

## RE: Progress in HPV Vaccine Hesitancy

In the article by Sonawane et al,<sup>1</sup> the important question of parental hesitancy regarding adolescent human papillomavirus (HPV) vaccination is examined. The authors reported an increase in hesitancy over a 6-year period (from 50% to 64%) among US parents asked about it. This apparent increase is due to progressively restricting the denominator in later years. Most importantly, the analytic choice masks a more general truth: HPV vaccine hesitancy actually fell among parents overall.

To make sense of this seeming paradox, let us start by observing that HPV vaccine initiation increased during that time period. The National Immunization Survey (NIS)-Teen found that in 2012, ~62.7% of US adolescents had not received HPV vaccination. By 2018, the percentage of unvaccinated children fell to 31.9%. Next, we can observe that the NIS assessed hesitancy only among parents of unvaccinated children; thus, there were fewer parents to ask about hesitancy in later years. These 2 findings create the illusion of higher hesitancy when one looks at smaller and smaller subsets of parents over time.

An illustration helps clarify the paradox. Let us walk through what this would look like for a cohort of 1000 parents. In the 2012 survey, ~627 parents would have been asked the hesitancy question, and 316 said they were hesitant to vaccinate. Although the authors described this as 50% hesitancy (316 of 627 parents), we assert that this is better understood as 32% hesitancy (316 of 1000 parents). By the 2018 survey, only ~319 of the parents had unvaccinated adolescent children, and 204 said they were hesitant to vaccinate when asked about it. Again, the authors said hesitancy increased to 65% (204 of 319 parents), and we believe it decreased to 20% (204 of 1000 parents). This illustration reveals how important it is to clearly

define the denominator when measuring hesitancy over time.

In contrast to Sonawane et al,<sup>1</sup> we conclude that HPV vaccine hesitancy decreased among US parents overall from 2012 to 2018 as rates of HPV vaccine recommendations and administration rose nationally. Clearly communicating this finding is of vital importance for encouraging pediatricians and other primary care providers to continue to build on the progress they have achieved in improving their communication and establishing HPV vaccination as a norm among US adolescents. Providers' hard work is paying off and should be applauded.

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**CONFLICT OF INTEREST:** Mr Brewer has served as a paid advisor to Merck, as well as the Centers for Disease Control and Prevention, US Food and Drug Administration, and World Health Organization; and Ms Gilkey and Mr Thompson have indicated they have no potential conflicts of interest to disclose.

## REFERENCES

1. Sonawane K, Zhu Y, Lin Y-Y, et al. HPV vaccine recommendations and parental intent. *Pediatrics*. 2021;147(3):e2020026286

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## Authors' Response

We appreciate the interest of Dr Brewer in our study.<sup>1</sup> We would like to clarify that our objective was not to assess the trends in HPV vaccine hesitancy in the United States overall. As we described, our motivation was to determine the proportion of parents

who refused to initiate the HPV vaccine series "despite having received a provider recommendation."

To simply explain our findings, let us assume that in 2012, of 1 million US adolescents, 460 000 (46%) were unvaccinated (received 0 doses), and of those adolescents, parents of 138 000 (30%) had received a provider recommendation. Among the parents who received a provider recommendation, 69 000 parents (50%) indicated, "they will not initiate the HPV vaccine series in the next 12 months" (ie, despite having received a provider recommendation). In 2018 (for the sake of simplicity, let us assume that the population size was constant), given the improvements in uptake, 300 000 (30%) adolescents were unvaccinated (ie, coverage improved). Of these, 150 000 (50%) had received a provider recommendation (percentage of parents of unvaccinated adolescents receiving recommendations also increased, as we documented in our study). Now, among 150 000 parents who received a recommendation, if we assume that similar to 2012, parents of ~50% of adolescents were reluctant to initiate the series, the number of parents lacking intent will be 75 000. However, what we found was that the lack of intent in this subset was higher (64% [our outcome of interest]) in 2018 (ie, 96 000 parents responded that they would not initiate the series despite having received a provider recommendation). Note that parents who lack the intent to initiate the HPV vaccine series have increased from 69 000 to 96 000 despite increased coverage. (Although we assumed a constant denominator for this example, newer vaccine-eligible adolescents will get added to the cohort each year given the increasing population size.)

Let us walk through the actual numbers in the NIS database. In the 2012 survey, parents of 31 792 teenagers participated. Of the adolescents, 17 832 were unvaccinated and 2456 reported