

# OFP

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COLLEGE OF OSTEOPATHIC  
FAMILY PHYSICIANS

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The Joy of Conversation

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Patient Knowledge and Understanding  
of Home Health Services Criteria

## REVIEW ARTICLES

Pseudogout: Uncommon and  
Under Recognized

Preventing Cancer with Two  
Injections, A Clinical Review of  
the HPV Vaccination

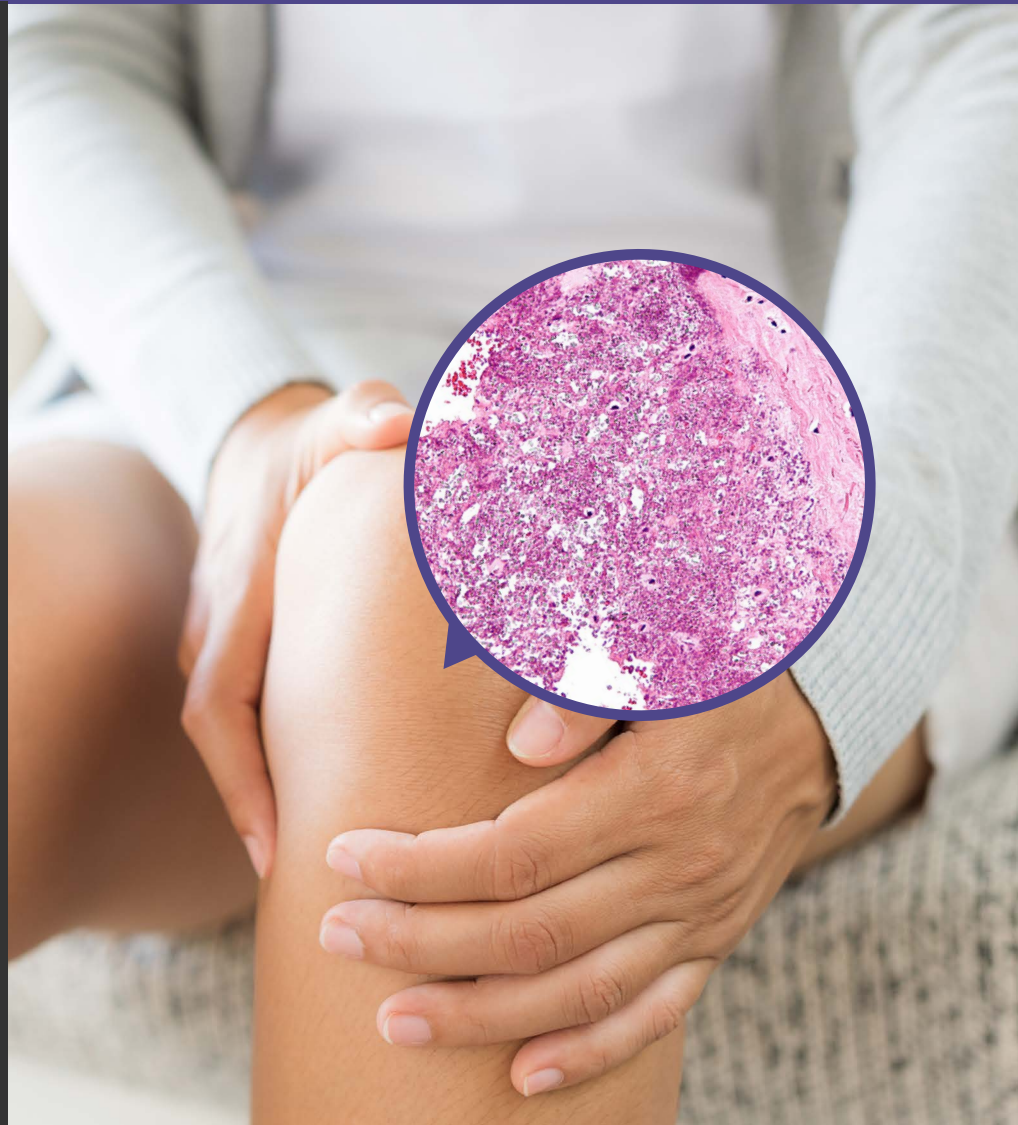
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A New Eyelid Growth

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## PATIENT EDUCATION HANDOUTS

Premenstrual Dysphoric Disorder  
Human Papillomavirus



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Certification / OCC

Cognitive Exam

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September 28, 2019

**April 1, 2019**

*Late fee through June 1, 2019*

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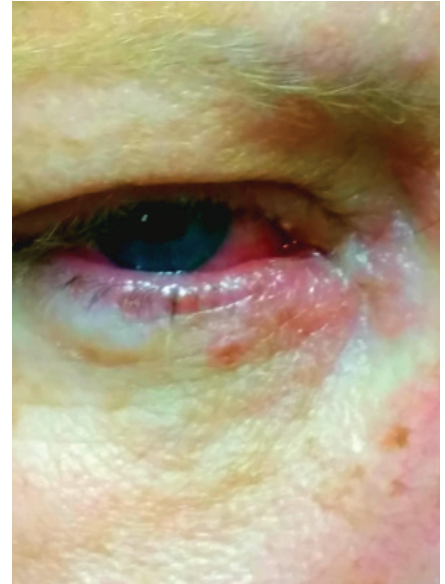
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# NOW SEEKING CLINICAL IMAGES



## OSTEOPATHIC FAMILY PHYSICIAN

ACCEPTING SUBMISSIONS FOR THE SECTION TITLED "CLINICAL IMAGES."

This section showcases clinical images from the wards that cover essential concepts or subject matter to the primary care physician.

Each installment of "Clinical Images" comprises 1 or 2 medical images along with a brief synopsis of how the case presented along with 1- 4 questions and approximately 1 page of education with reference to the image and questions.

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# EDITOR'S MESSAGE

## The Joy of Conversation

Ronald Januchowski, DO, FACFP, Editor, *Osteopathic Family Physician*

Democrats, Republicans, liberal, conservative, red, blue, anti-vax, Medicare-for-all, impeachment, fake news, Bills vs. Patriots: all words that can elicit emotions and sometimes eliminate true conversations. Finding common ground and carrying on a rational conversation to look for gray areas seems to be getting lost these days. Recognizing other people's perception and feelings is a difficult task at times and really takes effort.

While it would be wonderful to take on these highly charged phrases head-on in this issue of the *Osteopathic Family Physician*, instead, I would like to introduce you to the excellent articles contained within that may help facilitate conversation with fellow Osteopathic physicians and your patients. Communication skills are at the heart of Osteopathic medicine, and I am pleased that we are highlighting these topics.

In his article, Dr. Collins helps with the conversation about care outside of the office. Determining the patient's level of knowledge about medical services provided in the home is important to provide the optimal care for that patient. A conversation about the HPV vaccination with patients is even more critical these days, given recent reports attributing an increase in head and neck cancers to the virus. Being able to speak logically about this cancer-preventing vaccine can only improve patient perception regarding this treatment.

Be sure to review the remainder of the issue and speak to others about the clinical image and a review of calcium pyrophosphate disease. Of course, the patient handouts at the end are always a great way to reinforce positive communication with patients.

As 2019 comes to a close, enjoy a football game with friends – or maybe rivals – and discover the joy of conversation again!







## 2020 CALL FOR PAPERS

Osteopathic Family Physician is the ACOFP's official peer-reviewed journal. The bi-monthly publication features original research, clinical images and articles about preventive medicine, managed care, osteopathic principles and practices, pain management, public health, medical education and practice management.

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### CLINICAL IMAGES

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### REVIEW ARTICLE TOPICS

- Disorders of Puberty: An Approach to Diagnosis and Management with an osteopathic component
- Lupus: Review Article with Osteopathic Component
- CPPD: with an osteopathic component
- ADHD: Latest Options Treatment Review article with osteopathic component
- OMT treatments for pediatric conditions: a systematic review
- Insomnia Diagnosis and Management: An Osteopathic Perspective
- Non-Allergic Rhinitis with osteopathic component

### RESEARCH TOPICS

We are seeking original clinical or applied research papers. Original contributions include controlled trials, observational studies, diagnostic test studies, cost-effectiveness studies, and survey-based studies. The OFP will accept basic scientific research only if the work has clear clinical applications. For randomized controlled trials, study flow diagrams must be submitted. For all other types of original contributions, flow diagrams are encouraged. Original contributions should be 3000 words with no more than 50 references and 5 tables or figures. OFP requires you to submit a 250-word abstract, along with four to six keywords.

The content should include the following:

<i>Abstract</i>	<i>Discussion</i>
<i>Introduction</i>	<i>Conclusions</i>
<i>Methods</i>	<i>Acknowledgments</i>
<i>Results</i>	

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## FROM THE PRESIDENT'S DESK



### New ACOFP Resources for CME, Education and Patients

Robert C. DeLuca, DO, FACOFP *dist.*  
2019 - 2020 ACOFP President

Over the past year, the ACOFP has created several new resources to help educate osteopathic family physicians, residents and students, as well as patients. In the eLearning Center, we recently posted the 2019 Intensive Update & Board Review Online videos, which provide CME opportunities and help you prepare for Board exams. Also, we are launching the all-new OMTototal and OMTeaching Video Libraries, featuring 150 videos searchable by anatomy, symptom and manipulation type, available for individual and program purchases.

In addition to the on-going patient education handouts published in this journal, ACOFP Board task forces have created policies and guidelines around public health topics that are important to family medicine, such as disaster preparedness and management, outreach programs, medical cannabis, sexual health and gun safety.

Here are highlights of a few policies and resources the ACOFP has recently published. See the resources pages of ACOFP.org for full information and website links.

#### POLICY ON SEXUAL HEALTH IN TEENS AND YOUNG ADULTS

The ACOFP adopts the World Health Organization definition of sexual health as the state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity.

The ACOFP recognizes the integral part the family physician plays in working with teens, young adults and their families in addressing these issues and recommends the following.

1. Comprehensive sexual education should begin in early childhood and continue through a person's lifespan with emphasis on anticipatory guidance in the adolescent patient.
2. Family physicians should provide counseling and guidance about responsible sexual behavior to prevent pregnancy and sexually transmitted infections (STIs).
3. Family physicians should educate on the signs and symptoms of STIs and the need for testing when appropriate.
4. Family physicians should be aware that teens and young adults are exploring their sexual orientation and gender identity, which can greatly impact their emotional and physical well-being.

5. Family physicians should educate their patients on the concept of consent to sexual activity and what to do if they feel sexual activity has occurred without consent.

6. Family physicians should educate about the risks of sexting and the use of social media in a sexual manner, including the negative emotional impact.

7. Family physicians should encourage adolescents to have open dialogue with their parents or other trusted adults about their sexuality and/or gender identity, while assuring the confidentiality that is apparent in the physician-patient relationship.

8. Family physicians should make information available to patients through patient education handouts or referrals to available community services.

9. If a family physician feels uncomfortable in having these discussions with their adolescent patient, they should refer the patient to another provider.

The ACOFP also created patient education handouts for physicians on sexual health, birth control, gender identity and STIs.

#### ACOFP POLICY ON GUN SAFETY

The ACOFP declares that gun violence has become a public health emergency and calls on local, state and federal legislators, our nation's governors and the President to enact legislation supporting the following policies.

1. The ACOFP supports lifting the restrictions and the restoration of funding for gun violence research at the CDC and NIH that can develop policies to help decrease gun violence and promote gun safety.
2. The ACOFP supports the development of evidence-based strategies and supporting educational materials to be used by physicians and health care professionals during wellness screenings for adults and children.
3. The ACOFP supports the repair and re-enactment of the National Instant Criminal Background Check System (NICS) for all handgun purchases.

4. The ACOFP supports increased funding at the federal, state and local levels for mental health services.

5. The ACOFP calls for the implementation and continued funding of the 2018 Bipartisan School Security Funding Bill, which proposed and temporarily funded evidence-based safety programs in our nation's schools.

6. The ACOFP supports the establishment of federal laws allowing various persons to petition a court for the removal of a firearm when there is a high or imminent risk for violence.

7. The ACOFP supports increasing the legal age to purchase ammunition and firearms from 18 to 21 nationally.

8. The ACOFP supports legislative efforts to extend the definition of domestic violence to include violence against a current or former dating partner and surrender policies with firearm purchase and possession prohibition for persons under a domestic violence restraining order or anyone convicted of misdemeanor domestic violence, stalking and ex parte protective orders.

9. The ACOFP supports the implementation and enforcement of the ban of bump stocks and similar devices that enable the rapid fire of ammunition.

10. The ACOFP supports federal legislation requiring gun purchasers to complete a gun safety course or live fire exercise with a range instructor prior to purchasing a gun.

## LGBTQI+ RESOURCES

The ACOFP provides links to numerous resources for minority and LGBTQI communities on its website, including a new section regarding PrEP for HIV prevention.

### What is PrEP?

PrEP, or pre-exposure prophylaxis, is a medication (tenofovir and emtricitabine) prescribed daily to prevent HIV infection.

### Who should take PrEP?

PrEP is recommended for patients without HIV who are at high risk of becoming infected via injection drug use or unprotected sex.

### How effective is PrEP?

When taken consistently, PrEP reduces the risk of contracting HIV through sex by 99% and reduces the risk of contracting HIV through injection drug use by 74%.

### How safe is PrEP?

Studies have shown no significant health effects in HIV-negative people who have taken PrEP for up to five years. Some patients have reported nausea, diarrhea, headache, dizziness and fatigue when taking PrEP.

The ACOFP aims to continue adding useful resources to the website for members. If you would like to suggest resources to be added or provide documents with information that would benefit your fellow osteopathic family physicians, please feel free to contact ACOFP staff.

Osteopathically yours,



Robert C. DeLuca, DO, FACOFP *dist.*  
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## RESEARCH ARTICLE

# Patient Knowledge and Understanding of Home Health Services Criteria

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## KEYWORDS:

Home Health

House Call

Homebound Criteria

**ABSTRACT:** Context: This study was conducted to gain a better understanding of patients' understanding of homebound criteria and house call eligibility.

**OBJECTIVE:** To date, little empirical data exists assessing patient knowledge of home health care services. This study is designed to examine patients' understanding of home health care services, eligibility criteria, costs, and interest in house calls.

**METHODS:** This study used an anonymous survey developed by the researchers and provided to patients in four separate office locations at a large academic Family Medicine practice. Questions about homebound criteria, eligibility, out of pocket cost, and patient interest were asked.

**RESULTS:** In total 393 surveys were collected. Approximately 47 percent of all respondents in the survey showed interest in having a home care visit by a healthcare professional, while only 59.6 percent were able to accurately identify the definition of homebound status. Approximately 60 percent of all respondents believe that they will have to pay more out of pocket for home visits, and the subgroup of respondents who have an interest in home visits showed that 63.4 percent of that group think that they will have to pay more out of pocket for such visits.

**CONCLUSION:** These data have the potential to inform medical providers of a lack of understanding among patients regarding homebound criteria and home health care in general. While further studies could examine more specific details of this potential knowledge gap, the information provided by this study could prompt providers to begin educating patients on the possibility of home care.

## INTRODUCTION

The population of Americans age 65 and older is approximately 49 million and rising.<sup>1</sup> It is estimated that among those living in the community in this age range, 19.6% are homebound.<sup>2</sup> Compared to their non-homebound peers, homebound seniors have been

shown to have significantly higher health care expenditures and number of hospitalizations. Homebound status can also predict future depressed affect in addition to difficulties with activities of daily living (ADL) and instrumental activities of daily living (IADL).<sup>3</sup> Despite evidence indicating homebound individuals are more likely to have been hospitalized in the last year and have more chronic conditions, such as heart failure, emphysema, stroke, dementia, and depression, estimates suggest that only 11.9% of homebound patients receive home care.<sup>4,5</sup> In addition to the increased likelihood of the aforementioned chronic conditions,

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homebound patients over the age of 65 have a mortality rate of 40.3% compared to 5.8% seniors not homebound, independent of comorbidities.<sup>6</sup>

Homebound status can carry varying definitions. The Centers for Medicare and Medicaid Services (CMS) criteria that patients must meet in order to be considered homebound are defined as follows:

**Each of the following criteria must be met:**

- There must exist a normal inability to leave home
- Leaving home must require a considerable and taxing effort

**Additionally, one of the following criteria must be met:**

- Because of illness or injury, need the aid of supportive devices such as crutches, canes, wheelchairs, and walkers
- The use of special transportation or the assistance of another person to leave their place of residence
- Have a condition such that leaving his or her home is medically contraindicated.

In addition to these criteria the patient may be considered homebound if absences from the home are: infrequent, for periods of relatively short duration, for the need to receive health care treatment, for religious services, to attend adult day care programs, or for other unique or infrequent events (i.e. funeral, graduation, trip to the barber).<sup>7</sup>

Identifying these patients requires a medical professional to determine that the above criteria are met. Promoting the possibility of physician house calls to patients could prove to be helpful, though there is currently little known about the extent of patients' knowledge of home care and homebound criteria. In many cases there are options available to homebound patients to receive quality, cost-effective healthcare at home including skilled nursing services, physical and occupational therapy, and visits from physicians.<sup>7</sup> Introducing these at-home services early in disease progression can be beneficial as it has been shown that house call intervention at a younger age can lead to better outcomes.<sup>8</sup>

In addition to the health outcome benefits, house calls have been shown to reduce overall health care spending among homebound patients.<sup>9,10,11</sup> A 2014 systematic review of home-based primary care programs for older homebound adults enrolled in services showed several positive benefits to home health care including reduction in emergency room visits, hospitalizations, and long term care admissions compared to those non-enrolled. Furthermore, it showed a cost savings of 24% (\$29,000 to \$38,000) over a year.<sup>12</sup>

To our knowledge, there have been no studies evaluating patients' familiarity with home health in the US; however, one study based in Turkey found that only 54.9% of patients 65 or older are familiar with the concept of home health care.<sup>13</sup> Additionally, the Centers for Disease Control and Prevention (CDC) estimates that home health care is only utilized by 75 in 1000 patients over the age of 65 in the United States.<sup>14</sup> This low number could be due to a variety of factors. In this study we set out to explore the reasons

for this low utilization rate and, among other things, we also examine the role of information and perception of house calls and home health care. We aimed to assess patients' knowledge of homebound criteria, potential perceived barriers such as out of pocket costs, and whether there are any knowledge disparities related to age or race.

## METHODS

The researchers developed an anonymous 13-item multiple-choice survey and provided it to adult patients age 18 and older at four office locations within a large academic Family Medicine practice located in the mid-Atlantic region of the country. Demographic information including age, race, and gender were collected. In order to more effectively observe whether or not patients seek out information about physician house calls as they grow older, all age groups of patients were included. Questions included items that judged subjects' knowledge of qualifying and disqualifying criteria for homebound medical status eligibility. The survey also contained questions about participants' interest in home health care, the definition of homebound, which services are provided by home health care, the out of pocket cost of home care, and participants' perception of the level of care provided at home. To avoid confusing and lengthy questions, the definition of homebound on the survey was described as "it takes considerable effort to leave home." While this definition does not fully meet criteria set out by CMS, it does roughly approximate the criteria.

The logistics regression model and marginal effects were used to examine patient knowledge of home health care. For simplicity, only the respondents who showed interest in home visits were utilized for this analysis.

### Regression equation:

$$y_{ij} = \beta_0 + \beta_1 (\text{OutofPocket})_i + \beta_2 (\text{Black})_i + \beta_3 X_i + \delta_j + \mu_{ij}$$

Where  $y$  is the binary variable, which takes the value 1 if the respondent  $i$  chose the correct answer, and 0 if the respondent chose a wrong answer. "Out of pocket", our main variable of interest, is a binary variable, which takes the value 1 if the respondent believes that a home health visit will include out of pocket expenses, and 0 otherwise. Black is a binary variable for race.  $X$  is the vector of demographic characteristics like age and gender. We control the regression for location fixed effects, which is represented by  $\delta_j$ . Since this is a logistic regression, we are interested in the marginal effects of the variables instead of the coefficients.

## RESULTS

In total, 393 surveys were collected. The survey questioned the respondents on their interest in and their knowledge of the eligibility criteria for a home visit by a healthcare professional. *Table 1* gives the summary statistics of some of the main variables of interest. The variables are binary with value 0 or 1. A variable takes the value 1 if the respondent chooses "Yes" as the answer to a question, and it takes the value 0 if the respondent chooses "No" as the answer to a question. For the race/demographic variables,

TABLE 1 :

Summary statistics

Variables	Percentage Selecting Answer Choice
Respondents who are interested in home visits	46.6%
Respondents who are not interested in home visits	53.4%
<b>Eligibility related questions</b>	
Definition never able to leave my house	37.6%
Definition have less than 6 months to live	1.5%
Definition leaving my home requires considerable effort	59.6%
<b>Information</b>	
Out of Pocket Expense is more than office	60.2%
Out of Pocket Expense is more than office for group interested in home visit	63.4%
<b>Demographic Characteristics</b>	
White	72%
Black	14.2%
Hispanic	7.3%
Asian	1.2%
Male	35.6%
Female	64.4%

it takes value 1 if the respondent belongs to that particular race/ demographic category, it takes the value 0 otherwise.

Approximately 47 percent of all respondents in the survey showed interest in having a home care visit by a healthcare professional. The next question on the survey, related to the definition of homebound status, gave respondents three different options concerning the definition of homebound status for which they were asked to check the correct answer. Most respondents (59.6 percent) chose the most accurate answer, "leaving my home requires considerable effort" while 37.6 percent chose "never able to leave my house" and 1.5 percent chose "less than six months to live."

Another variable of interest is what patients consider to be the cost of home visits. Approximately 60 percent of all respondents believe that they will have to pay more out of pocket for home visits. The subgroup of respondents who had interest in home

visits, showed that 63.4 percent of that group think that they will have to pay more out of pocket for such visits. In reality, however, home care visits are covered by many insurers, including Medicare, with similar cost as office visits.<sup>15</sup>

The last few variables examined are demographic characteristics of the respondents. 72 percent of all respondents identified as White, 14.2 percent identified as Black, and approximately 7 percent identified as Latino. Though there is a slight over sampling of participants identifying as female with only 36 percent of all respondents identifying as male, that should not affect the results because there is not an identifiable gender difference in the responses.

Table 2 provides demographic characteristics of patients in various age groups. There are seven different age cohorts ranging from 18 years to 75 years and above. Racial distribution of the respondents was similar across groups, except the 35 to 44 year age group, which had a higher proportion of Hispanic patients. Another age cohort, 65 to 74 years old, had no Hispanic respondents. There were fewer males in every age cohort. A possible explanation is that fewer males agreed to fill out the survey.

We included all age groups in the analysis to observe if there is a learning curve among the population, postulating that as people get older they gather more information about home visits because they usually need assistance around that time. The results for all the age groups look similar. The number of respondents picking the correct answer choice or showing interest in house calls does not change significantly with age.

Respondents who indicated that they were interested in home calls were more likely to accurately identify the correct homebound definition, Table 3.

The likelihood of someone showing interest in home visits was then evaluated based on demographic information. Participants identifying as White represented the largest subgroup in the category of race, hence it was used as the control group and then compared to other racial subgroups. Participants identifying as Black were more likely to be interested in home visits, Table 4.

Table 5 shows the results from the logistic regression along with its marginal effects where the dependent variable is the correct choice for eligibility question on the survey and the independent variable refers to the question about people's knowledge about cost of home visits. The regressions only include respondents who showed interest in a home health visit. The second column above includes the marginal effects of the logistics regression.

## DISCUSSION

A recent study found that only 54.9% of patients aged 65 or older are aware of the concept of home health care, indicating an overall lack of knowledge. The findings reported in the current study support these prior results by identifying about 40% of participants were not aware of the homebound definition.<sup>13</sup> It should be noted the former study was based out of Turkey, where the health care system may vary from that of the US, but



TABLE 2 :

Summary statistics by age

Variables	18-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	65-74 years
Number of Responses	20	45	57	90	85	59	59
Respondents who show interest in home visit.	0.4	0.42	0.493	0.44	0.51	0.44	0.44
Eligibility related questions							
Definition leaving my home requires considerable effort (correct answer)	0.45	0.62	0.42	0.633	0.61	0.49	0.49
Information							
Patient believes out of pocket cost is higher	1	0.53	0.63	0.606	0.55	0.52	0.52
Patient believes the quality of care received during house calls is better than doctor's office	0.88	0.52	0.66	0.789	0.695	0.64	0.64
Demographic Characteristics							
White	0.80	0.62	0.72	0.72	0.715	0.88	0.88
Black	0.15	0.117	0.088	0.176	0.141	0.101	0.101
Hispanic	0.05	0.155	0.14	0.077	0.058	0	0
Asian	0	0.022	0.017	0	0.011	0.016	0.016
Male	0.55	0.244	0.403	0.344	0.388	0.378	0.378

TABLE 3 :

Regression results – interest in home visits

Variables	Correlation	Logit Regression Coefficient	P-Value	Statistical Significance
Definition never able to leave my house	-0.057	-0.290	0.170	No
Definition have less than 6 months to live	0.052	0.841	0.335	No
Definition leaving my home requires considerable effort	0.109	0.413	0.046	Yes (at 5%)

Notes: The table shows the correlation between the variable "interest in home visit" and the three answer choices for the definition of homebound. The regressions were run without any controls. All the variables are binary variables.

TABLE 4 :

Interest in Home Visits by Race

Variable Name	Coefficient	P-Value	Statistical Significance
Black	0.632	0.032	Yes
Hispanic	0.415	0.295	No
Asian	1.37	0.238	No

Notes: All the variables indicating various races have a positive correlation, however, the coefficient on the variable "Black" is significant. This indicates that Black respondents are more likely to show interest in these services.

TABLE 5 :

Logistic Regression Results – Homebound Criteria Correctly Identified

	Logistical Regression	Marginal Effects
<b>Variables</b>	Choice: Leaving Home takes Considerable Effort	
Out of pocket	-0.574	-0.139*
S.E.	(0.375)	(0.0871)
Black	-0.789*	-0.2007*
S.E.	(0.445)	(0.103)
Hispanic	-0.706	-0.166
S.E.	(0.584)	(0.143)
Male	0.0356	0.016
S.E.	(0.372)	(0.083)
Age – 18 to 24 years	1.002	0.213
S.E.	(0.873)	(0.134)
Age – 25 to 34 years	0.187	0.062
S.E.	(0.551)	(0.121)
Age – 35 to 44 years	-0.157	0.031
S.E.	(0.517)	(0.121)
Age – 55 to 64 years	0.775*	0.174*
S.E.	(0.461)	(0.091)
Age – 65 to 74 years	-0.271	-0.0657
S.E.	(0.514)	(0.121)
Constant	-0.680**	
S.E.	(0.309)	
Observations	173	173

\*=significance at 10%; \*\*=significance at 5%; \*\*\*=significance at 1%

Notes: The dependent variable is a binary variable that represents correct choice for the eligibility criteria for house calls. We find the marginal effects (change in probabilities) of our main variable of interest, that is, patients who think house calls will cost them more out of pocket than an office visit.

Age group 75 years and above is the control group. Age group 45 to 54 years was dropped in the model (by STATA). This could be because of multicollinearity.

interestingly a large number of participants were not familiar with home care services in either study. Additionally, our findings show that this knowledge gap is not limited to people age 65 and older but is present among adults of all ages. This result is worth noting given that many caregivers of elderly patients are under the age of 65.

A majority of participants (60.2%) in this study, and 63.4% of respondents who are interested in house calls, believe it costs more out of pocket. While the actual out of pocket costs may vary based on insurance carrier/plan, typically there are no additional costs to the patient.<sup>15</sup> The misconception of increased costs could certainly deter patients from seeking house calls, even if interested. Educating patients could clear up this fallacy.

In this study, most people who indicated interest in home health care chose the correct answer when identifying its definition and, as evident in *Table 1*, the coefficient is statistically significant. This finding is not surprising and may be explained by the possibility that patients are interested because they are more knowledgeable of the criteria and what house calls entail. Interestingly, there still remains a disparity of knowledge even among those who are interested in house calls and accurately identifying homebound status. Our results indicate that this group of participants is still less likely to identify out of pocket costs as being similar to office visits. The logistics regression and the marginal effects show how the probability of one of these events changes for the respondents who choose the correct answer. The marginal effect on the variable "out of pocket" is -0.139, meaning that if someone shows interest in home health visits and that respondent chooses the correct eligibility criteria, then their probability of claiming additional out of pocket expenditure for such visits decreases by almost 14%, *Table 5*. However, while interesting, this number is still quite low from an economic significance. It is possible that a large portion of the eligible population doesn't look for home visit information, as they mistakenly think that it will cost them more out of pocket. It should also be noted that interest in house calls does not change with age. This is an interesting observation, and it underscores the importance of raising awareness among the elderly patients about home visit options available to them.

Another important take away from *Table 5* is the result for the Black respondents in the sample. From *Table 4*, we note that Black respondents were more likely to show interest in home health visits. However, we see a lack of information among the same group on the eligibility criteria for such visits. They were 20 percent less likely to select the correct choice for the eligibility criteria, as shown in *Table 5*. While there are several potential reasons for this, one would need to consider if there is a lack of information among the community.

It should be noted that this study was done in an academic practice that actually has a house call department, which potentially led to an increase in overall knowledge among participants. The patients surveyed were not housecall patients, as this is a separate department, but it would be interesting to see a future similar study performed at a practice without a house call department. Other limitations of this study include a lack of equal racial distribution across age groups and the fact that the majority of respondents identified as white.

Future research should focus on the race-related knowledge disparities seen in this study. Additionally, research aimed at finding the best way to educate patients on homebound criteria and other related details such as cost and services may prove to be a helpful way to increase home care utilization.

## CONCLUSIONS

To our knowledge, this is the first study that looks at the effect of misinformation on the usage of home health care services by patients. There is clearly a gap in the literature and this study contributes towards reducing this gap. These data have the potential to help inform providers that there may be a lack of understanding and awareness among patients in regard to home health care eligibility. This study found that there might exist a knowledge gap in regards to homebound status definition and the cost of house calls. While there may be specific details with each patient that may or may not qualify someone for home care, many of the participants in this study were not aware of at least some of the criteria or details of home health care indicating a possible knowledge gap. Educating patients about eligibility and details could potentially lead to more patients seeking home health care and understanding the reasons for such low rate of usage among the population is important to take steps to increase awareness and access.

## AUTHOR DISCLOSURES:

No relevant financial affiliations or conflicts of interest.

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## REVIEW ARTICLE

# Pseudogout: Uncommon and Under-Recognized

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## KEYWORDS:

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CPPD

CPPD Disease

Calcium Pyrophosphate  
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Pseudogout

**ABSTRACT:** Pseudogout or calcium pyrophosphate deposition (CPPD) disease is an uncommon and often under-recognized presentation in primary care. Patients may initially develop asymptomatic crystal deposition, but these changes can evolve to synovitis, arthritis, and cartilage calcification. An initial differential diagnosis includes traditional gout, osteoarthritis, rheumatoid arthritis, septic arthritis, and Lyme disease. Acute attacks of CPPD may be indistinguishable from these conditions clinically, and a definitive diagnosis requires synovial fluid analysis. Fluid should be microscopically analyzed for cell count, crystal analysis under compensated polarizing microscopy, Gram stain, and culture. CPPD crystals are weakly birefringent under polarized light and have a rhomboid or rod-shaped appearance. No therapy is proven optimal, so CPPD treatment is instead tailored to symptoms, with goals of controlling acute pain, preventing additional attacks, and impeding the degenerative joint disease associated with CPPD disease arthropathy. Current treatment methods include intra-articular corticosteroid injections, NSAIDs, DMARDs, OMT, and in severe, refractory cases, surgery.

## INTRODUCTION/EPIDEMIOLOGY

Calcium Pyrophosphate Deposition disease, also known as CPPD disease or Pseudogout, is an uncommon and often under-recognized presentation in primary care. While the exact prevalence of this condition is unknown, it is estimated that 4-7% of adults in the U.S. are affected.<sup>1-3</sup> CPPD disease is generally seen in patients over age 60, with risk increasing with age, while a majority of cases are found in the setting of prior arthritis.<sup>2,3</sup> This review summarizes the evaluation and management of this polymorphous cause of crystal-induced arthritis.

## DIFFERENTIAL

CPPD disease is likely under-recognized as a cause of both acute and chronic synovitis and arthritis given its wide range of clinical presentations, as well as the much more common conditions that mimic its presentation.<sup>1</sup> While patients may initially develop

asymptomatic crystal deposition, these changes can evolve to synovitis and arthritis, and even cartilage calcification. Given these features, an initial differential diagnosis includes traditional gout, osteoarthritis, rheumatoid arthritis, septic arthritis, and Lyme disease, among other causes of monoarticular arthropathy.

## HISTORY

Patients with CPPD disease are generally older than age 60, with prevalence doubling each decade after that.<sup>2,3</sup> To further complicate the initial assessment, those with CPPD generally have a history of prior joint damage or degeneration, such as gout, osteoarthritis, or trauma.<sup>1-3</sup> CPPD disease can affect any joint, but most commonly affects the knees, wrists, hips, symphysis pubis, and metacarpophalangeal joints.<sup>1</sup>

Patients have joint pain with joint tenderness and swelling. Patients may endorse symptoms of systemic illness including fevers, chills, and malaise. A prior family history of CPPD disease may help make the diagnosis. Several medications and metabolic conditions are associated with CPPD disease attacks, including loop diuretics, pamidronate, and intra-articular hyaluronic acid injections, as well as hyperparathyroidism, hypomagnesemia, and hemochromatosis.<sup>1-3</sup>

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TABLE 1 :

Comparison of pseudogout and gout

	Pseudogout	Gout
EPIDEMIOLOGY	Age >60; affects males and females equally	Age 30-60; affects males more commonly than females
ETIOLOGY	Chondrocalcinosis	Hyperuricemia
JOINT PREDILECTION	Larger joints, most commonly the knee	Smaller joints, most commonly the first metatarsophalangeal joint
CRYSTAL APPEARANCE	Weakly birefringent, rhomboid- or rod-shaped	Negative birefringence, needle- shaped

## CLINICAL EVALUATION

CPPD disease is defined by acute attacks of joint pain and swelling due to synovitis that mimic gout (*Table 1*). These acute or subacute attacks can involve one or multiple joints. Similar to gout, CPPD disease can manifest with elevated acute-phase reactants, including ESR and CRP levels. Acute attacks of CPPD may be indistinguishable from acute gout.<sup>4</sup> One cannot definitively diagnose either condition without a synovial fluid analysis. Although CPPD disease and gout share similar joint predilection, CPPD disease tends to affect larger joints more commonly than gout and smaller joints less commonly than gout.<sup>4,5</sup>

## DIAGNOSTICS

Because acute CPPD disease closely resembles gout, the definitive diagnosis requires synovial fluid analysis.<sup>4</sup> Synovial fluid should be microscopically analyzed for cell count and crystal analysis under compensated polarizing microscopy. In addition, fluid should be examined by Gram stain and culture. CPPD crystals are weakly birefringent under polarized light and have a rhomboid or rod-shaped appearance, while gout crystals are needle-shaped with negative birefringence.<sup>4,5</sup> Crystals can be seen either intracellularly or extracellularly; however, detection might not be as accurate if fluid analysis is delayed.<sup>4</sup> CPPD disease and gout can also coexist.<sup>4</sup>

Radiographs can show chondrocalcinosis in the involved joint and other joints even if CPPD disease is not clinically active at the time of presentation. Radiographs can help confirm the clinical impression, especially images of the knees, wrists, and anterior pelvis, as well as determining the extent of joint degeneration; however, radiographs are not required to make the diagnosis once CPPD crystals are seen under polarized light.<sup>6,7</sup> Chondrocalcinosis is seen in the knees, wrists, and other joints such as intervertebral discs and the symphysis pubis.<sup>4,7</sup> Other radiographic features include joint space narrowing, subchondral bone formation, normal bone mineralization, cysts more prominent than in osteoarthritis, bilateral preponderance, and osteophyte formation.<sup>6</sup>

Most of the differential diagnosis factors with gout can be considered in the case of CPPD and must be ruled out. Infection is always a major differential, especially in the patient presenting with acute monoarticular arthritis. In addition, septic arthritis

can coexist in a joint that has been, or is currently, involved in an acute CPPD disease attack, as with gout.<sup>2-4</sup> Thus, it is important to aspirate the involved joint whenever possible for the microscopic examination of the synovial fluid and Gram stain and culture.

## TREATMENT

Optimal therapy includes prompt treatment of the acute attack, prevention of additional attacks, and prevention or reversal of the degenerative joint disease associated with CPPD disease arthropathy. Unfortunately, no proven therapy fits this description for CPPD, and no treatment is available to dissolve the crystal deposits.<sup>4,5</sup>

The treatment of CPPD disease is mostly tailored to the manifesting symptoms. In patients presenting with one or two joints of acute synovitis, after septic arthritis has been ruled out, rapid relief of pain and inflammation may be accomplished with joint aspiration and steroid injection.<sup>4,6</sup> Many patients find relief from the joint aspiration itself. When more than two joints are involved, it is not feasible to inject all the joints, so treatment is directed toward systemic therapy, with nonsteroidal anti-inflammatory drugs, like indomethacin and naproxen. For patients unable to tolerate these agents, colchicine is another alternative, but it typically needs to be given three to four times daily to be effective.

Other medicines may help some patients during severe attacks of CPPD disease or with the less common chronic inflammation that these crystals can cause. These drugs include hydroxychloroquine, methotrexate, or an interleukin-1 beta antagonist medication which can decrease inflammation.<sup>3,4,6,8</sup> The successful use of anakinra, an interleukin-1 receptor antagonist, has been described for treatment and prophylaxis of acute CPPD arthritis resistant to NSAIDs and prednisolone.<sup>8</sup>

All patients should receive education about their disease, a prescription for physical therapy for local strengthening and aerobic exercise, advice on reduction of adverse mechanical factors, and simple analgesia. Goals of treatment include control of symptoms, early mobilization to avert effects of prolonged immobility, and maintenance or improvement of function.<sup>3,4</sup>

Osteopathic Manipulative Treatment (OMT) is another option to address musculoskeletal complaints. There are many known benefits to OMT including increased range of motion, decreased pain, improved ADL's, and shortened disability time.<sup>9</sup> While there are no direct studies on treating CPPD with OMT, after obtaining a history and choosing an appropriate technique, OMT can be considered as another treatment option.

In severe cases of CPPD, surgery to repair and replace damaged joints may be required. CPPD management remains eminence-based, rather than evidence-based, as very few controlled clinical trials have been published.<sup>3,4,6</sup>

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**EISENHOWER HEALTH**

## REVIEW ARTICLE

# Preventing Cancer with Two Injections, A Clinical Review of the HPV Vaccination

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## KEYWORDS:

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**ABSTRACT:** Human Papilloma Virus (HPV) has become a major public health concern in the United States. HPV has high subclinical infection rates and is a major cause of preventable cancers (cervical, vaginal, vulvar, anal, penile, and oropharyngeal).<sup>1,2</sup> Despite availability of an effective vaccine against several common and carcinogenic strains of HPV, it remains the most common STI.<sup>2</sup> Gardasil 9 is a widely available vaccine that protects against nine strains of HPV. Seven of those strains are known to cause a wide range of cancer, and the other two strains are the most common cause of condylomas (genital warts).<sup>3</sup> Yet, patients are not completing this vaccination series. There are a constellation of reasons for this, including failure of the provider to offer it to patients and patient refusal.<sup>4</sup> Either way this easy public health intervention is significantly underutilized. This review explores the infection process of HPV; its link to cancer; a comparison of vaccines offered in the past, such as Cervarix and Gardasil 4, compared to the currently offered Gardasil 9; and finally, an exploration of the beliefs and views around vaccination of the STI and cancer by looking at patient/physician stances against the vaccine tied with the ways to help patient compliance.

## INTRODUCTION

Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) worldwide, and it is causative of some of the most common cancers, including cervical, oropharyngeal, anal, penile, and others. The cancers linked to HPV and the rate at which they occur are shown in *Figure 1*.<sup>1,2</sup> HPV has become so common it is estimated that every non-vaccinated, sexually-active person will have been infected at some point in their life.<sup>2,3</sup> Nearly half of US adults 18-59 years old during 2013-2014 were actively infected.<sup>2,5</sup>

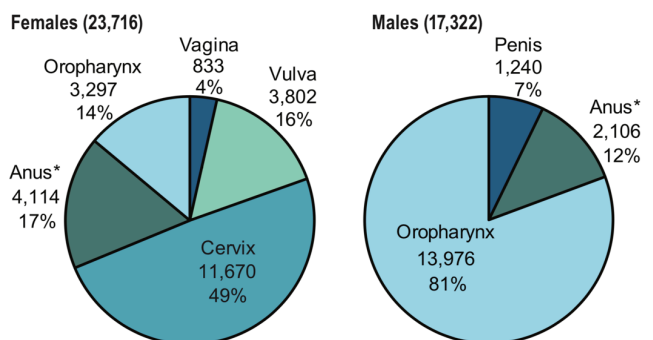
There are over 150 types of HPV, but not all strains carry the same risk of significant infection. HPV is a nonenveloped, double-stranded circular DNA virus of the papillomavirus family.<sup>6</sup> Forty of the 150+ strains are associated with infections of the genital tract. Specifically, HPV 6 and 11 cause approximately 90% of HPV-associated genital warts and can cause infection in the respiratory tract, conjunctiva, and oral cavity.<sup>6</sup> HPV 6 and 11 can cause malignancy of the respiratory tract. HPV 16 and 18 cause about two thirds of cervical cancers.<sup>2</sup> HPV 16 is strongly associated with penile cancer and oral cavity infection.<sup>6</sup> The

lesions are referred to as warts when on the skin and condylomas on mucosal surfaces. Transmission rates are relatively high, with condylomas developing in about two thirds of sexual partners of a person with a condyloma.<sup>6</sup> There are several typical courses for an HPV infection: the infection may resolve spontaneously without symptoms, resolve with symptoms, persist without pre-cancerous dysplasia, or become pre-cancerous.<sup>5</sup>

## FIGURE 1 :

Number of new HPV-related cancers from 2010-2014.

Source: CDC, Data Brief Cancers associated with HPV<sup>7</sup>



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## PATHOGENESIS AND CLINICAL PRESENTATION

Infection with any HPV strain requires skin-to-skin contact. Skin condition/integrity also plays a role in risk of infection. During intercourse the epithelium and mucosal membranes may be damaged by disruption of the cellular tight-junctions, exposing the basal layer of cells. It is believed the micro-trauma of intercourse increases the susceptibility of developing chronic HPV infection (and other STI's).<sup>6</sup> Clinically, exposure can be hard to determine as the incubation period of this virus may be weeks to months. This also makes tracking the source of infection harder in those with multiple sexual partners. After incubation, HPV warts/condylomas may show persistence, latency, and some people may never show symptoms and go directly to latency.<sup>6</sup> Latency is believed to be achieved when there is damage to the epithelial barrier; the virus bypasses the non-dividing, protective cells and gains access to the basal, dividing cells. Infection can persist longer and potentially indefinitely in these stem cells. The infection is capable of remaining subclinical in latency or persistent as a condyloma.<sup>6</sup> Thus, during intercourse there is a higher risk of epithelial damage which in turn leads to a stronger chance of HPV infection. Risk of infection with an anogenital strain of HPV is very much like the risk-profile for other STI's; increased with lifetime number of partners, partner's lifetime number of partners, condom use, alcohol use, illicit drug use, being under 25 and condom use.<sup>3</sup>

All viral STI rates have been on the rise since the 1960's, with HPV showing a steeper increase than others.<sup>8</sup> Incidence of condyloma-related-visits in a study from Minnesota rose from 13 per 100,000 to 106 per 100,000.<sup>9</sup> This is in contrast to bacterial STI rates, which have been on the decline since 1980.<sup>8</sup> This stark increase in HPV prevalence is very concerning. The prevention of this disease must be a high priority because cervical cancer is the most common cancer in women in developing countries.<sup>4</sup> In the US there are about 15,000 newly diagnosed cases of cervical cancer each year, and about one third will die.<sup>6</sup>

Diagnosis of HPV infection is typically made by clinical presentation confirmed with a few subsequent tests, such as pap testing and PCR analysis. When a patient presents with a non-genital wart, diagnosis can be made upon physical exam with visual inspection. Laboratory methods are then used for testing a suspected condyloma. The procedures and recommendations are thoroughly explained for all age groups in the "Updated Consensus Guidelines for Managing Abnormal Cervical Cancer Screening Tests and Cancer Precursors."<sup>10</sup> The guidelines for women 30 and over are summarized in *Table 1* from the CDC.

Cells obtained from the cervix may be stained by Papanicolaou staining (Pap smear/Pap test). Infection is shown by the presence of koilocytosis, a condensed nucleus with a prominent perinuclear clear zone.<sup>6</sup> Cervical and other samples may also be analyzed by PCR and a hybrid capture assay. These additional tests are useful for typing the HPV infection and may dictate best management for the patient but must be considered case-by-case.<sup>6</sup> The hybridization assays are less sensitive than PCR for viral detection but may give additional insight to the potential for malignancy. Squamous cell carcinomas make up about 85% of the malignancy while most other cases are adenocarcinomas, and very few are neuroendocrine small cell tumors.<sup>6</sup>

## HPV SCREENING RECOMMENDATIONS

Screening for condylomas and nonvisible/asymptomatic infection by pelvic exam and pap smear should be completed routinely in at-risk groups. Routine pap tests should begin for all women aged 21 years.<sup>11</sup> From age 21-30 women should be screened every 3 years by pap smear alone and at age 30-65 should receive cytology and HPV co-testing every 5 years.<sup>11</sup> After age 65, if the woman has had 3 consecutive negative pap tests or 10 years of negative HPV co-tests with the most recent being negative, screening may be discontinued in the absence of high risk behavior.<sup>11</sup> High risk behavior are those outlined as the risk profile for STIs.

**TABLE 1 :**

Summary of Cervical Cancer Screening Results and Management for Women 30 Years of Age or Older

Test Results	What to Do Next
Normal Pap and Negative HPV	Rescreen in 5 Years.
Normal Pap and Positive HPV	Repeat co-test in one year or do HPV DNA typing now (ASCCP guidelines).
ASCUS Pap, No HPV Test	Repeat cytology in one year or do HPV test now (see ASCCP guidelines).
ASCUS Pap and Negative HPV LSIL Pap and Negative HPV	Repeat Pap and co-test at interval as per ASCCP guidelines.
ASCUS Pap and Positive HPV LSIL Pap and Positive or Unknown HPV ASC-H Pap HSIL Pap	Colposcopy and/or referral to gynecologist.

## VACCINATION

HPV is largely preventable via the vaccine, but implementation of the vaccination is currently less than satisfactory. With the rising rates of HPV infection the need for vaccination programs is critical. A multiprong approach is needed to change the course of this disease. Education on effective condom use is becoming more often utilized and may help to reduce spread, but more can be done. Vaccination against an infection that is known to commonly progress to cancer seems like an excellent solution.

The L1 major capsid protein of HPV is capable of reassembly without the minor capsid protein L2 to create an immunogenic structure closely mimicking the natural HPV epitopes.<sup>12</sup> L1 reassembly product is then used to create viable vaccines against HPV capable of generating robust IgG responses. All three FDA approved vaccines are recombinant non-living vaccines.<sup>13</sup>

Originally the quadrivalent vaccine, Gardasil, was approved in 2006. A bivalent vaccine, Cervarix, was released in October of 2009. Cervarix and Gardasil were recommended only for girls and women (9-26 years old) upon the initial release of each.<sup>13</sup> Both vaccines have been taken off the market since introduction of the newer nine-valent vaccine (9vHPV, Gardasil 9) was adopted. The vaccines previously available summarized in *Table 2*.

Currently, vaccination with Gardasil 9 is recommended for boys and girls starting at 11 years old, but is approved for use at nine years old. The increased coverage of 9vHPV have made older versions of the vaccine obsolete leading to sales/production to cease. The new 9vHPV protects against 9 strains of HPV; HPV 16, 18, 31, 33, 45, 52, and 58 that can cause cancer (cervical, vaginal, vulvar, anal, penile, and oropharyngeal) and HPV 6 and 11 that cause about 90% of HPV-condylomas.<sup>3,14</sup> The vaccine may be given to women while breastfeeding, but should be avoided in pregnancy.<sup>3</sup>

The recommended vaccination schedule for Gardasil 9 can be completed in a two or three-dose regimen. The two-dose regimen is recommended for girls and boys nine to 14 years old at an interval of time 0 months for the first dose and 6-12 months for the second dose. The three-dose regimen may be used for anyone nine to 26 years old at an interval of time 0 months for the first dose, two months for the second dose, and six months for the third and final dose. Each dose is a 0.5 mL suspension administered

**TABLE 2 :**

Different versions of the HPV vaccine no longer on the market.

Vaccine	Approval	Coverage	Recommendation	Discontinued
Cervarix	October 2009	HPV 16,18	Females 9-26	October 2016
Gardasil (4, Female)	June 2006	HPV 6, 11, 16, 18	Females 9-26	May 2017
Gardasil (4, Male)	October 2009	HPV 6, 11, 16, 18	Males 9-26	May 2017

intramuscularly. If the second dose of the two-dose schedule is given before five months, the schedule should be adjusted to the three-dose regimen, with the final dose at least four months after the second.<sup>3</sup>

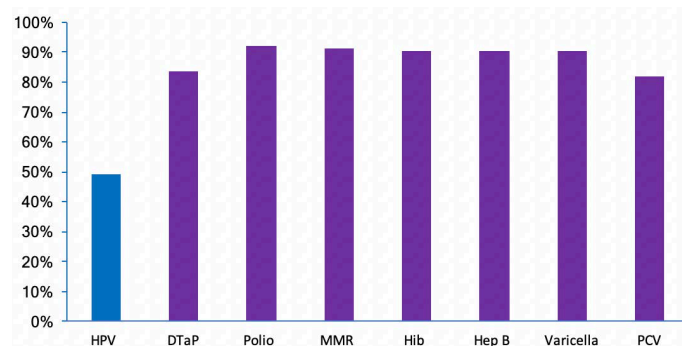
The vaccine has had a very strong and positive impact countering the continued rise of HPV infection. Vaccinated women, compared to their unvaccinated counterparts, showed a significant decrease in HPV prevalence since introduction of the first vaccine.<sup>15</sup> In the past decade since the 4 valent HPV vaccine introduction there was a nearly 83% decline in HPV infection (34.8% to 6%, OR .12, 95% CI .07-.20), and a 72% decline in HPV prevalence with the 9-valent vaccine (46.4% to 13.1%, OR .17, 95% CI .12-.26). The remaining 5 additional HPV types included in the 9-valent vaccine decreased from 67%. (23.5% to 7.7%, OR .27, 95% CI .16-.44).<sup>15</sup> In comparison, there was no notable change in the prevalence for unvaccinated women.<sup>15</sup>

The continued use of a readily available vaccine with insurance coverage can greatly reduce the prevalence of genital cancer for men and women of all ages. However, just starting on the vaccination schedule does not guarantee full adherence to the regimen and therefore not full protection. This is the second area of concern. In 2016, only 60% of teens aged 13-17 received one or more doses of HPV vaccine, and many in that population are not completing the vaccination series. Only 49% of teens are up to date on all the recommended doses of HPV vaccine.<sup>16</sup> This is in strong contrast to other vaccines series, as shown in *Figure 2*.

**FIGURE 2 :**

Vaccination completion rates for regularly recommended vaccines in the US.

Source: CDC Fast Stats<sup>17</sup>



## REASONS FOR OPPOSITION TO VACCINATION AND COUNTER-ARGUMENTS

Even though there is convincing evidence demonstrating the HPV vaccine's effectiveness at decreasing the risk for certain cancers, firm opposition from some politicians, parents, and healthcare providers remains.

What separates the HPV vaccine from other mandated childhood vaccines is that it prevents an infection that is only sexually transmitted and not spread by casual contact in other settings.<sup>18,19</sup> This difference in transmission has ignited deep-rooted controversies regarding adolescent sexuality.<sup>20</sup> Some politicians have labeled the HPV vaccine as “the promiscuity vaccine” arguing that it confers implicit approval to engage in sex while also giving a false sense of security against STIs.<sup>19,20</sup> These sexual disinhibition arguments are based on the assumption that the vaccine will change current behaviors. However, fear of HPV has not historically deterred teens from engaging in sexual activity.<sup>19</sup> Other evidence that indicates that sexual disinhibition is unlikely includes research on sexual education and condom distribution programs at schools which have not led to increased sexual behavior among high school students.<sup>21</sup>

Parents who oppose HPV vaccination argue that mandating vaccination at the early age of 11 or 12 years will undermine abstinence only messages or force them to discuss sex with their children prematurely.<sup>18</sup> In response, Gardasil 9 manufacturer Merck has recommended providers to center their message on prevention of cancer, rather than an STI in order to deemphasize the sexual ties of the vaccine. Framing the vaccine in a culturally acceptable way is critical for public acceptance and raising vaccination rates.<sup>20</sup> Therefore, providers can counsel conservative parents that there is no need to mention the sexually transmitted nature of the infection if they don't feel comfortable discussing it with their children. Parents can instead focus on the cancer preventing aspects of the vaccine.

In addition to parents, there are also healthcare providers who oppose the HPV vaccination due to their religious views on sexuality. In a survey of 1,144 practicing U.S. physicians, 63% said it would be ethical for morally conflicted doctors to explain their objections to their patients. Only 86% felt obliged to present all medical options and only 71% would refer the patient to another provider who does not object.<sup>22</sup> This raises the question, does a provider's beliefs take priority over a patient's health? The authors believe that all women and men have a right to information about the vaccine whether or not their provider opposes a vaccine. They should not have to miss the chance of taking advantage of this medical milestone due to a provider's beliefs. Therefore those providers who personally do not support the use of this vaccine should still present information about the HPV vaccine, but share that they are not comfortable administering it because of their values and refer their patient to another clinician. This will allow the provider to uphold their personal morals while still fully caring for the patient.

Since the HPV vaccine was introduced in 2006, some clinicians have opposed mandating the vaccine due to its relative newness

compared to other childhood vaccines. The long term side effects of the HPV vaccine and length of protection are currently unknown.<sup>19</sup> Yet, according to the CDC with over 100 million doses distributed in the United States, the HPV vaccine has a reassuring safety record that's backed by 10 years of monitoring and research. Current studies suggest vaccine protection is long-lasting and that there is no evidence of weakened protection over time.<sup>23</sup>

With the safety of this vaccine established, it should be asked, at what age should children receive the vaccine? One study found that Gardasil was 99% effective in preventing cervical cancer and pre-cancerous lesions in women who never had vaginal sex but only 44% effective in sexually experienced women who may have potentially already been exposed to HPV.<sup>20</sup> Based on this evidence it is critical to vaccinate children prior to them becoming sexually active which is why the CDC recommends completion of the vaccination series by the age of 11-12. The vaccine series can even be started as early as age 9 based on FDA approval.<sup>23</sup>

## HOW TO INCREASE VACCINATION RATES

Osteopathic Family Physicians are the gatekeepers to vaccine usage and are essential to increasing adolescent HPV vaccination rates and potentially reducing preventable cancers. There are many strategies to accomplish this. Providers can create a culture of immunization in their office by training all office staff on how to explain the importance of the HPV vaccine.<sup>24</sup> In addition, offices can also use an EHR-based alert system for when vaccinations are due. One randomized trial focusing on physicians examined the use of EHR-based alerts and showed an increase in timeliness of the HPV vaccination by 27% while another study showed an 8% increase in vaccination initiation.<sup>25,26</sup> Providers can also recommend the HPV vaccine and other vaccines at all visit types or can combine the recommendation with other scheduled adolescent vaccines instead of proposing the vaccine individually.<sup>24</sup> In response to patients who ask if the vaccine is required, providers should strongly endorse the vaccine by emphasizing its protective effects and discussing possible negative outcomes if vaccination is missed including risk of numerous preventable cancers. If the patient is hesitant, the provider can offer educational materials and make a note to ask the patient again at the next visit as timeliness of the HPV vaccination is critical for effectiveness. After the patient receives their first dose, they should be promptly scheduled for their next appointment during the current visit to ensure completion of the series. Office staff can also provide patients with reminder calls or letters for their upcoming appointments. One study showed that using these two types of reminders increased HPV vaccination rates by 27%.<sup>27</sup>

Federal and state governments can also play a role in boosting immunization rates through legislation and funding. Since 2006, 42 states have introduced some type of legislation to either require the HPV vaccine, fund the vaccine, or educate the public about the vaccine.<sup>28</sup> There is a growing push for mandating HPV vaccination, however opposition remains firm as only three states including Rhode Island, Virginia, and District of Columbia currently require the HPV vaccine series for public school attendance.<sup>28</sup> Hawaii has approved the mandate and will begin implementation in 2020.



Virginia and District of Columbia both enacted the mandate in 2007, but only required the vaccine for girls. Rhode Island enacted the requirement in 2015 and made the requirement for both girls and boys.<sup>28</sup> In 2007 the Texas governor mandated all female 6th graders receive the vaccine via executive order. However, legislators later overrode the order.<sup>28</sup> As of May 2018, New York is the only state that currently has pending legislation to mandate the HPV vaccine for school attendance.<sup>28</sup>

## CONCLUSION

According to the CDC, without the HPV vaccination 80% of sexually active people will get an HPV infection in their lifetime without the HPV vaccination.<sup>29</sup> It is known that HPV can cause numerous cancers in women and men. Though the current HPV vaccines do not provide protection against every strain of HPV, it has decreased infections with the HPV types that cause most HPV cancers and genital warts by 71%.<sup>29</sup> Despite the availability of an effective HPV vaccine, there are still 32,000 new cases of HPV related cancers (cervical, vaginal, vulvar, anal, penile, and oropharyngeal) every year in the U.S. Because preventing cancer is more effective than treating it, it is critical to start the vaccine at the CDC recommended age.<sup>29</sup> The intense controversy surrounding government mandated HPV vaccination for school entry has unfortunately shifted the focus away from the demonstrated benefits of HPV vaccination.<sup>19</sup> Providers can bring the focus back by continuing to educate patients and parents about the magnitude of what the HPV vaccine can do regardless of its associated controversies.

## AUTHOR DISCLOSURES:

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## CLINICAL IMAGE

## A New Eyelid Growth

Leonid Skorin, Jr., DO, OD, MS, FAAO, FAOCO<sup>1</sup>; Dessie D. Westall, OD<sup>2</sup>

<sup>1</sup>Mayo Clinic Health System, Albert Lea, MN

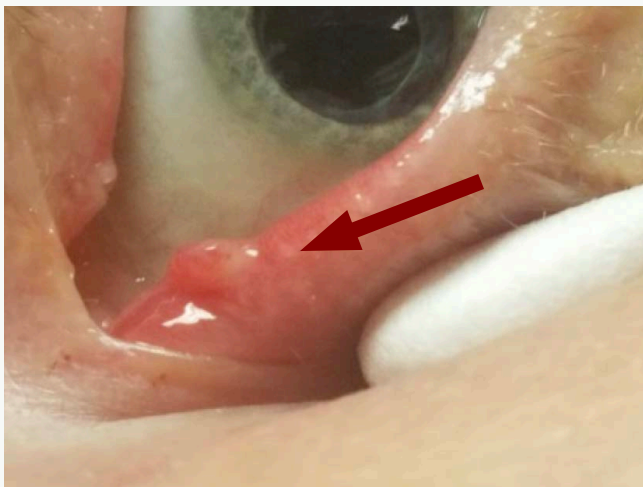
<sup>2</sup>Family Eye Care Center, Austin, MN

A 69-year-old Caucasian female presents to the eye clinic with a complaint of a new itchy growth on her left lower eyelid. Over the previous two weeks the irritation caused by the lesion has become increasingly bothersome. The lesion appears as a pink growth within the nasal canthus. She has also been experiencing excessive tearing and purulent discharge of the left eye. The patient denies having similar lesions in the past. Warm compresses and artificial tears has not relieved any of her symptoms.

On physical examination, a soft, non-tender, flesh-colored lesion is protruding from the patient's left lower puncta. The round lesion is entirely blocking the puncta (*Figure 1 and Figure 2*). It is vascularized with a smooth mucosal appearance. There is additional inflammation surrounding the lesion in the nasal region of the lower eyelid. There are no additional abnormalities to the lids, lashes, or conjunctiva of either eye.

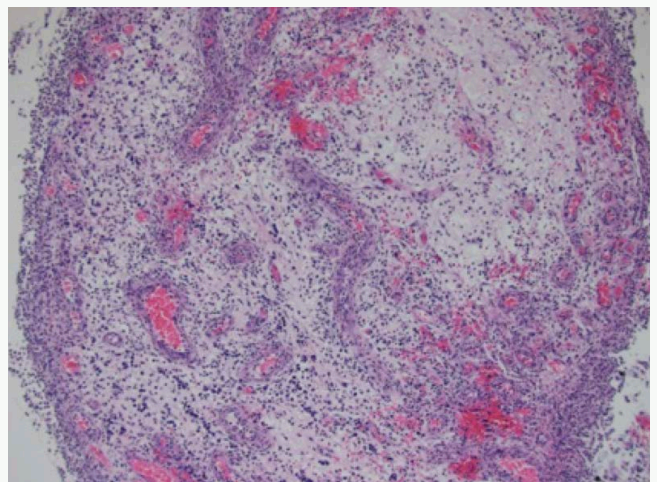
### FIGURE 1:

Lower left eyelid growth (arrow). The pupil is pharmacologically dilated.



### FIGURE 2:

Histology showing tissue is ulcerated with vascular proliferation and presence of acute inflammation.



The quality of her vision is not affected. She is not photophobic. The patient does not wear contact lenses but wears spectacles full time to correct her refractive error. There is no prior history of skin cancers or other suspicious lesions. She has previously been diagnosed with rosacea, hyperlipidemia, hypothyroidism, and type 1 diabetes mellitus.

### QUESTIONS

#### 1. What is this eyelid lesion?

- A. Internal hordeolum
- B. Kaposi's sarcoma
- C. Pyogenic granuloma
- D. Squamous cell carcinoma

#### 2. What is the most likely underlying etiology for this lesion?

- A. Blepharitis
- B. Canaliculitis
- C. Dacryocystitis
- D. Rosacea

### CORRESPONDENCE:

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## ANSWERS:

### 1. What is most likely the diagnosis of this eyelid lesion?

Correct Answer:

C) *Pyogenic Granuloma*

Pyogenic granulomas are benign tumors that present on various areas of skin and mucous membranes of the body. They appear as vascularized lobular or smooth lesions, some being sessile while others may be pedunculated.<sup>1</sup> These findings are consistent with the presentation of the patient in this case. Internal hordeola (often referred to as a sty) are an acute and painful infection of the meibomian glands. These glands are found within the upper and lower tarsal plate of the eyelids, and open onto the eyelid margin. They produce an oily substance on the eye, which prevents tears from evaporating. This condition is not consistent with the presentation of the lesion in this case, as the growth does not involve a meibomian gland. Since internal hordeola are focal infections, they do not have the typical lobular, sessile or pedunculated presentation seen in pyogenic granulomas. Kaposi's sarcoma is a vascular neoplasia associated with immune deficiencies like human immunodeficiency virus (HIV). These lesions often grow on the skin and mucous membranes, or within internal organs and lymph nodes.<sup>2</sup> Kaposi's sarcoma is not consistent with the lesion in our case because our patient does not have HIV or similar conditions. The lesion in our case also appears in isolation, which is not characteristic of Kaposi's sarcoma. Squamous cell carcinoma (SCC) is a malignant cutaneous tumor. These lesions often occur on sun-exposed areas of the skin. Actinic keratosis is the most common precursor lesion to SCC in Caucasian patients. If left untreated, SCC invades and destroys surrounding tissue.<sup>3</sup> SCC is not likely the cause of the new growth in our patient because it is not located in a sun-exposed portion of the eyelid nor is there any focal tissue destruction.

### 2. What is the most likely underlying etiology for this lesion?

Correct Answer:

B) *Canaliculitis*

Canaliculitis is an infection within the canalicular drainage system of the eyelid. These horizontally running canals drain the tears from the puncta to the lacrimal sac. It is uncommon for these structures to become inflamed leading to a high rate of misdiagnosis.<sup>4</sup>

When a canaliculitis presents, it is typically unilateral, and with applied pressure, purulent discharge from the puncta is released.<sup>5</sup> This is the etiology of our case as the pyogenic granuloma is rooted in the involved canaliculi and infectious discharge is later discovered. Blepharitis affects individuals of all ages and ethnicities. It is an inflammatory condition involving the eyelid margin. It is a very common finding in ophthalmic examinations and often becomes a chronic issue. Blepharitis may lead to permanent changes of the eyelids including scarring, madarosis (loss of eyelashes), or trichiasis (misdirected eyelashes). Other consequences of blepharitis include superficial punctate keratopathy, corneal neovascularization, or ulceration.<sup>6</sup> Also, blepharitis involves the complete eyelid margin

and is usually bilateral while canaliculitis occurs only at the medial aspect of the eyelid and is typically unilateral. These associated findings are not consistent with the presentation of our case as there was no involvement of the cornea, lashes or eyelid margin. Dacryocystitis is an infectious inflammatory response within the nasal lacrimal sac. The nasal region of the lower eyelid is often very swollen and erythematous. In these cases, the applied pressure will create great discomfort to the patient and release purulent discharge from the puncta.<sup>7</sup> It is not likely that the lacrimal sac is involved as our patient did not experience edema or discomfort from prominent lacrimal sac distension as would be expected with dacryocystitis. Rosacea is a chronic cutaneous syndrome that presents with variable manifestations, often on the face. Ocular rosacea includes findings, such as lid margin telangiectasia, corneal infiltrates, conjunctival injection, dry eye syndrome, and "honey crust" collarette growth at the base of the eyelashes.<sup>8</sup> Ocular rosacea does not accurately diagnose our patient's etiology as it does not result in flesh-like lesions and often compromises the integrity of the cornea, while our patient's cornea was not involved.

## DISCUSSION

Pyogenic granulomas are benign rapid growing masses. They are often solitary lesions that arise spontaneously or occur after trauma. Additional etiologies may include human papilloma virus type 2, herpes virus type 1, and B-Raf proto-oncogene serine/threonine kinase (BRAF) mutations.<sup>1</sup> The BRAF gene serves as a primary driver of protein synthesis. The resulting proteins control cellular functions including cellular proliferation, apoptosis, and differentiation. BRAF mutations within endothelial cells are recognized to be a trigger for pyogenic granuloma formation. In a small study of three patients who were taking selective BRAF inhibitors (vemurafenib or encorafenib), the development of multiple new pyogenic granulomas have been reported.<sup>9</sup>

A retrospective study of thirty-eight patient records reported that there was an observed peak incidence of nasal pyogenic granulomas in women with increased hormonal action, which accounted for 40% of the involved cases. Hormonal action was defined as women who were pregnant or undergoing hormonal therapy (including oral contraceptives). The second most common cause remained idiopathic, but 18% were reported to have prior injury at the site of the pyogenic granuloma growth.<sup>10</sup>

Ocular pyogenic granulomas can appear on various structures of the eye, such as the cornea, conjunctiva, or eyelid. Underlying etiologies of these pyogenic granulomas include, but are not limited to, infectious keratitis, ocular surgeries (keratoplasty, strabismus, etc.), and chalazia.<sup>11,12</sup> In cases of punctal pyogenic granulomas, underlying causes often include previous insertion of silicone punctal plugs (used for dry eye management), and as seen in our case, lacrimal canaliculitis.<sup>5</sup>

The underlying etiology of lacrimal canaliculitis is infectious. Common causative organisms include streptococcal and staphylococcal species. In recurrent cases it is recommended to culture for fungi (*Aspergillus*, *Candida albicans*, and *Fusarium*),



less common bacteria (*Fusobacterium* and *Nocardia*), and viral (herpes simplex and varicella zoster) agents. The presence of sulfur granules or concretions is a known characteristic finding of *Actinomyces israelii*, a filamentous anaerobic gram-positive bacteria.<sup>5</sup> *Actinomyces israelii* often presents with other gram-positive or gram-negative bacteria. It is also established that *Staphylococcus* alone can form these canalicular concretions.<sup>13</sup> The variability of canaliculitis pathogenesis and its related concretions are an important consideration when initiating treatment.

## TREATMENT

The standard treatment is excision of the pyogenic granuloma.<sup>5</sup> The lesion in our case was excised under local anesthesia. Once the lesion had been removed, the pressure was applied to the lower eyelid with a cotton tip applicator. A copious amount of purulent discharge was expressed from the canaliculi through the puncta (Figure 3). Sulfur granules or concretions were also expressed from the puncta (Figure 4). These findings are commonly seen in lacrimal canaliculitis.

In canaliculitis cases, any purulent discharge, including sulfur granules, should be cultured if the clinician is unsure of the underlying infectious organism, or in chronic recurrent cases. In bacterial infectious cases, ophthalmic antibiotic solution is injected through the involved canalicular system and into the lacrimal sac immediately after the procedure.<sup>7</sup> Antibiotic eye drops should also be prescribed for one to two weeks post-operatively. Depending on duration and severity of the canaliculitis, conservative treatment with topical agents and warm compress four times per day may be sufficient in mild presentations. Other more involved cases may require a canaliculotomy for complete resolution and expression of concretions or additional infectious debris.<sup>7</sup> A canaliculotomy is a longitudinal incision along the canaliculus that spares the puncta and has a resolution rate of 80%-100%.<sup>14</sup>

In our case, the patient was treated empirically using moxifloxacin 0.5% ophthalmic solution, a broad-spectrum antibiotic for the intracanalicular irrigation. Moxifloxacin 0.5% eye drops were also prescribed, one drop four times per day, for one week. If a culture is obtained and the report finds fungal involvement, the treatment should include an anti-fungal agent, such as natamycin 5% eye drops. The patient is directed to use the natamycin, one drop, four times per day. The usual course of this therapy is 2 to 3 weeks, or until resolution.<sup>15</sup> Treatment for herpetic infections should include trifluridine 1% drops dosed one drop five times per day, for two to three weeks.<sup>7</sup>

At one week follow-up the patient reported that the nasal aspect of her left eye was tender for about three days after her surgery. The left eye has not been itching, excessively tearing, or producing discharge as it previously did. She was compliant using the moxifloxacin 0.5% eye drops four times a day for a week as prescribed. There were no signs of active infection or inflammation indicating the drops could be discontinued. The patient was advised to return if there is any recurrence of symptoms or eyelid lesions.

**FIGURE 3:**

Expressing purulent discharge and concretions (arrow) from previously occluded puncta with cotton tip applicator.



**FIGURE 4:**

Sulfur granule or concretion (arrow) on cotton tip applicator after expression through the lower left puncta.



## CONCLUSION

Pyogenic granuloma is a benign, vascularized tissue that grows on various structures of the body including mucosal linings or on the surface of the skin. These rapid growing lesions are common in areas that have previously been insulted by trauma, infection, or inflammation. The standard treatment is excision of the pyogenic granuloma with biopsy to confirm the diagnosis.<sup>5</sup> The common etiology of punctal pyogenic granulomas include canaliculitis or previous silicone punctal plug placement.

Lacrimal canaliculitis is an uncommon cause of inflammation and infection of the eyelid. It may involve a variety of infectious organisms including viral, bacterial or fungal so it is crucial the clinician considers cultures in recalcitrant cases for effective treatment.<sup>7</sup> If caught early in the disease process, conservative therapy including warm compresses, topical and/or intracanalicular irrigation with antibiotic solution may resolve the canaliculitis. In chronic or recurrent cases, surgical canaliculotomy is usually curative.

**AUTHOR DISCLOSURES:**

The authors have no financial disclosures or conflicts of interest.

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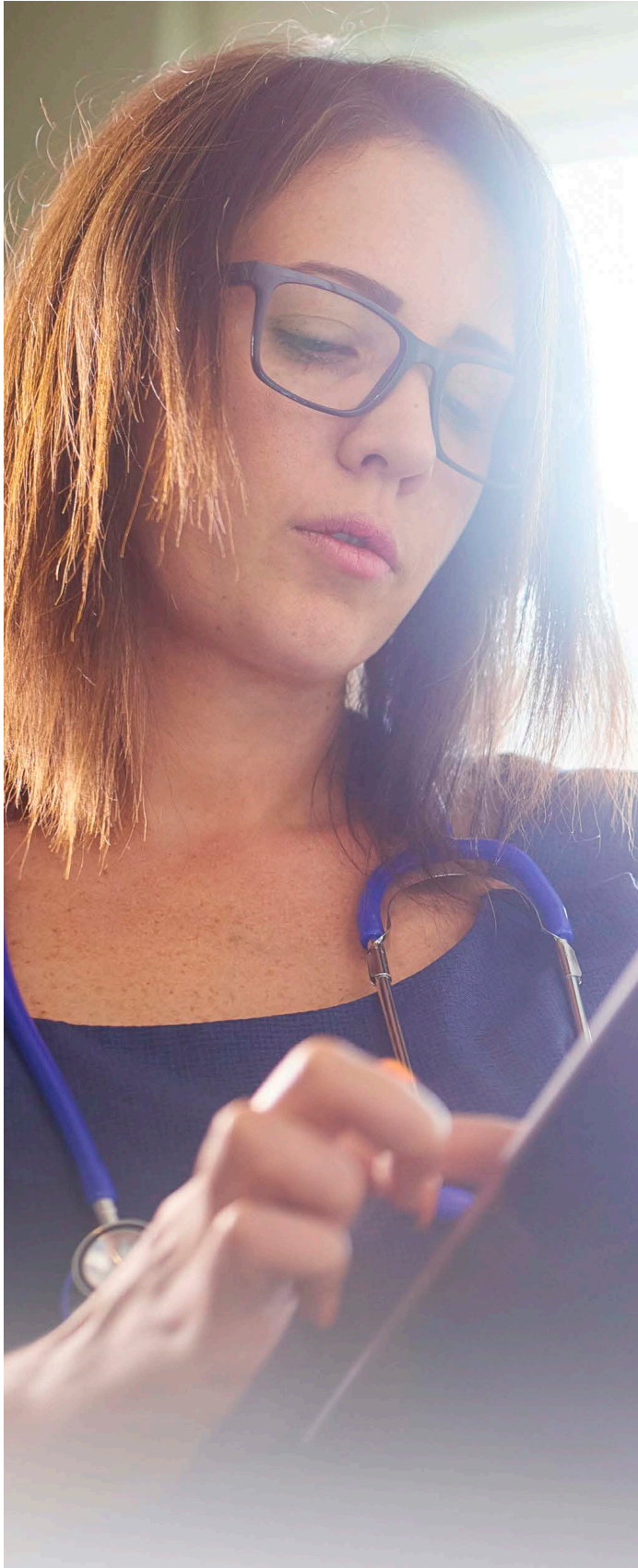
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# PATIENT EDUCATION HANDOUT

## PMDD

Tania Ghazarian, OMS

*Ronald Januchowski, DO, FACOFP, Editor • Paula Gregory, DO, MBA, CHCQM, FAIHQ, Health Literacy Editor*

Premenstrual Dysphoric Disorder (PMDD) is the severe form of Premenstrual Syndrome (PMS). Symptoms of PMDD are both physical and emotional caused by normal hormonal changes that begin typically seven to ten days before the start of your period.

### SYMPTOMS

Common emotional symptoms of PMDD include irritability or anger that lasts for a long time, sadness or hopelessness that can turn into depression, anxiety, and extreme moodiness. Physical symptoms of PMDD include cramps, bloating, joint and/or muscle pains, breast tenderness and/or enlargement, and headaches. Behavioral changes include tiredness, low energy, difficulty sleeping, food cravings and/or binge eating, crying spells, and panic attacks.

### TREATMENT OPTIONS

Treatment for PMDD includes the use of antidepressants, birth control pills, over-the-counter pain relievers, and lifestyle management. Antidepressants are used to treat some of the emotional symptoms associated with PMDD. Many patients with PMDD experience depression or thoughts of suicide if not treated. Birth control pills are used to manage normal hormonal changes that lead to abnormal emotional and physical reactions in patients with PMDD. Other treatments such as pain relievers may be used to alleviate muscle and joint pain, or even abdominal cramping. Lifestyle management includes the reduction of stress, as stress can cause the worsening of these symptoms.

### WHEN TO CONTACT YOUR OSTEOPATHIC FAMILY PHYSICIAN?

Please see your Osteopathic Family Physician if any of the symptoms of your menstrual cycle interfere with your daily life activities as this may be a sign of PMDD.



# PATIENT EDUCATION HANDOUT

## HPV Protection

Mana Lazzarotto, DO

*Ronald Januchowski, DO, FACOFP, Editor • Paula Gregory, DO, MBA, CHCQM, FAIHQ, Health Literacy Editor*

HPV, also known as the human papilloma virus, is a sexually transmitted virus that can cause different types of cancers including cervical, oral and anal cancer. There are certain virus strains strongly linked to cancer. Those strains are 16 and 18. Other strains are linked to anogenital warts and lung disease. It can be transmitted by contact with skin, usually during sex.

### WHAT DOES THE HPV VACCINE PROTECT AGAINST?

We have now developed a vaccine that protects against the high-risk strains that are linked to cancer. Depending on the vaccine, it can protect anywhere from two to nine strains. All vaccines protect against strains 16 and 18. Generally you will need two doses of the vaccine 6-12 months apart.

### WHO SHOULD GET?

Both males and female can get the HPV vaccine.

### WHAT AGE?

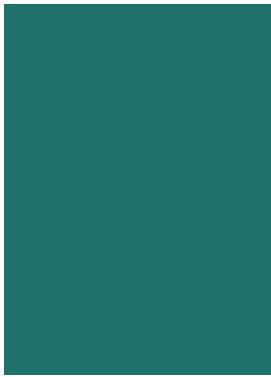
The ideal age to receive the vaccine is between 11-12 but can be started as early as 9 years old and also be given between the ages of 13-26. Ideally, it is to be started before having sex and there has been no prior exposure to HPV. However, being sexually active does not preclude getting the vaccination.

### REACTIONS

Like other vaccines, there can be injection site reactions, pain, dizziness and nausea. Unlike other vaccines there are a significant number of post vaccine fainting episodes. Therefore, it is recommended that your child wait in the clinic for 15 minutes either sitting or lying down.

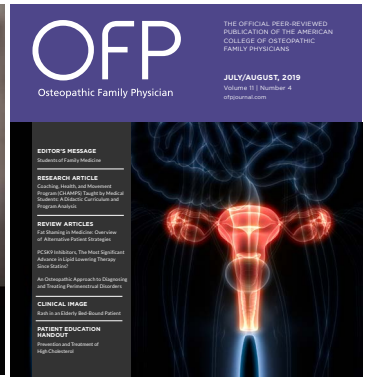
### EFFECTIVENESS

Studies have shown that the vaccine is effective, producing a good antibody response in patients. It is most effective in people who have not been exposed to HPV in the past.



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**PRIMARY CARE APPROACH TO EYE CARE**



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Prevention and Treatment of High Cholesterol



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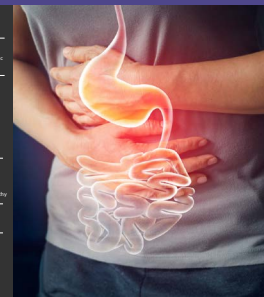
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Ocular Surface Growth

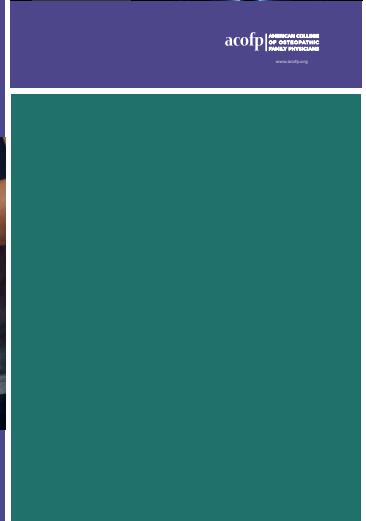
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**Kenneth A. Ramey, DO, FACOPF serves as the program director and is a 1994 graduate of the Chicago College of Osteopathic Medicine. He is board certified in family medicine/osteopathic manipulative treatment, neuromusculoskeletal medicine/osteopathic manipulative medicine and has a certificate of added qualification in sports medicine. Dr. Ramey is a member of the medical staff at Sky Ridge Medical Center and has served as a team physician at the high school, college and semi-professional levels. He is an Associate Professor of OPP at Rocky Vista University and serves as the Director of the Sports Medicine and Osteopathic Manipulative Medicine Program at the Rocky Vista Health Center.**

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