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# Epidemiology of warts in United States adults: a survey study

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To the Editor:

Verruca vulgaris, commonly known as warts, are benign growths caused by human papilloma virus (HPV) infection of the skin [1]. The majority of warts spontaneously regress over 1-2 years without treatment but their appearance, ability to spread, and associated pain, bleeding, and itching, are frequently cited reasons for patients to seek treatment [2]. Destructive therapies are most often used, such as cryotherapy, cantharidin, salicylic acid, or surgical excision [1,2]. Treating warts remains difficult because numerous visits are often required; none of the current modalities, alone or in combination, provide a rapid or effective removal of the wart [3]. Epidemiologic studies of warts usually focus on children as they are most frequently affected [2,4,5]. The objective of this study was to investigate the prevalence of warts among adults in the United States, in addition to types and efficacy of treatments utilized.

After Institutional Board Review, 1,074 subjects  $\geq 18$  years old from the United States were recruited using Amazon Mechanical Turk (Amazon, Seattle, WA), an online crowdsourcing platform frequently used in social science research [6]. Subjects were invited to complete a survey about "health" using Qualtrics (Provo, UT). Those with a current or prior history of warts were further questioned about their experience with warts, any attempted treatments, and associated side effects. An attention check was used to exclude inattentive survey responses from the analysis.

Of 1,074 subjects, 1,045 completed the survey (97.3%). Of 1,045 subjects, 277 (14.1%) currently have or had a history of warts. After filtering for those who passed the attention check, responses from 189 subjects were included in the analysis. Respondents with warts or a history of warts, were mean age 40.6 years old, 55% female, 45% male, and 88.9% Caucasian. Of those who currently had warts at the time of the survey (N=111), the average number of warts was 4.8, average largest wart was 6.5mm and the most common body areas affected were feet and lower legs (10.5% and 10.0%, respectively). The majority (N=94/111, 84.7%) of subjects saw a medical professional for their warts with 92/111 (82.9%) receiving treatment; chemical and freezing treatments were the most common modalities (37.3% and 35.8%, respectively; **Table 1**). Many subjects (N=103/111, 92.8%) had attempted over-the-counter treatments, such as freezing and chemical treatments (37.9% and 35.6%, respectively; **Table 1**). Subjects responded that freezing and chemical treatments performed by a medical professional worked the best (31.7% and 25.0%, respectively). Of those who received wart treatments (N=104), 84.6% reported side effects; pain, bleeding and blistering were most frequently reported (26.3%, 22.1%, and 20.6%, respectively). Of those with a previous history of warts, (N=189), 84.7% had at least one recurrence, 64.6% had 2-4 episodes of recurrence, and 15.3% had 7-10 episodes of recurrence.

**Table 1.** Wart treatments for those with a history of warts and those who currently have warts.

	History of warts (N=189)	Current warts (N=111)
What treatments were prescribed or performed by a medical professional? (select all that apply)	N=124	N=92
Freezing	104/242 (43.0%)	73/204 (35.8%)
Chemical	80/242 (33.1%)	76/204 (37.2%)
Cutting it off	54/242 (22.3%)	52/204 (25.5%)
Other (write-in)	4/242 (1.7%)	3/204 (1.5%)
What OTC treatments were used? (select all that apply)	N=141	N=103
Freezing	89/259 (34.4%)	83/219 (37.9%)
Chemical	107/259 (41.3%)	78/219 (35.6%)
Cutting it off	54/259 (20.9%)	56/219 (25.6%)
Other	9/259 (3.5%)	2/219 (0.9%)
What treatment worked best?	N=164	N=104
Medical professional's freezing	51/164 (31.0%)	33/104 (31.7%)
Medical professional's chemical treatment	28/164 (17.1%)	26/104 (25.0%)
Medical professional cutting it off	17/164 (10.4%)	13/104 (12.5%)
Other wart treatment by medical professional	8/164 (4.9%)	4/104 (3.9%)
OTC freezing treatment	22/164 (13.4%)	13/104 (12.5%)
OTC chemical treatment	14/164 (8.5%)	7/104 (6.7%)
Non-medical professional cutting it off	8/164 (4.9%)	2/104 (1.9%)
Other OTC treatment	7/164 (4.3%)	0/104 (0%)
Wart treatments were not effective	9/164 (5.5%)	6/104 (5.8%)

Based on this survey, approximately one in 10 adults have warts, which is not much lower than the reported frequency of warts in children [7]. The recurrence rate of warts, even with treatment, is high, with five out of six patients experiencing at least one recurrence, likely due to reinfection from latent virus present in the epithelium [2]. Cryotherapy and chemical destructive treatments, such as salicylic acid, are considered first-line therapies and patients report these are the most effective options [8]. Given the frequent recurrence rates of warts, their spontaneous regression, and possible poor follow-up rates amongst patients, it is not always evident which treatments are more effective than others. Although the majority of subjects in our cohort reported that treatments by a medical professional were the most effective, specifically cryotherapy, over-the counter treatments were considered the most effective by more than a third of patients. Warts are a prevalent skin condition, not only limited to children, with high

recurrence rates, and numerous treatment options, with varying efficacy.

### Potential conflicts of interest

Dr. Feldman has received research, speaking and/or consulting support from a variety of companies including Galderma, GSK/Stiefel, Ammiral, Leo Pharma, Baxter, Boeringer Ingelheim, Mylan, Celgene, Pfizer, Valeant, Taro, Abbvie, Cosmederm, Anacor, Astellas, Janssen, Lilly, Merck, Merz, Novartis, Regeneron, Sanofi, Novan, Parion, Quriert, National Biological Corporation, Caremark, Advance Medical, Sun Pharma, Suncare Research, Informa, UpToDate and National Psoriasis Foundation. He is founder and majority owner of [www.DrScore.com](http://www.DrScore.com) and founder and part owner of Causa Research, a company dedicated to enhancing patients' adherence to treatment. Patrick O Perche, Parker J Funk, Madison K Cook, and Erin M Hagen have no conflicts of interest to report.

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