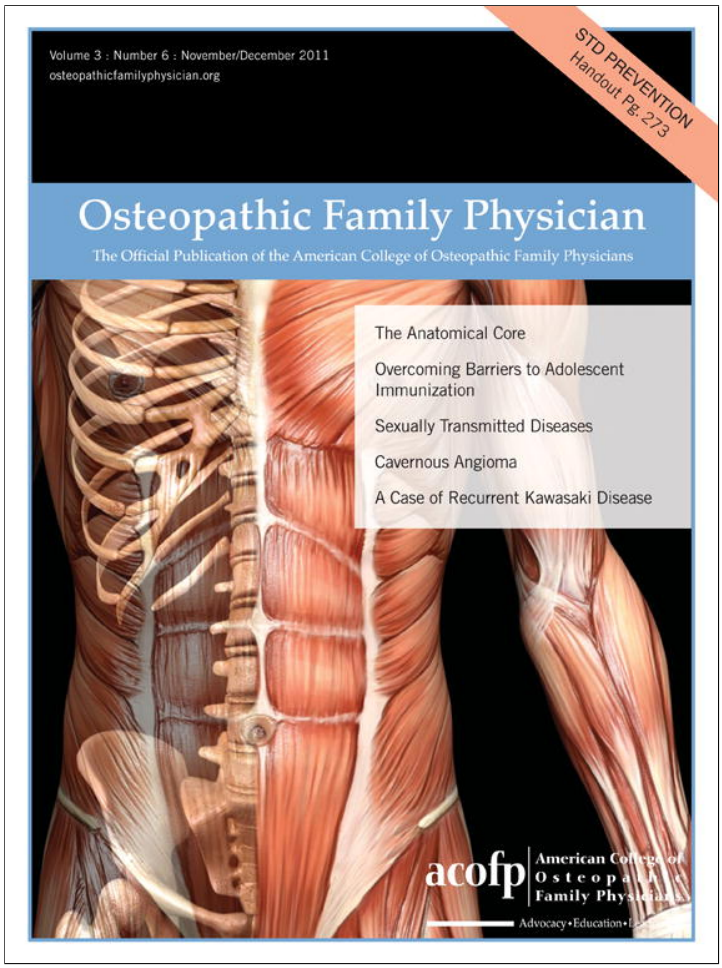

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Overcoming barriers to adolescent immunization: a survey of family practice providers

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Environmental, economic, and insurance barriers;
Osteopathic primary care physicians

The purpose of this study was to determine whether the influence of environmental, economic, and insurance barriers affect the immunization process for adolescents. The study attempted to determine whether physician knowledge was positively associated with the implementation of vaccinations to adolescent patients. This study used a mixed methods through the gathering of data via a survey that included both qualitative and quantitative components. Study respondents were recruited from a generated list of primary care physicians obtained through the Ohio Osteopathic Association; 232 physicians participated in this study. The survey questions assessed current practices and beliefs regarding immunizations as well as their attitude toward vaccination. Data measured included frequency of response; the categorical variables were compared using a chi-square method of statistical analysis. Statistical significance was set at $p < 0.05$. The study concluded that physician knowledge, skepticism, and belief barriers may be responsible for the decreased immunization rates. Further research is necessary to identify specific barriers to adolescents receiving vaccinations.

Immunization is among the most successful and cost-effective public health interventions.[1] The Centers for Disease Control and Prevention (CDC) state that immunization programs have led to the eradication of smallpox as well as the elimination of measles and poliomyelitis in many regions of the world.[2] Substantial reductions in morbidity and mortality attributed to diphtheria, tetanus, and pertussis have been proven.[1] In 2003, the World Health Organization estimates that 2 million child deaths were prevented by vaccinations alone.[1]

Although routine adolescent immunizations have been recommended since 1996, an estimated 35 million adolescents (i.e., persons 11-21 years of age, as defined by the American Medical Association and the American Academy of Pediatrics) lack one or more recommended vaccinations.[3]

Despite the availability of a safe and effective vaccine against measles, globally 614,000 measles-related deaths were estimated to have occurred in 2002.[4] Measles was a leading cause of childhood death in 2002 throughout the world. To achieve a high level of population immunity, it is necessary that control programs sustain at least 90% coverage with the first dose of measles vaccine.[4] Research supports that many immunizations fall short of immunity because the second vaccine opportunity, or booster, is often missed.[4] These added vaccination opportunities often are required during the adolescent years. Adolescent immunization rates continue to remain low, despite the success of pediatric vaccination programs.

Research shows that provider attitude and lack of recommendation are strong predictors of vaccination.[5] In a

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CDC study, provider attitude appeared to be the most significant variable influencing vaccination.[6] Interpersonal and clinical issues are the primary barriers of human papillomavirus vaccination in the United States.[7] Additional barriers to vaccination included lack of reimbursement, patients' out-of-pocket expense, and high up-front cost of vaccines.

Human papillomavirus is the most common sexually transmitted disease in the United States and the predominant cause of cervical cancer and genital warts.[7] Cardarelli reports that only 10% of females 18 to 26 years of age have received at least one dose of this vaccine. Influenza is another example of a vaccine-preventable disease.

The CDC reports that only 25% of eligible adolescents have received three doses of HPV vaccine and that 40.6% of adolescents have received just one dose of HPV vaccine in Ohio.

In addition, the survey showed that 67.7% and 50.2% of teens have received one dose of tetanus toxoid-diphtheria vaccine (Td) or tetanus toxoid, reduced diphtheria toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) since the age of 10 in Ohio.

As a result of decreased vaccination rates across the United States, research is necessary on this health promotion issue to identify specific barriers to vaccination for adolescents and adults. Research shows that provider attitude and lack of recommendation are strong predictors of vaccination.[5] In a CDC study, provider attitude appeared to be the most significant variable influencing vaccination.[6] Interpersonal and clinical issues are the primary barriers toward human papillomavirus vaccination in the United States.[7]

An expert panel of the Infectious Diseases Society of America has prepared updated, evidence-based guidelines for the immunization of infants, children, adolescents, and adults.[8] The now universal recommendations include hepatitis A vaccine to be administered to all children 6 months through 18 years. The adolescent schedule includes a second dose of varicella and has been expanded to accommodate many of the newer recommendations.

It has been found that there is a positive relationship between reimbursement rates for immunizations and immunization rates.[9] According to Hainer, the high cost of vaccines and inadequate reimbursement can limit the ability of some practices to offer them. Cost has been shown to be a barrier regarding availability of immunizations should they affect negatively toward the practice.

Coverage and reimbursement influences the decisions of providers participating in the immunization process. In addition, there are many factors influencing the coverage of the health insurance plans. Data suggest that although health plan coverage for ACIP-recommended vaccines is high, coverage for all vaccines is not universal in all of the products being offered.[10]

The purpose of this study was to determine whether the influence of environmental, economic, and insurance barriers affect the immunization process for adolescent patients. The study attempted to determine whether physician knowledge was positively associated with the implementation of vaccinations to adolescent patients in primary care practices. This study involved the use of mixed methods through the gathering of data via a survey that included both qualitative and quantitative components. Participants were recruited from Ohio. The target population made up a broad range of osteopathic primary care physicians. Study respondents were recruited from a generated list of primary care practitioners obtained through the Ohio Osteopathic Association. The survey took less than 10 minutes to complete. A single-stage, stratified sampling design was used. An 8-week deadline was identified for return of the surveys. Data measured included frequency of response; the categorical variables were compared using a chi-square method of statistical analysis. Statistical significance was set at $p < 0.05$.

Materials and methods

Research design

This study involved the use of mixed methods through the gathering of data via a survey that included both qualitative and quantitative components.

Study participants

Participants were recruited from Ohio. The target population comprised a broad range of primary care physicians. Study respondents were recruited from a generated list of primary care practitioners obtained through the Ohio Osteopathic Association, although there were a few MDs among the respondents. A total of 1052 physicians (≥21 years old) were sent surveys for recruitment in this study. A total of 232 physicians completed the survey and returned it within a set 8-week deadline for this study. All respondents indicated their experience in the field of immunizations in the adolescent population within their survey. Respondents who indicated that they treated adolescents completed the survey. The research protocol for this study was approved by the Institutional Review Board at A.T. Still University.

Survey

The survey questions were related to accepted current practices and beliefs within the health care industry within the United States regarding immunizations and physician attitudes toward vaccination. The survey questions encompassed four categories:

1. Primary care office practice: Specific tools that may be used for screenings/risk assessments within their practice. This would incorporate the decision-making models for provider treatment plans in the immunization process.

Table 1 Demographic characteristics of respondents

	$n = 226$
Male	66.4%
Female	33.6%
	Mean (median)
Age	47.2 (15)
Years since completion medical school	23.3 (10
Practice setting	
Solo	29.8%
Two-physician	16.2%
Group/HMO	41.7%
Practice location	
Neighborhood health center	28.0%
Medical school	2.2%
Hospital	4.0%
Clinic	28.9%
Community setting/population	
Metropolitan, >1 million	7.8%
500,000-1 million	9.5%
250,000-500,000	24.2%
50,000-250,000	39.8%
Nonmetro 2500-50,000	9.5%
Rural <2500	0.9%
Other	0.4%

2. Provider practice: Specific interventions or recommendations used by providers and their rationale for selecting these processes.
3. Perceived effectiveness: A measurement of satisfaction with their current practices.
4. Barriers or issues in practice: Recommendations for changes or improvement strategies in the immunization process.

One question from the survey was open-ended, requiring a narrative response. The survey was pretested among five immunization nurses and five immunizing providers. Respondents from the pretest helped ensure question clarity. Pretest respondents helped determine that the questions were clear and relevant, and that the context was understandable. These processes assessed the instruments' face and content validity. Reliability and internal consistency were measured through computation of Cronbach's alpha. The survey took less than 10 minutes to complete.

Procedure

A single-stage, stratified sampling design was used. An 8-week deadline was identified for the return of the surveys. Each survey was mailed with a self-addressed, stamped return envelope. Responses were transcribed by a research assistant, which reduced any bias that may have resulted from the investigator making assumptions or by misinterpretation of responses.

Statistical analysis

Data were entered using Microsoft Excel (Redmond, WA). Recoding and analysis were performed with Statistical Package for the Social Sciences for Windows Version 15.0 (SPSS Inc., Chicago, IL). The data measured included frequency of response; the categorical variables were compared using a chi-square method of statistical analysis. Statistical significance was set at $p < 0.05$.

Results and discussion

Respondent characteristics

The survey was sent to 1008 Ohio osteopathic primary care physician and respondents who received the mailed survey; responses were returned from 231 physicians. Five respondents were actually allopathic physicians. Sixty-three surveys were returned as undeliverable. Forty-seven respondents did not qualify for the study because they did not care for adolescents, so they were excluded. The overall response rate to the survey was 25.6%. Among all respondents, 28.0% were from neighborhood health centers and 7.8% were from metropolitan areas with populations greater than 1 million. Response rates by provider were compared across regions of the state of Ohio and no statistically significant differences were found. After excluding respondents who reported not immunizing adolescents or whose work did not include adolescent patients, the final study population was composed of 226 physicians. The practice settings of respondents included solo practice (29.8%), two-physician practice (16.2%), and group/HMO (41.7%). Demographic characteristics of these immunizing private practice respondents are shown in Table 1.

Male and female respondents made up 66.4% and 33.6%, respectively. The mean age of respondents was 47.2 years. The mean year since completion of medical school was 23.3 years. Demographic characteristics of physician respondents are shown in Table 1.

Table 2 Factors related to immunization decisions

	$n = 205$
Prior compliance with appointments	20%
Amount of child is behind	3.4%
How well physician knows family	0.0%
Presence of a chronic illness	0.0%
Child's age	0.0%
Visit type (acute or follow-up)	30.4%
Specific immunization	2.9%
Practice policy	14.4%
Community standards	0.0%
Don't know	0.5%
Other	30%

Table 3 Support of school-based immunization program

	$n = 215$
Support school-based immunization program	
Yes	62.8%
No	34%

When are adolescents vaccinated?

The majority of respondents (84%) reported administering vaccinations during well-child appointments. Some providers (1.9%) indicated that they are unlikely to vaccinate during acute care appointments. A smaller number of respondents indicated that they are unlikely to vaccinate during follow-up care appointments (1.4%) or chronic illness follow-up appointments (0%). Six percent of responses from physicians indicated that they do not vaccinate for other reasons during their scheduled appointment because they refer their patients elsewhere for vaccination. One respondent indicated, ". . . tell them to get vaccination at the county health dept." Another responded, "Send kids to the health department."

What are factors in the decision-making to vaccinate during an acute care visit?

The focus on acute problems (30.4%) and the practice policy (14.4%) were the most common responses in the decision not to vaccinate during an adolescent acute care visit. Contraindication and insufficient time were cited by providers as additional reasons why they do not vaccinate during acute care visits. Physicians (1%) shared that lack of immunization records contributed to their inability to vaccinate during these visits. A very small number of physicians (<1%) revealed that they feared that immunizing during this period of time might decrease their well-child visits. Additional factors affecting the decision to vaccinate are shown in Table 2.

What vaccines have been unavailable during the past year and why?

At the time of the survey, half of the respondents (50%) indicated that vaccines had not been available to them within the past year as a result of national shortages. In regard to costs, 19.2% of physicians indicated that some vaccines were unavailable to them because of a variety of reasons (Table 2).

How supportive are providers of school-based immunization programs?

Participants stated that they would support a school-based program (62.8%). The minority of respondents (34%) revealed that they would not support a program of this nature. The majority of respondents (62.8%) stated that they would not participate in a school-based immunization program (see Table 3).

Is influenza vaccination profitable?

One-third (33%) of respondents stated that influenza vaccinations were profitable to their practice. Other respondents indicated that influenza vaccination produced a financial loss (27%). Profitability within physician practices can be viewed in Figure 1.

What mechanisms are in place to help identify undervaccinated adolescents and is there a callback system in place for influenza vaccination?

Computer (19.8%) and systematic chart review (56%) produced the highest responses from respondents in terms of mechanisms to identify undervaccinated adolescents. Only 1% of physicians indicated that a "Tickler file" played little part as a mechanism of delivery of vaccination. Mechanisms of detecting undervaccinated adolescents can be seen in Figure 2.

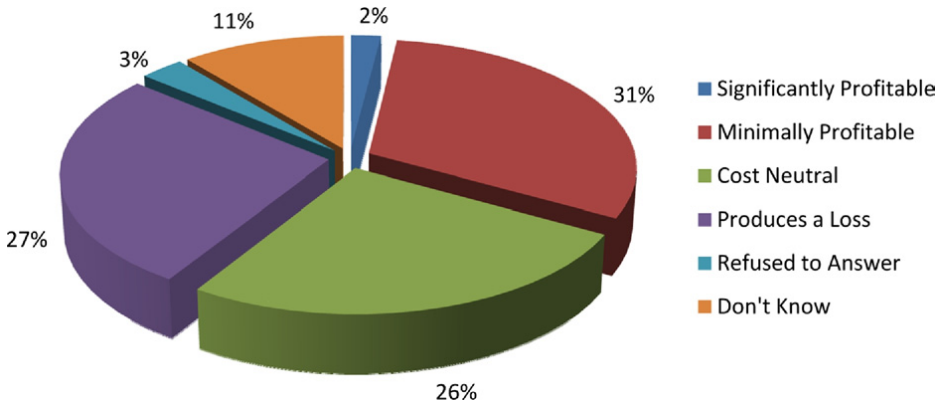

Figure 1 Influenza immunization profitability within practice.

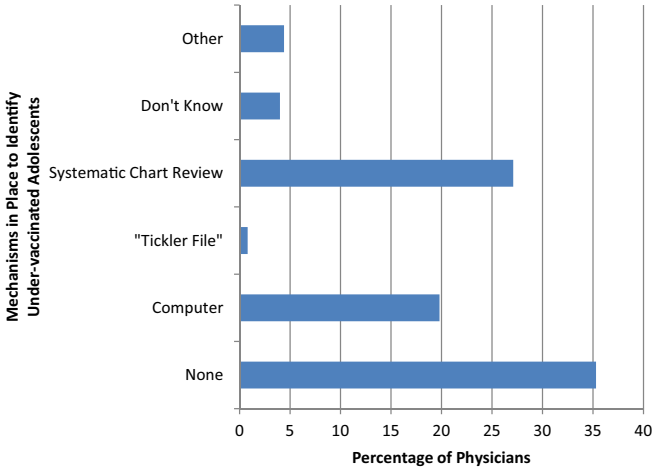

Figure 2 Mechanisms in office to identify undervaccinated adolescents.

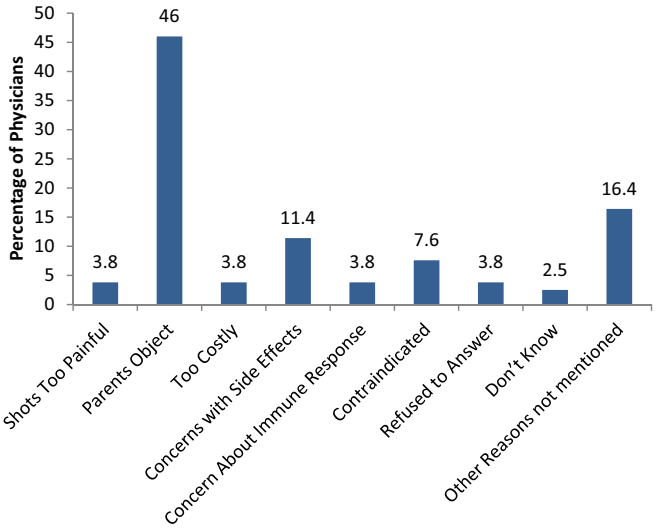

Figure 4 Reasons that vaccinations are not administered at the same encounter.

Should consent be required for vaccination?

The majority of respondents stated that one consent should be required to cover all vaccinations (40%). However, other physicians (30%) indicated that consents should not be required separately in an immunization series. An equal number of physicians (30%) felt that a consent form should be signed for each vaccination.

Why do providers not give all recommended vaccines during the same encounter?

A majority of physicians (83.8%) indicated that they give all recommended vaccines during the same encounter (Figure 3). Other respondents (26.1%) stated that parental objection prevented all vaccines from being administered during the same encounter. Physician responses about why vaccinations are not given during the same encounter can be seen in Figure 4.

Where should adolescent-recommended vaccination occur?

Nearly half of the respondents (46.6%) felt that the physician's office should be the location where vaccination should occur. Physicians unanimously concurred that immunizations should not be administered in pharmacies or hospitals. Physician responses about where adolescent immunizations should be administered are listed in Figure 5.

Respondents (62.8%) revealed that they would only participate indirectly under an off-site supervision agreement with a school-based immunization program. Physicians suggested that an on-site supervision agreement is something that they are not interested in participating in at this time. Twenty percent stated that civic involvement might persuade them to participate in such a program. This was followed by 12.3% of respondents citing financial recompense as a reason to participate in a school-based immunization program. Few respondents (1%) noted that they would participate in a school-based immunization program if it was required or if they were persuaded. Finally, 27.7% of respondents indicated that there was nothing that could persuade them to participate in a program of this nature.

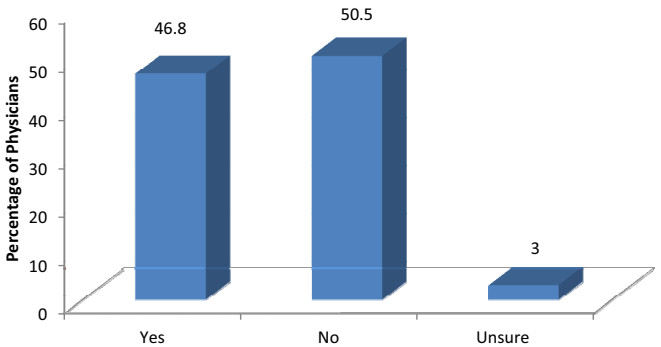

Figure 3 Participation in school-based immunization program.

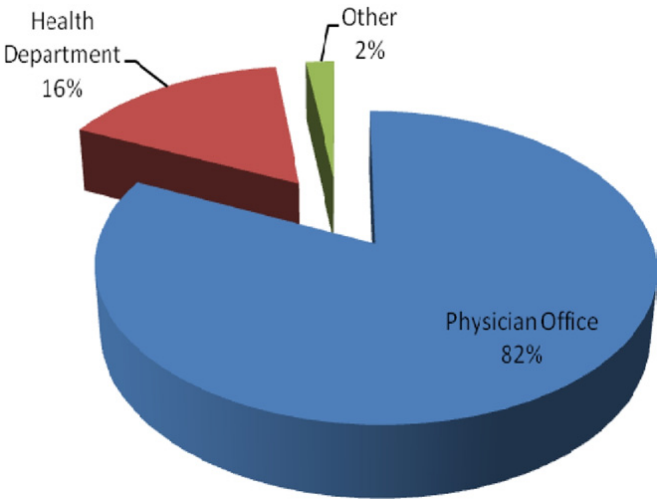

Figure 5 Recommended location for adolescent vaccination.

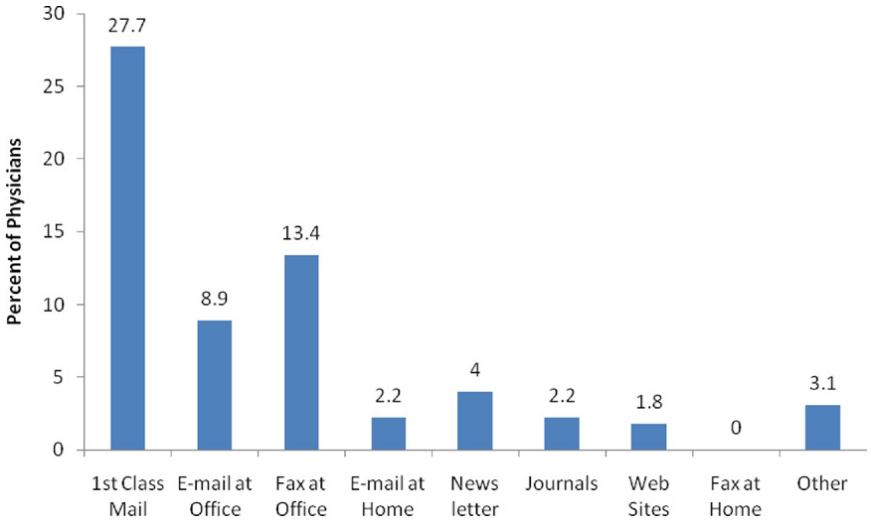

Figure 6 Preferred method of receiving immunization information.

What is the preferred method of receiving immunization information?

First Class mail (27.7%) and fax at the office (13.4%) were the most common physician responses. For a complete list of survey results, see Figure 6.

What methods would help improve vaccination within the state?

Respondents suggested various solutions to improve vaccination within the state. Some respondents indicated that improving communication from either chart record to provider and/or to parent would improve rates of vaccination. Respondents stated that physicians' communicating with pharmaceutical companies to learn of newer vaccines was a mechanism to improve immunizations within the state. Cost of the vaccines was cited by 3.8% as a barrier within the state. Reimbursement was cited by 3.8% of 226 respondents as an additional factor affecting administration rates of vaccines in their state. Finally, the most frequently reported recommendation to improve vaccination within the state was improved availability of the vaccines to adolescents.

What is the overall physician satisfaction with current immunization practices?

All respondents stated that they were satisfied with their current immunization practices. Twenty percent of physicians indicated that they were very satisfied with their current practices. Providers suggested ways to improve provider satisfaction indirectly through increasing reimbursement rates to physicians. Physician satisfaction rates can be seen in Figure 7.

Conclusions

The survey results revealed that respondents were most likely to give immunizations on a well check-up or a chronic illness follow-up appointment, which causes delays for the patient that comes in for an acute illness and is not current with immunizations. Focus on the acute problem was the most common reason why physicians did not vaccinate during the acute care visit. Physicians would vaccinate during an acute visit depending on how far the child was behind. It was encouraging to see that if children were behind, physicians may be more likely to give the immunizations to catch the child up. A majority of the respondents agreed that consents should be required for immunizations and only one consent should be required for all vaccinations. Most physicians reported that they do not have a call-back system for flu immunizations and that flu immunizations were minimally profitable or produced a loss. Manufacturing problems were the main reason that providers reported that some vaccines were unavailable during the last season.

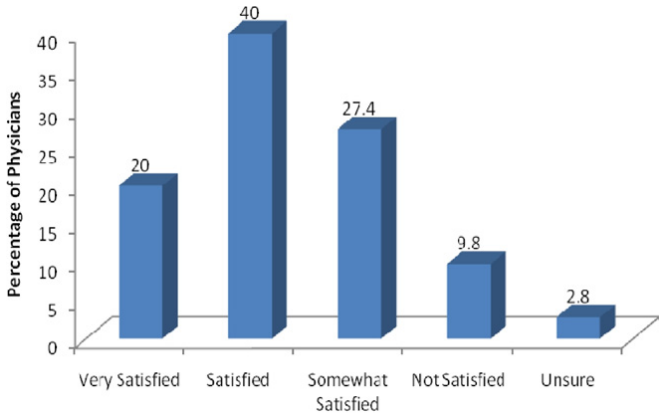

Figure 7 Overall physician satisfaction with their current immunization practices.

The physicians reported that parental objections were one of the primary reasons they did not give all the recommended vaccines at the same time. "Parents' request that immunizations be separated over a course of visits versus of receiving them all in one visit" was a common theme among physician open responses. This can lead to further delay in immunizations when follow-up appointments are missed. The physician office and the health department—not in the hospital or pharmacy—were the two settings where the majority of physicians felt vaccinations should occur. This was interesting because there is an increasing push to immunize in the latter two locations. School-based immunization programs were supported by a majority of physicians, although most would not participate in the program. Most physicians were satisfied with the current immunization system and stated that increased availability would improve the program.

The participants in the study were mainly Ohio osteopathic family physicians with limited participation from MDs; this is considered a limitation in the study because the study may not be generalizable to all geographic locations within the United States. Objectifying predictors of success has led to studies that attempt to identify the barriers that influence rates of vaccine administration. Therefore, continued research in this area can help increase access to immunizations on a global scale. Replication of this study throughout the country could enhance physician awareness of immunization patient outcomes, which could encourage providers to be involved with vaccinations within their communities.

Research showed in 2009 that there were increases in the percentages of adolescents between ages 13 and 17 receiving vaccines that were routinely recommended. However, further research is needed to explore variables that contribute to decreased immunization rates within the country. Clinical providers actively involved with adolescent vaccination within their communities could be of great benefit and may further aid the development of program activities that would prevent disease progression.

Immunization is among the most successful and cost-effective public health intervention.[1] In 2003, the World Health Organization estimated that 2 million child deaths were prevented by vaccinations alone.[1] Although routine adolescent immunizations have been recommended since 1996, an estimated 35 million adolescents (i.e., persons 11-21 years of age, as defined by the American Medical Association and the American Academy of Pediatrics) lack one or more recommended vaccination.[3]

References

1. Centers for Disease Control and Prevention: Vaccine preventable deaths and the global immunization vision and strategy, 2006-2015. Morb Mortal Wkly Rep 55:511-515, 2006
2. Centers for Disease Control and Prevention: CDC survey provides estimates of coverage for adolescent vaccination at the national, state and selected local area levels. 2010. Available at: www2c.cdc.gov/podcasts/download.asp?f=5626038&af=h&t=1. Accessed January 26, 2011.
3. Vukshich N, McPhillips-Tangum C, Howell K. Barriers to adolescent immunization: A survey of family physicians and pediatricians. JAm Board Fam Med 18:13-19, 2005
4. Helfand R, Moss WJ, Harpaz R, Scott S, Cutts F: Evaluating the impact of the HIV pandemic on measles control and elimination. 2006. Available at: http://www.google.com/search?q=Heflland+Moss+Harpaz+Scott+Cutts+2005&sourceid=ie7&rls=com.microsoft:en-us:IE-SearchBox&ie=&oe=&rlz=1I7ADSA_en
5. Santibanez T, Zimmerman R, Nowalk P, et al: Physician attitudes and beliefs associated with patient pneumococcal polysaccharide vaccination status. Ann Fam Med 2:41-48, 2004
6. Centers for Disease Control and Prevention: Adult immunization: Knowledge, attitudes, and practices. MMWR Morb Mortal Weekly Report 47:657-661, 1988
7. Cardarelli R, Cardarelli K: Recommendations for primary care physicians to improve hpv vaccination rates during clinical encounters. Osteopathic Medicine and Primary Care 1750-1752, 2008
8. Barclay L: New Guidelines Issued for Immunization of Infants, Children, Teens, Adults. Retrieved February 10, 2010, from Medscape medical News: http://www.medscape.com/viewarticle/709282 Department of Osteopathic Services.Services D.O: Recommended Immunization Schedule for Persons Aged 7 through 18 Years-United States 2010. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5851a6.htm?s_cid=mm5851a6_e. Accessed April 10, 2010
9. Hainer B: Vaccine administration: Making the process more efficient in your practice. Fam Pract Manag 3:48-53, 2007
10. Shen, A, Hunsaker, J, Gazmararian, J, et al: Role of health insurance in financing vaccinations for children and adolescents in the United States. J Am Acad Pediatr 124:522-531, 2009