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Impact of a physician recommendation

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HPV vaccination has failed to achieve uptake comparable to the other adolescent-specific vaccines. Gargano et al. conducted a survey of parents of adolescents in a single Georgia county and found uptake similar to national surveys. They also found among the most commonly cited reasons for receiving vaccines a recommendation from a health care provider and among the most commonly cited reasons for not getting any of the adolescent vaccines were concerns for adverse effects. Of note, they found that the recommendation for any one vaccine had a positive effect on the uptake of other vaccines. Their findings of the importance of provider recommendations matched findings from other studies of adolescent vaccines, infant vaccines, and adult vaccines. This is despite flaws in their study including a very poor response rate (effectively 4.5%) of those surveyed and in their reporting including a lack of details of survey methods. Local surveys of vaccination have much to offer the national and local discussion about immunization delivery and how delivery should be optimized, but such surveys should use standardized approaches as well as pursue more comprehensive investigations at the local level to address the nuances national complex-cluster surveys cannot.

Keywords: adolescent, preventive health services, vaccination, immunization, adolescent health services, vaccines, meningococcal vaccines, papillomavirus vaccines, tetanus toxoid, diphtheria-tetanus vaccine, attitude to health, patient acceptance of health care, treatment refusal

Abbreviations: aOR, adjusted odds ratio; CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus; MCV, meningococcal conjugate vaccine; NIS-Teen, National Immunization Survey of Teens; OR, odds ratio; Tdap, tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine.

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Uptake for each of the three recently introduced adolescent vaccines varies widely. The Advisory Committee on Immunization Practices first recommended the routine use of the meningococcal conjugate vaccine (MCV) for adolescents in the June 2005,[1] the adolescent formulation of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine (Tdap) in March 2006,[2] and the first licensed human papillomavirus (HPV) vaccine in females in March 2007 extending the recommendation to males; first permissively in May 2010 then as a routine recommendation in December of 2011.[3-5] Uptake for MCV and Tdap among 13 to 17 y old adolescents are increasing and, in 2012, MCV had achieved 70% coverage and Tdap 85%. On the other hand, the rates of completion of the 3-dose series HPV vaccine in females appeared to have plateaued in 2012 with uptake rates of 33% for females and 7% for males. For females, the completion of the 3-dose HPV vaccine series is not significantly different in 2012 from the 35% reached in 2011. Even for the first dose of HPV vaccine, one finds no difference. In 2012, 54% of females received one dose—a rate not statistically different from the 53% in 2011.[6] In contrast, Tdap vaccine has surpassed the HealthyPeople 2020 goal of 80% and MCV appears likely to achieve this goal soon even as HPV vaccine has stalled.[7] Examining the systems and patient factors around the delivery of vaccines and especially with HPV vaccine is critical to achieving and maintaining needed coverage levels.

In the December 2013 issue of *Human Vaccines & Immunotherapeutics*, Gargano et al. reported the results of their telephone survey of parents of middle and high school students.[8] The investigators conducted the survey in October and November of 2011 in a single county in Georgia. They measured vaccination rates for their sample and found uptakes rates of 68% for MCV, 84% for Tdap, and 41% for one dose of HPV vaccine, rates similar to those nationally. As with the national rates among 13 to 17 y old adolescents,

the rates for HPV vaccine receipt are much lower than for the other vaccines.

Gargano et al. report high rates of physician recommendation for the adolescent vaccines, ranging from 51% for HPV to 73% for the MCV.[8] They also reported that physician recommendations were among the most frequent reasons for receiving or intending to receive all of the adolescent vaccines, although they did not provide an effect size. Gargano et al. also reported in a listing of the most commonly cited reasons for receiving or intending to receive vaccines was that "It was recommended by the health department." This was the top reason for Tdap. The most commonly cited reasons for not getting any of the adolescent vaccines revolved around concerns about adverse effects of the vaccines. Recommendation for the specific vaccine and for any of the vaccines were associated with receipt of MCV, Tdap, and HPV vaccines. In addition Gargano et al. show that recommendations for any vaccine increased receipt of the other adolescent vaccines.[9]

The consensus of many studies indicate that clinician recommendations are associated with increased receipt of vaccines. Ylitalo et al. examined the 2009 NIS-Teen survey and found that 60% of female adolescents with provider verified vaccines had received a recommendation for HPV vaccine and these 60% were almost 5 times as likely to be vaccinated as those who did not. Those findings were consistent across race/ethnic groups.[10] Darden et al. examined 2008–2010 NIS-Teen for MCV, Tdap, and HPV vaccines found that parent reported clinician recommendation was common and increasing for adolescent vaccines and in 2010 providers recommended, MCV, Tdap, and HPV vaccines 36%, 50%, and 52% respectively. Specifically provider recommendation for HPV vaccine in females had increased from 47% to 52%.[11]

In a survey of HPV vaccinated and unvaccinated females 19–26 years of age attending a large US managed care plan, Rosenthal et al. found that physician discussion and recommendation for HPV was the strongest independent predictor of vaccination (OR 94). The participants who received a physician recommendation were also asked to rate the strength of the recommendation and 81% rated it as 4 or 5 on a 5 point scale. The strength of the recommendation was a predictor of HPV vaccination.[12]

Like Gargano et al., Guerry et al. examined a local sample of 11–18 y old females attending public schools serving economically disadvantages populations in Los Angeles County. In this largely minority population they found in 2007 and 2008 that 30% of parents reported a clinician recommendation and that this was strongly associated with having initiated the HPV vaccine series and was among factors studied, the strongest predictor in an adjusted analysis (adjusted odds ratio or aOR 48.5).[13]

Similarly, Brewer et al. interviewed a sample of parents of 10–18 y old females in North Carolina in the summer of 2007 with follow up in 2008. They examined both those who had received at least one dose of HPV vaccine and those who intended to initiate HPV vaccination. Those receiving a clinician recommendation had a relative risk of 2.2 of having received the HPV vaccine. Despite that only 38% of those intending to be vaccinated in the coming year actually received vaccine, that intent was associated with a relative risk of 3.9 of actually receiving the vaccine.[14]

Studies of other vaccines for other patient age groups similarly find that clinician recommendations is associated with vaccination. Nowalk et al. surveyed the parents of 6–23 mo old patients seen in inner-city health centers following the 2002–03 and 2003–04 influenza seasons. They found that doctor's recommendation served as an important factor leading to influenza vaccination with an odds ratio (OR) of 10.5.[15] Gnanasekaran et al. studied an older group of children during that time for the same vaccine.[16] Their 2003 survey of parents of asthmatic children 5–18 y of age attending a managed care organization in Massachusetts found that if parents received a physician-recommendation their children had an OR of 2.6 to receive the influenza vaccine.[16] Similarly, Daley et al. surveyed children 6–21 mo in 2003 and 2004 before and after influenza season in 5 Denver practices. Daley et al. reported that physician recommendation was the most influential independent predictor of influenza vaccination (OR 3.9).[17]

While those surveys all concerned influenza vaccine, Freeman et al. in 1995 surveyed North Carolina parents of children 23–35 mo of age and the most frequently cited factor among parents who had or intended to obtain varicella vaccine was provider recommendation.[18] Similarly, Rosenthal et al. surveyed adolescents 11–18 y in 1994 in adolescent clinic about Hepatitis B vaccine found that the parents' perception of how important the clinician viewed the vaccine was independently associated with vaccination.[19]

Investigators have similarly found a positive impact of a clinician's recommendation in improving adult vaccination rates. Looking at influenza and pneumococcal vaccination in a survey of Medicare beneficiaries Winston et al. found that clinician-recommendations were associated with pneumococcal vaccination (OR 2.32) as well as influenza vaccination (OR 1.31).[20] Samoff et al. reported a convenience sample of adults seeking care a New York STD clinic in 1997. The investigators surveyed the subjects for their reasons for their acceptance or rejection of the vaccine. They found that a clinician's recommendation was highly associated with hepatitis B vaccine acceptance (OR 4.2).[21]

The results reported by Gargano et al. thus fit with a growing body of studies that support the importance of provider or clinician recommendations, but their study suffers from significant limitations. First, the response rate to the survey is only 4.5% and not the 57.6% reported. The original random sample included 2,552 students enrolled in the 11 middle and high schools. Only 198 responded with a signed consent form, a rate of 7.8%. Of those 198, only 57.6% completed the telephone survey, resulting a response rate of 4.5%. These raises a substantial concern for a volunteer or consent bias. One might imagine those responding positively to the original invitation packet and then completing the telephone survey might be more persuaded by a provider recommendation.

That only 114 parents of students from 11 schools completed the survey means

that only 10 students on average for each school participated. Gargano et al. does not provide any specifics about the numbers of students per school or if all schools were represented. We know from kindergarten surveys that there are wide variation in immunization uptake by location.[22,23] The survey examined reported demographics, vaccine receipt, and intention to receive vaccine, as well as attitudes and beliefs. The investigators relied upon parental report for receipt of vaccine without provider verification. This can introduce a degree of imprecision although possibly less of a problem for adolescent vaccines than those for younger children.[24] NIS-Teen, in comparison, includes clinician-verification of vaccines received.[25]

The Health Beliefs Model informed the questions on attitudes and beliefs (severity, susceptibility, barriers, benefits and social norms), but the investigators required that the responses were binary (yes/no) rather than graduated (e.g., Likert scale). This simplified the telephone survey but may have lost important variation among parents. While the reasons for receipt, intent to receive and non-receipt are presented in the results the investigators provide no information in the methods section for how these were determined. Important information in evaluation of this data would include: was this an open ended question similar to NIS-Teen[25] or were the parents presented with a predetermined list? Also were multiple reasons allowed or even encouraged (e.g., "mark all that apply")?

That a recommendation for one adolescent vaccine results in the receipt of other vaccines, as presented by Gargano et al., is exciting and provocative. Examining the materials and methods section we see that the parent was asked a separate question for each adolescent vaccine and for influenza vaccine. We cannot determine how these recommendations were combined. More problematic is that these recommendations are likely not independent of each other, and it appears that the analysis did not take into account the correlated nature of the recommendation data. While we are given the number and proportion receiving or intending to receive each vaccine after a recommendation, we are not given that information for those who received no recommendation and were immunized or intended to be immunized. This leaves the reader without a way to evaluate the results such as an effect size for individual recommendations.

The authors report the reasons given by parents that their adolescent received, intended to receive or would not receive each of the adolescent vaccines. Unfortunately it is not clear how these reasons were assessed and then categorized, which makes interpretation problematic. It would be helpful to know whether these were open-ended questions or a list of possible responses as well as whether multiple responses were encouraged.

Local surveys of reasons for vaccination or not vaccination have much to offer the national and local discussion about immunization delivery and can provide valuable information as to how delivery should be optimized. Immunization education and delivery efforts should be tailored for their particular groups, regions and communities. As is noted above, children who are not vaccinated or are incompletely vaccinated tend to cluster together.[22,23]

How should surveys of parental attitudes and vaccine receipt be conducted? It is known that those unvaccinated and vaccinated tend to cluster. What is still to be elucidated is how those cluster are the same and how they are different, are the reasons for vaccine delay or refusal the same and/or how do they differ? Are there reasons that are related to the provider of care or the school that is attended rather than the patient? In order to answer these questions investigators need to consider and to use a core set of instruments. A requirement of the need to use the same instruments is that investigators should publish their instruments. A clear source of knowledge, attitudes and behavioral questions related to immunization is the National Immunization Surveys for children and teens.[26,27] In Garagano et al., there appear to be two different questions related to clinician or provider recommendation. From the methods section, we find "Did a doctor recommend that your child receive a flu/Tdap/MCV4/HPV vaccine?" From the results, from the reasons given, we infer parents were asked about recommendations from the health department. Both of these questions are combined into one question from the 2012 NIS-Teen asked for each vaccine. For example, "Has a doctor or other health care professional ever recommended that [TEEN] receive Td or Tdap shots?"[27] Standardizing the questions and methodologies will permit readers the ability to assess local phenomenon such as clustering or campaigns in terms of what is known in other localities and at a national level.

Furthermore, investigators conducting local surveys must provide for a broader range of responses to questions about intent, attitude, and belief. Binary valences for true and false lose important precision that may differentiate effects of clustering or campaigns.

Finally, investigators conducting local surveys must pursue means that achieve much more representative sampling of the populations under consideration. Low response rates put such studies at risk for consent or volunteer bias which in turn makes it difficult to interpret clustering of vaccine-hesitators and campaigns to improve attitudes and change beliefs.

We need studies of local phenomenon so that we can better understand the nuances of the findings from the nationally representative surveys such as NIS-TEEN but investigators need to take advantage of standardized questions and reporting as well as achieve sufficient sampling to cast a stronger light to reveal important detail and add nuance to national findings.

Disclosure of Potential Conflicts of Interest

P.M.D. serves on the US HPV Advisory Board for Merck. He has been a consultant and served on an advisory board to Pfizer, Inc. in the last three years.

R.M.J. serves as a member of a safety review committee for a Phase IV safety study conducted by Merck and Co. in males receiving HPV4 and as a member of a data monitoring committee for a series of Phase III pneumococcal vaccine trials also conducted by Merck and Co.

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