



AMERICAN OSTEOPATHIC ASSOCIATION

142 E. Ontario St., Chicago, IL 60611-2864 ph (312) 202-8000 | (800) 621-1773 | www.osteopathic.org

AOA's Call to Action on Pneumococcal Disease

1. Overall Aim and Objectives

The overall aim of this initiative of the American Osteopathic Association (AOA) would be to increase the percentage of adults vaccinated against pneumococcal disease in the practices of osteopathic physicians, also known as DOs. To reach that aim, the AOA's call to action would be designed to (a) increase the number of outpatient DO practices that use standing order programs (SOPs) for adult pneumococcal disease immunization (APDI) and (b) increase the frequency in which existing SOPs for APDI are used in outpatient DO practices that have already adopted them.

The secondary aims of this call to action would be (a) to increase DOs' knowledge of which patients should be immunized for pneumococcal disease based on current recommendations of the Advisory Committee on Immunization Practices (ACIP) of the federal Centers for Disease Control and Prevention (CDC), (b) to increase the frequency of patient education interventions about APDI in DO practices, and (c) to increase the proportion of DO practices in which osteopathic physicians and their staff recommend pneumococcal vaccination to patients who should be immunized based on ACIP recommendations.

Upon completing this initiative, participants will be better able to:

- implement and manage standing order protocols for APDI within their practice settings.
- evaluate adult patients who are candidates for APDI based on current recommendations.
- employ culturally competent patient education strategies about the benefits of APDI.
- increase recommendations for APDI to patients who should be vaccinated.

The AOA believes that increasing the use of SOPs for APDI is a reliable surrogate measure for increasing the percentage of adults vaccinated against pneumococcal disease. Adopting SOPs is a well-documented strategy for overcoming barriers to vaccination. Therefore, it is expected that adopting SOPs and increasing their use will correlate with increasing the percentage of adults vaccinated.

Adopting SOPs requires a leadership intervention by one or more DOs in an outpatient practice, and it engages staff by empowering them. Thus, the entire physician practice becomes a vaccination advocate. This is important because it has been documented that physician attitudes and recommendations regarding vaccines have a positive influence on patients and vaccination rates. Adopting SOPs is, therefore, a tangible expression of an entire DO practice's stance on immunization.

The adoption process also mandates that DOs and staff acquire knowledge of the ACIP recommendations for APDI, as well as vaccine indications and contraindications. Combining interventions (in our case, SOP adoption and provider education) has been shown to increase vaccination coverage. Furthermore, SOPs serve as visible reminders to staff to educate patients about vaccine indications and vaccine safety.

The AOA also believes that measuring the increase in use of SOPs for APDI as our key outcome measure makes our initiative cost effective. But most important, the AOA believes that the increased adoption of SOPs during this initiative will continue in DOs' regular practice after the initiative ends. There is every reason to believe that once DO practices have adopted SOPs, witnessed their usefulness and seen the results, they will continue using SOPs. This initiative, therefore, will affect patient care within the scope of this initiative and beyond.

2. Technical Approach

Ours will be a nationwide call to action to DOs under the auspices of the AOA. The AOA is the national professional home for DOs and osteopathic medical students, who number more than 100,000 in the United States. U.S.-trained DOs represent a significant segment of medical professionals, and approximately 60% are engaged in primary care specialties, which may be most effective in improving APDI rates.

The AOA is cognizant of the performance gap in APDI and is already partnering with Healthy People 2020, thus stating its position on vaccine-preventable disease, including pneumococcal disease. This initiative, therefore, will be undertaken under the auspices of a professional medical association that supports increasing APDI rates.

The AOA's call to action would (a) make DOs more aware of the facts related to pneumococcal disease, (b) help them to understand what they can do to affect overall population health by increasing APDI rates, and (c) give them opportunities to lead their practices by embracing SOPs and thus directly affecting patient care by increasing rates.

The AOA and an AOA-accredited CME sponsor would be the accredited CME providers for this initiative. As such, the AOA and the AOA-accredited CME sponsor would have final control of all content and all decisions affecting content. In addition, the AOA would oversee compliance with all applicable requirements of the AOA Council on Continuing Medical Education. The AOA would assign a DO expert in APDI to serve as the medical director of the initiative.

The call to action would have a dedicated portal on the website of *JAOA—The Journal of the American Osteopathic Association*, the AOA's official journal and the leading peer-reviewed journal in osteopathic medicine. This portal would be the home of the initiative's webcasts, news and informational bulletins, the registration page for enrolling in the practice change study, and surveys. The portal would also feature a library of hyperlinks to relevant websites such as the Immunization Action Coalition's website, from which template SOPs can be

downloaded; the CDC's site for its adult immunization schedule and ACIP recommendations; the US Department of Health and Human Services' patient education site; and the National Foundation of Infectious Disease's site.

All email invitations, announcements, news bulletins, and other informational and recruitment communications for our call to action would be sent by the AOA to the target audience.

In addition, the *JAOA* would publish a print-and-online supplement that would serve as the report on the initiative. The print version of the *JAOA* supplement would be distributed to more than 32,000 osteopathic family physicians, general practitioners, general internists, obstetricians and gynecologists, gastroenterologists, cardiologists, infection disease specialists, pulmonologists, immunologists, and specialists in osteopathic manipulative treatment. The online version of the supplement would be posted to the *JAOA*'s website at www.jaoa.org, and a digital table of contents of the supplement would be emailed to at least 80,000 DOs and osteopathic medical students. Thus, our call to action would not only be widely promoted, but it would also have the cachet of the AOA's official journal behind it.

Miller Medical Communications LLC (MMC), a medical education company in New York City with extensive experience in immunization education, would be responsible for all content development; faculty recruitment; timeline development; webcast logistics; the monitoring of participant enrollment; the monitoring of survey reporting; interaction with the AOA, the *JAOA*, and the Postgraduate Institute for Medicine (PIM); the development of news bulletins; and the development of the final report for the *JAOA* supplement.

PIM would be in charge of evaluating outcomes. As an institute with many years of experience in outcomes measurement design and execution, PIM will be responsible for the overall outcomes design for this initiative, development of survey questions, the monitoring of response rates to ensure robust enrollment, statistical analysis, and outcomes reporting.

a. Current Assessment of Need in Target Area

Professional Practice Gap

The professional practice gap in APDI is evident in the low actual rates of coverage in the targeted patient populations compared with the recommended rates. For its report on adult vaccination coverage in the United States in 2010, the CDC analyzed data from the 2010 National Health Interview Survey (NHIS) and found that pneumococcal vaccination coverage among adults aged 65 and older was 59.7% overall, essentially unchanged from the previous year. The coverage was 63.5% for non-Hispanic whites, 39% for Hispanics, 46.2% for non-Hispanic blacks, and 48.2% for Asians.¹ These rates are well below the 90% target set by Healthy People 2020.² For the high-risk adults aged 19 to 64, the rates are lower still: 18.5% overall, with 19% for non-Hispanic whites, 14.8% for Hispanics, and 11.5% for Asians.¹ These rates were also

essentially unchanged from the previous year, and they were significantly below the 60% target set by Healthy People 2020.²

ACIP Recommendations for APDI

APDI recommendations are published each year by the ACIP as part of the complete annual immunization schedule for all US adults. In the immunization schedule for 2012, the ACIP recommends pneumococcal vaccination for all adults 65 and older without histories of pneumococcal vaccination and for adults 19 years and older with such risk factors as smoking, chronic lung disease, chronic cardiovascular disease, diabetes mellitus, chronic liver disease, alcoholism, cochlear implants, cerebrospinal fluid leaks, functional or anatomic asplenia, and immunocompromising conditions.

One-time revaccination is recommended 5 years after the first dose in patients who were vaccinated before the age of 65 for any indication once they reach the 65 and older age group and in patients aged 19 to 64 with chronic renal failure, asplenia, and immunocompromising conditions.³

The ACIP makes additional recommendations based on available evidence. In June 2012, for example, the ACIP voted to recommend broader protection against pneumonia and invasive pneumococcal disease in adults with immunocompromising conditions by using two available vaccines: the 13-valent pneumococcal conjugate vaccine (PCV13) and the 23-serotype polysaccharide vaccine (PPSV23). This recommendation is pending acceptance by the director of the CDC and publication in *MMWR*. The guideline is expected to be as follows:

- Adults 19 and older with immunocompromising conditions who have not been previously vaccinated should receive a single dose of PCV13 followed by a dose of PPSV23 at least 8 weeks later.
- Adults 19 and older with immunocompromising conditions who have previously received at least one dose of PPSV23 should receive a single dose of PCV13 no sooner than 1 year after the last PPSV23 dose. If patients require another PPSV23 dose, it should be administered no sooner than 8 weeks after the PCV13 dose and no sooner than 5 years after the last PPSV23 dose.⁴

Burden of Pneumococcal Disease

The consequences of the professional practice gap in APDI are significant. The target of pneumococcal vaccines is *Streptococcus pneumoniae*, a gram-positive bacterium that causes several disease, including pneumonia, bacteremia, and meningitis. Annually, pneumococcal disease is responsible for approximately 2 million illness episodes among US adults, almost 500,000 emergency department visits, more than 2.5 million outpatient visits, 386,000 hospitalizations, more than 2 million hospital days, and more than 20,000 deaths. The estimated direct cost of pneumococcal disease is \$3 billion annually, while the total annual cost is estimated at \$6.5 billion when work loss and productivity costs are added.⁵ Even though the highest rates of morbidity, health care utilization, and mortality are among patients 65 years

and older, the total costs are similar for patients between 18 and 50 years and those 65 years and older because the total cost for the younger age group accounts for lost productivity in the workplace.⁵ Furthermore, adults are responsible for 83%, or \$3 billion, of the annual direct medical costs associated with pneumococcal disease.⁵

The professional practice gap in APDI is one of the root causes of this disease burden, as much of the severe disease and associated costs may be preventable through use of pneumococcal vaccine. Additional prevention methods for adults include influenza vaccination because respiratory tract inflammation from influenza can make a person more susceptible to secondary pneumococcal infection.⁶ Smoking cessation is recommended as a prevention method for smokers.⁷

Barriers

The gap between actual and target rates of APDI is due to a host of barriers: Some are systems barriers, some pertain to health care professionals (HCPs), and some pertain to patients.⁸ Some barriers are related to practice setting.⁹

Systems barriers include lack of structure for ensuring vaccination in adults, lack of regular well-care visits for adults, switching of HCPs and medical plans, care by subspecialists who do not consider immunizations their responsibility, inconsistent reimbursement, lack of health care insurance, lack of access to HCPs, and inadequate vaccine storage.

HCP barriers include lack of awareness of current ACIP recommendations, not recommending vaccines to patients who need them, not assessing immunization status, lack of communication among staff members about patients' vaccination needs, and lack of feedback on performance in this area.

Patient barriers include discrepancies between physicians' perception and patients' actual reasons not obtaining vaccinations, as well as common myths related to vaccinations.⁸

Barriers related to specific practice settings include the following:

- Outpatient private practices give low priority to vaccines compared to other medical needs, and the physicians and staff in these practices do not inquire about patients' vaccination status.
- Hospitals lack adequate documentation and communication among HCPs.
- Public health clinics lack commitment to vaccination, they lack information about vaccines in languages patients can understand and on an appropriate reading level, and they lack Internet access.
- Extended care facilities lack of a systematic approach to vaccination, and they lack monitoring.⁹

HCP Barrier: Knowledge Gap

Among the HCP barriers, the knowledge gap regarding ACIP vaccine recommendations is surprisingly large. In a survey of 100 US primary care physicians and 100 US nurse practitioners, physician assistants and registered nurses, almost 50% reported that they did not rely on the ACIP vaccine guidelines.¹⁰

Knowledge gaps regarding specific vaccine recommendations were also documented in a national survey of 198 primary care clinicians, consisting of 51 general internists, 47 obstetricians and gynecologists, 46 family physicians, 47 family medicine NPs and PAs, and 7 internal medicine NPs and PAs.⁸ Presented with 5 case scenarios in which knowledge of pneumococcal disease vaccination or revaccination needed to be demonstrated, clinicians in all categories showed substantial knowledge gaps. The percentages of clinicians responding correctly to the scenario questions ranged from as low as 30% to no higher than 80% for family physicians and from 50% to 90% for the general internists.⁸

More than 60% of the general internists and family physicians who participated in this survey reported having no method in place to keep themselves up to date on changes in pneumococcal immunization practices. Most of the 198 respondents rated themselves as not being particularly effective in keeping up to date regarding changes in pneumococcal disease prevention recommendations: Responses averaged slightly above the midpoint on a 1-to-5 scale, with 1 being not very effective and 5 being very effective.⁸

This survey and the accompanying qualitative provider interviews additionally uncovered lack of knowledge about smokers younger than 65 needing to receive pneumococcal vaccine, confusion about who is considered immunocompromised, confusion on revaccination of patients who first received the vaccine before age 65, uncertainty about what to do when immunization status is unknown, and incorrect beliefs about vaccine effectiveness.⁸

HCP Barrier: Inadequate Assessment of Immunization Status

Related performance gaps are not assessing immunization status and not providing missing immunizations. The Infectious Diseases Society of America (IDSA) surveyed its members in 2009. Of the 568 respondents, only 47% reported always or almost always reviewing patients' immunization histories, and only one-third reported providing missing immunizations.¹¹

HCP Barrier: Inadequate Vaccine Recommendation

The rate at which HCPs recommend APDI is low: In the survey cited earlier of 100 US primary care physicians and 100 US NPs, PAs and RNs, only 65% of the physicians and 55% of the other respondents recommended APDI for their patients aged 65 and older. The survey results were lower still for high-risk patients: Less than 30% of physicians and less than 20% of the NPs, PAs and RNs reported recommending APDI for patients with heart disease, chronic kidney disease, or asplenia or for patients who were smokers. The respondents did slightly better for chronic lung disease (65% and 55%, respectively) and for diabetes (44% and 26%, respectively).¹⁰ The

average rate of APDI recommendations for the 65 and older group in this survey (60%) matches the nationally reported rate of 59.7%.¹

Overcoming Barriers

The most effective strategies for overcoming barriers to vaccination have been identified as implementing SOPs that allow nonphysicians to vaccinate and strong recommendations from HCPs for vaccination.¹² The effectiveness of SOPs in increasing vaccination rates for influenza and pneumococcal vaccine is well established in the inpatient setting.¹³ In outpatient settings, SOPs improved influenza vaccination rates 27% in a general elderly patient population,¹⁴ among cardiovascular patients attending a lipid clinic,¹⁵ and among pregnant women.¹⁶ In a study of patients in dialysis clinics, SOPs significantly increased pneumococcal and hepatitis B vaccination rates.¹⁷

SOPs are endorsed by the CDC and its ACIP,¹⁸ the Task Force for Community Preventive Services,¹⁹ and the Southern California Evidence-Based Practice Center-RAND.²⁰ In 2002, Medicare regulations prohibiting SOPs for medication administration were modified to exclude influenza and pneumococcal vaccination.²¹

Studies have demonstrated that SOPs are more effective in increasing vaccination rates than clinician and patient reminder systems.^{22,23} Still, the use of SOPs for adult immunization remains low. A nationwide survey of 900 US general internists and family physicians who reported immunizing adults found that only 42% consistently used SOPs for influenza. The most important factors associated with greater likelihood of consistently using SOPs were (a) being aware of the ACIP recommendations and Medicare regulations regarding adult immunizations, (b) agreeing that SOPs are effective, and (c) having two or more clinical staff members per physician.²⁴ The strength of respondents' agreement that SOPs are effective was a key predictor for whether they adopted SOPs. These results suggest that two aspects of the "Awareness-to-Adherence" model of physician adoption of vaccines—namely, awareness of and agreement with the effectiveness of SOPs—were associated with the use of SOPs.²⁵

Further analysis of this sample of US primary care physicians revealed that only 23% reported using SOPs consistently for both influenza and pneumococcal vaccine and that using SOPs for pneumococcal vaccine alone was rare.²⁶ Physicians in practices with SOPs for both vaccines reported greater awareness of ACIP recommendations, Medicare regulations, or both, and they were more likely to agree that SOPs are effective for boosting vaccination coverage. Using both influenza and pneumococcal vaccine SOPs was associated with several practice-level factors as well, including more effective practice teamwork, the presence of an immunization champion, and greater availability of clinical assistants with more advanced training than that of medical assistants.²⁶

Access to PAs or licensed nursing personnel was a significant correlate of SOPs for pneumococcal vaccine. Physicians in practices with these more highly trained personnel were

twice as likely to have SOPs for pneumococcal and influenza vaccines. This association may be related to the complexity of pneumococcal vaccination and recommendations for high-risk patients.

Additionally, the use of electronic medical records (EMRs) was associated with SOPs for pneumococcal vaccine. EMRs make it easier for HCPs to track immunization histories and flag patients who should be vaccinated.²⁴ The Medicare incentive program for EMR usage may further facilitate using SOPs and thus increase adult vaccination rates.²⁷

HCPs' recommendations are a major influence on adults' decision to get immunized. This has been demonstrated specifically for pneumococcal vaccine. In a survey of almost 500 patients at a Department of Veterans Affairs medical center, the rate of APDI in high-risk patients was 62.5%. The vaccination rate was associated with HCPs' recommendations and with patients having positive attitudes toward immunization.²⁸ A survey of more than 2,000 US adults indicated that lack of physician recommendation was among the most common reasons for not receiving immunizations.¹⁰ A survey of 300 patients from three inner-city health centers found that attitudes about vaccination and clinicians' recommendations were the most powerful predictors of pneumococcal vaccine status.²⁹ In a survey of people older than 65 that generated 716 analyzable responses, HCPs' recommendations emerged as the most important factor associated with influenza and pneumococcal vaccine status. Even among patients with a negative attitude towards vaccination, most were vaccinated if their HCPs recommended it.³⁰

Primary Audience for the Initiative: Osteopathic Physicians

The primary audience for this initiative are US-trained DOs. The same gaps, barriers, and strategies for overcoming barriers apply to osteopathic primary care physicians as apply to other primary care physicians. Furthermore, DOs self-report an educational need for information about immunization. The AOA conducted a practice characteristics study in 2007 to describe the practices of office-based primary care DOs and to compare DOs with MDs.³¹ Responders consisted of 220 DOs and 111 MDs. Participants were asked to indicate areas of practice in which additional information would be most useful. Among 20 identified practice areas, adult vaccines were identified as the third-highest area of interest by both the DO and MD respondents, preceded only by EMRs and pediatric vaccinations.³¹

In another survey specifically designed to assess DOs' educational needs, the more than 1,000 respondents identified preventive health services as the fifth-highest area of interest. When practice settings of the responders were analyzed, however, preventive health services was identified as one of two highest-ranked areas (along with obesity) among osteopathic general internists and the fourth-highest among urban-based DOs.³²

The AOA's Call to Action on Pneumococcal Disease would be made known to nearly all US DOs. The AOA would send email, Facebook and Twitter announcements to direct DOs to 2 webcasts on the JAOA's site and to invite DOs to sign up for the initiative. Even after the initial enrollment in the initiative is closed, each webcast would remain available and would offer AOA Category 1-B CME credit for 12 months. Finally, the report from the initiative would be published in print

and online as a supplement to the *JAOA*. An electronic table of contents of this supplement, complete with hyperlinks to all of the supplement articles, would be emailed to approximately people, the majority of whom are US-trained DOs and osteopathic medical students. The supplement would offer AOA Category 1-B CME credit for 18 months. Audience engagement would be determined by the number of participants in each component of the initiative.

We expect a great deal of interest and a high level of participation in this initiative, not only because of the self-reported interest of DOs in this topic but also because this will be the only such initiative targeted specifically at DOs that will have the imprimatur of the AOA. While being the AOA's sole initiative specific to APDI, it will nonetheless build on the AOA's existing partnership with Healthy People 2020, as well as with the AOA's Clinical Assessment Program, which recently launched a module on adult immunization.

b. Intervention Design and Methods

The characteristics of this AOA call to action are as follows:

- It combines multiple interventions, which research has shown have better success rates than do single interventions.^{12,32} The intervention to increase the number of outpatient DO practices that use SOPs for APDI and to increase the frequency of use of existing SOPs for APDI would be combined with interventions to reduce the knowledge gaps about APDI among DOs and to promote patient education and HCP recommendations of APDI.
- It addresses the following barriers and gaps: (a) It aims to reduce the knowledge gap of ACIP recommendations for APDI. (b) It promotes the identification of patients who are candidates for APDI. (c) It promotes patient education because the need for APDI must be explained to patients and any concerns they have must be addressed. (d) It promotes HCP recommendation of APDI in that adopting SOPs is a visible sign that practices recommend APDI.
- The components of the initiative are as follows: (a) enrollee registration in the initiative, (b) 3 surveys to assess adoption of SOPs (the first at baseline, the second at 6 months, and the third at 12 months), (c) 2 webcasts, (d) 4 AOA *TouchPoint* news bulletins, (e) a library of hyperlinks to relevant websites, (f) periodic posting of invited success stories from participants, and (g) a final report published as a *JAOA* supplement. All of the components would be posted on a *JAOA* portal dedicated to the call to action. The *JAOA* supplement would be published in print in addition to being posted on the *JAOA*'s website. All components would be designed to reduce DOs' gap in knowledge of ACIP recommendations, and they would explain that having and using SOPs and recommending APDI to patients are the strongest available strategies to increase APDI. In addition, the AOA's *TouchPoint* news bulletins would disseminate any relevant information from ACIP

that may come out subsequent to the webcasts, eg, the APDI 2013 recommendations, as well as reinforce the teachings from the webcasts.

- The knowledge and performance of participants enrolled in the initiative would be measured at baseline, and changes in knowledge and performance would be assessed at 6 months and 12 months.

The call to action would have a dedicated portal on the *JAOA's* website. The initiative would begin (Time Zero) with 1 recorded webcast of 2 experts explaining the clinical importance of the AOA's call to action and encourage online enrollment of clinicians. The first webcast would provide 0.5 AOA Category 1-B credit. The AOA would inform both member and nonmember DOs of the initial webcast via email invitations, Facebook and Twitter announcements, and banner ads on the *JAOA's* website and the website of the *JAOA's* sister publication *The DO*. The number of registrants would be carefully monitored to ensure robust enrollment in the initiative.

The content of the first webcast would address DOs' knowledge gap in APDI and explain the significance of SOPs and vaccination recommendations to patients. The key purpose of the first webcast would be to invite DOs to participate in the initiative.

Participants would have to register for the initiative and take the baseline survey. As part of the registration process, the components of the initiative would be explained.

To ensure robust participation, enrollment in the initiative would be open for six months following the first webcast. If needed, additional waves of invitations would be sent. After six months, the registration for the initiative would be closed so that we can follow the progress and the changes the enrollees make. Because program enrollment would be open for 6 months, the entire initiative would be 18 months in length so that we can measure the changes in every enrollee's knowledge and practice during a 12-month period. The likelihood is high that a large number of adult patients who are candidates for APDI will visit each participating DO's practice for some medical reason at least once during the course of the initiative, giving each DO the opportunity to recommend APDI and to assess how well the practice's SOP is working.

At 6 months (Time 6 Months), the second webcast would be posted on the *JAOA's* website, and invitations would be sent to all initiative enrollees. The second webcast would reinforce the clinical importance of APDI, SOPs, and HCPs' recommendations. It would also include several clinical scenarios to help enrollees identify patients who are candidates for APDI. At this time, we would conduct a midpoint checkpoint survey of the enrollees to measure SOP use, knowledge of ACIP recommendations for APDI (using patient vignettes), frequency of assessment of immunization status, frequency of patient education on APDI, and frequency of recommendation of APDI to patients who need it. A second wave of the midpoint checkpoint survey would be sent 3 months later to capture the changes in those enrollees who may have signed up late in the six-month enrollment period.

To keep awareness, interest, engagement, and motivation high among the enrollees in the period from Time 6 Months to Time 12 Month, we would send 4 AOA *TouchPoint* news bulletins via email to enrollees and simultaneously post to them on the *JAOA's* website. The content of the news bulletins would be developed under the guidance of the initiative's medical director, and they would be based on APDI-related clinically relevant content from published peer-reviewed literature, the ACIP, or other sources. The *TouchPoint* news bulletins would keep the initiative fresh on the participants' minds.

We would also invite participants to share their APDI-related success stories, and upon obtaining participants' permission, we would report these stories on the *JAOA's* website. This would encourage greater participation and competitiveness among enrollees.

At Time 12 Months, the final survey would be administered. If necessary to ensure adequate participation in the final survey, inducements may be offered, such as a donation to a charity of the selected enrollee's choice. The results will be analyzed. The entire Initiative and its results would be reported and published as a CME supplement to *JAOA*, which would be distributed in print form to 32,000 DOs and online to all DOs, all osteopathic medical students and other health care professionals.

c. Evaluation Design

With the review and approval by the initiative's medical director and the AOA's editor in chief, PIM would construct the survey tools and data-entry tools, and it would analyze the outcomes for this initiative. As noted above, 3 surveys would be developed and administered to DO enrollees during the initiative.

The primary end-point for this study would be statistically significant improvement in rate of adoption of SOPs by enrollees and their practices at 12 months of participation compared to baseline. Secondary qualitative survey data collection and analysis would assess (a) improvement in participants' knowledge of ACIP recommendations as measured by patient scenario responses, (b) self-reported improvements in frequency of assessing immunization status, (c) frequency of educating patients about APDI, (d) frequency of recommending APDI to patients who need it, and (e) vaccination rates as measured against data at Time Zero, Time 6 Months, and Time 12 Months.

Demographic characteristics of the enrollees and information on barriers to change would be collected by each survey to allow parsing of the data. For all statistical analyses, alpha would be set at 0.5. Statistical methods used in analysis would conform to appropriate scientific rigor for the analysis of convenience samples in educational outcomes studies.

A control group of DOs who do not enroll in the initiative would be surveyed twice: once at the baseline right after enrollment in the initiative closes and once at 12 months. This would be

done to account for intervening variables that could affect results, such as an educational campaign by the CDC on this subject and exposure to concepts related to SOP adoption in professional or popular media during the initiative. The control group would be incentivized to participate in both surveys, with the incentives approved by the initiative's medical director and the AOA's editor in chief.

Because the AOA plans to publish the results of the initiative, the design for data collection and analysis would be submitted to an independent institutional review board (IRB) to confirm that the study conforms to requirements for research on human subjects. Many professional journals require this clearance before publication of data, even for educational outcomes studies. The AOA anticipates that the IRB would determine that the study protocol is exempt from strict federal regulations related to research on human subjects.

3. Detailed Work Plan and Deliverables Schedule

Date	Deliverable
August 2012	Grant approved and LOA executed
September 2012	First planning teleconference held and timeline developed
September 2012	Surveys developed and approved by IRB, faculty recruited, and a second planning teleconference held
October 2012	Web portal developed for the <i>JAOA</i>
October 2012	First webcast recorded and marketing developed for the webcast and the rest of the initiative
November 2012	First webcast edited, tested and certified, the initiative's marketing executed through email and other media, Web links completed
December 2012	The initiative launched with posting the first webcast, enrollment started, and baseline survey conducted.
December 2012 – June 2013	Initiative enrollment active, enrollment carefully monitored, and additional marketing conducted as needed
April 2013	Second webcast recorded
May 2013	Second webcast edited, tested and certified, and marketing for the second webcast executed
June 2013	Enrollment closes, second survey of enrollees conducted, and control group surveyed
June 2013	Second webcast launched
July 2013	Develop first AOA <i>TouchPoints</i> news bulletin and conduct second survey, with follow-up as needed
August 2013	Email first news bulletin, develop second news bulletin, and request for success stories
September 2013	Email the second news bulletin, develop thirds news

	bulletin, selected success stories to post on the initiative's <i>JAOA</i> portal, and request additional success stories
November 2013	Email third <i>TouchPoint</i> news bulletin, develop fourth news bulletin, and selected success stories to post on the initiative's portal
December 2013	Email fourth news bulletin
January 2014	Third survey started and control group survey started
February and March 2014	Actively monitor responses to the third survey in both the enrollee and control groups, and conduct follow-up and provide incentives as needed
May 2014	Survey data collected and analyzed, and survey report completed
June and July 2014	<i>JAOA</i> supplement developed on initiative and its results
July through December 2014	Supplement edited by <i>JAOA</i> staff and certified for AOA CME
December 2014	Supplement mailed and posted online

References

- Centers for Disease Control and Prevention (CDC). Adult vaccination coverage – United States, 2010. *MMWR Morb Mortal Wkly Rep.* 2012 Feb 3;61(4):66-72
- www.healthypeople.gov. Accessed July 2012
- Centers for Disease Control and Prevention (CDC). Recommended adult immunization schedule – United States, 2012. *MMWR Morb Mortal Wkly Rep.* 2012 Feb 3;61(4).
- www.medpagetoday.com/MeetingCoverage/ACIP/33383. Accessed July 2012
- Huang SS, Johnson KM, Ray GT, et al. Healthcare utilization and cost of pneumococcal disease in the United States. *Vaccine.* 2011;29(18):3398-3412
- Johnson TD. Q&A with infectious disease specialist William Schaffner: Preventing pneumococcal illness: Vaccines can prevent pneumococcal disease in all age groups. *The Nation's Health, American Public Health Association.* 2011;41(1):7
- Centers for Disease Control and Prevention (CDC). Updated recommendations for prevention of invasive pneumococcal disease among adults using the 23-valent pneumococcal polysaccharide vaccine (PPSV23). *MMWR Morb Mortal Wkly Rep.* 2010;59(34):1102-1106
- Partnership for Adult Vaccination and Education. Pneumococcal Disease Prevention among Older Adult and At-Risk Patients. Educational Research Plan – Final Report. September 2011. University of Wisconsin-Madison School of Medicine and Public Health
- Rehm SJ, File TM, Metersky M, et al. Identifying barriers to adult pneumococcal vaccination: an NFID Task Force meeting. *Postgrad Med.* 2012 May;124(3):71-9

10. Johnson DR, Nichol KL, Lipczynski K. Barriers to adult immunization. *Am J Med.* 2008(7 suppl 2);121:S28-S35
11. Now Is the Time To Immunize Adults: Results of an IDSA Survey of Members' Immunization Practices. Available at www.idsociety.org. Accessed July 2012
12. Stinchfield PK. Practice-proven interventions to increase vaccination rates and broaden the immunization season. *Am J Med.* 2008;121(7 Suppl 2):S11-21
13. Dexter PR, Perkins SM, Maharry KS et al. Inpatient computer-based standing orders vs physician reminders to increase influenza and pneumococcal vaccination rates: a randomized trial. *JAMA.* 2004 Nov 17;292(19):2366-71
14. Goebel LJ, Neitch SM, Mufson MA. Standing orders in an ambulatory setting increases influenza vaccine usage in older people. *J Am Geriatr Soc.* 2005;53(6):108-1010
15. Loughlin SM, Mortazavi A, Garey KW, et al. Pharmacist-managed vaccination program increased influenza vaccination rates in cardiovascular patients enrolled in a secondary prevention lipid clinic. *Pharmacotherapy.* 2007;27(5):729-733
16. Mouzoon ME, Munoz FM, Greisinger AJ, et al. Improving influenza immunization in pregnant women and healthcare workers. *Am J Man Care.* 2010 Mar;16(3):209-16
17. Bond TC, Patel PR, Krishner J, et al. Association of standing-order policies with vaccination rates in dialysis clinics: a US-based cross-sectional study. *Am J Kidney Dis.* 2009;54(1):6-9
18. Centers for Disease Control and Prevention (CDC). Use of standing orders programs to increase adult vaccination rates. *MMWR Morb Mortal Wkly Rep.* 2000;49(RR01):15-26
19. Task Force on Community Preventive Services. Recommendations regarding interventions to improve vaccination coverage in children, adolescents, and adults. *Am J Prev Med.* 2000;18:92-96
20. Health Care Financing Administration. Evidence report and evidence-based recommendations: interventions that increase the utilization of Medicare-funded preventive service for persons age 65 and older. Baltimore, MA. Health Care Financing Administration. 1999
21. Centers for Medicare and Medicaid Series H: Medicare and Medicaid programs; conditions of participation; immunization standards for hospitals, long-term care facilities, and home health agencies; final rule with comment period. *Fed Regist.* 2002;67:61808-61814
22. Rhew DC, Glassman PA, Goetz MB. Improving pneumococcal vaccine rates. Nurse protocols versus clinical reminders. *J Gen Intern Med.* 1999 Jun;14(6):351-6
23. Coyle CM, Currie BP. Improving rates of inpatient pneumococcal vaccination: impact of standing orders versus computerized reminders to physicians. *Infect Control Hosp Epidemiol.* 2004 Nov;25(11):904-7
24. Zimmerman RK, Albert SM, Nowalk MP, et al. Use of standing orders for adult influenza vaccination. *Am J Prev Med.* 2011;40(2):144-148
25. Pathman DE, Konrad TR, Freed GL, et al. The awareness-to-adherence model of the steps to clinical guideline compliance. The case of pediatric vaccine recommendations. *Med Care.* 1996;34:873-89
26. Albert SM, Nowalk MP, Yonas MA, et al. Standing orders for influenza and pneumococcal polysaccharide vaccination: correlates identified in a national survey of US primary care physicians. *BMC Fam Pract.* 2012 Mar 20;13:22

27. www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html?redirect=/EHRIncentivePrograms/. Accessed July 2012
28. Nichol KL, MacDonald R, Hauge M. Factors associated with influenza and pneumococcal vaccination behavior among high-risk adults. *J Gen Intern Med*. 1996 Nov;11(11):673-7
29. Zimmerman RK, Tabbarah M, Nowalk MP, et al. Predictors of pneumococcal polysaccharide vaccination among patients at three inner-city neighborhood health centers. *Am J Geriatr Pharmacother*. 2005 Sep;3(3):149-59
30. Adult immunization: knowledge, attitudes and practices ---DeKalb and Fulton Counties, Georgia, 1988. *MMWR Morb Mortal Wkly Rep*. 1988;37:657-661
31. Practice Characteristics—2007. Osteopathic Primary Care Physicians. Analytical Research Services Inc. 2007
32. Ndiaye SM, Hpokins DP, Shefer AM, et al. Interventions to improve influenza, pneumococcal polysaccharide, and hepatitis B vaccination coverage among high-risk adults. A systematic review. *Am J Prev Med*. 2005;28(5S):248-279