**PUBLIC HEALTH IMPLICATIONS AND POSSIBLE FUTURE DIRECTIONS**

Maintaining appropriately high levels of immunization not only benefits those vaccinated by protecting them from disease, but also protects those who cannot be vaccinated and reduces the financial and societal costs of diseases and outbreaks. An increase in parents choosing to delay or refuse vaccines could sufficiently lower vaccine coverage, at least locally, to provide opportunities for outbreaks that may lead to severe morbidity and mortality. By gaining a better understanding of parents who are vaccine-hesitant and those who delay and refuse vaccines, interventions designed to maintain or raise vaccination rates can be well-informed and evidence-based.

The results of this study indicate that the factors influencing vaccine receipt for the selected vaccines, and likely the other vaccines in the childhood schedule, are varied but have common themes. This underscores that a “one size fits all” approach will likely not be sufficient to successfully maintain or raise vaccine uptake and also suggests trends for further study and intervention. The sources that parents trust most to receive their vaccine information from are varied, but their consistent association with vaccine uptake highlights the importance of information-seeking behavior in parents’ vaccine decision-making. The influence of information sources tied to social networks—face-to-face interactions or online—reinforces that interpersonal relationships hold large sway over how parents view vaccines, and finding ways to leverage these social connections to improve vaccine uptake will likely go a long way to reduce vaccine hesitancy. Information sources should continue to be a target of studies of vaccine hesitancy as well as interventions aimed to improve vaccine knowledge and understanding.

The ideological differences influencing vaccine acceptance are also key to understanding how to effectively communicate with those who may be vaccine hesitant. If these ideological differences vary significantly by vaccine, then it is key that messaging be tailored to these specific populations when talking about specific vaccines. Overall perceived vaccine importance will always be a key predictor of vaccine uptake, as parents who believe some or all vaccines are not important will be less likely to receive any vaccine, but understanding other values that may mediate this helps differentiate what may be influencing vaccine receipt. Valuing things such as self-fulfillment and warm relationships in daily life was associated with increased vaccine uptake, perhaps suggesting that these parents feel empowered and optimistic, leading them to be less distrustful and more confident in their relationships with others, including their physician. Parents who placed more value on excitement and self-respect in their daily lives were less likely to report vaccination, which may indicate that these parents are more concerned with personalized approaches to health care and feeling secure in their decisions.

Additionally, understanding sociodemographic differences in populations not receiving specific vaccines highlights both populations facing disparities in access and those choosing to delay or refuse vaccines. Understanding the vaccine behavior patterns of these two different groups is key to differentiating between those who face disparities and those who are hesitant or refusing vaccination. Groups facing barriers to vaccination for specific vaccines may not have been as apparent in studies of overall up-to-date status and vaccine acceptance. By differentiating which vaccines still show evidence of large disparities in access, these groups can be better targeted for interventions. Parents less accepting of one vaccine may be different than those not accepting other vaccines, and understanding what these groups look like and any similarities they might hold provides the opportunity to more specifically target messaging to these groups.

Future studies should observe trends across the wider childhood schedule to see if these patterns hold true for other categories of vaccines. Additionally, the study should be conducted on a larger sample with a nationally representative study sample to validate the trends seen in this study.