase vaccination practices for obstetrician-gynecologists.

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