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**Title of Initiative:** Multilevel Pathways and Interventions to Promote Vaccine Uptake among Populations Experiencing Health Disparities

**Authors:** Deborah E. Linares, Ph.D., M.A., Rada Dagher, Ph.D., Nancy L. Jones, Ph.D., M.P.H., Phuong-Tu Le, and Vanessa Marshall, Ph.D.

**Reviewers:** Kenneth Resnicow, Ph.D. and Chau Trinh-Shevrin, Ph.D.

**Objective:** This initiative will support research examining multilevel pathways at multiple levels and interventions to promote vaccine uptake among populations experiencing health disparities.

**Background:** Vaccines provide multiple benefits for the prevention or reduction of disease, serious illness, or death while also protecting against transmission. For example, influenza, or the flu, is an infection of the respiratory system that can cause serious complications for children ages 2 or younger, pregnant people, adults over age 65, and people with chronic health conditions. The flu causes more than 400,000 hospital stays and 50,000 deaths every year in the U.S., with the highest rates among Blacks and American Indian/Alaska Native (AI/AN) populations. Receiving an annual flu vaccine can lower your risk of experiencing serious illness, or a hospital stay, or death from the flu. Despite the overwhelming benefits of vaccination against viral outbreaks of preventable diseases, such as SARS-CoV-2 (COVID-19), the flu, or measles, substantial levels of vaccine hesitancy exist and are increasing among populations with health disparities. There is an ongoing need to develop strategies to increase vaccine uptake among populations experiencing health disparities in the U.S. (racial and ethnic minority groups, people with low socioeconomic status, sexual and gender minority [SGM] persons, and rural populations). Food and Drug Administration (FDA)-authorized/approved vaccines are critical for reducing rates of infection and slowing the spread of infectious diseases. Despite these guidelines and the overwhelming benefits of vaccination, disparities exist in the acceptance and uptake of vaccines (e.g., COVID-19, influenza, pneumococcal, hepatitis B [HBV], tetanus, diphtheria, and pertussis [Tdap], measles, mumps, rubella (MMR), and human papilloma virus [HPV]) among populations experiencing health disparities. These disparities occur for many routine immunizations and during public health emergencies (e.g., COVID-19) for all ages. For instance, parental vaccine hesitancy for childhood vaccines is increasing within the U.S. for diseases such as measles, despite it being declared as eliminated in the U.S. in 2000 due to a prior robust vaccination program. Vaccine hesitancy is one of the key factors influencing vaccination uptake. The World Health Organization’s Strategic Advisory Group of Experts on Immunization (SAGE) working group defines vaccine hesitancy as “a delay in acceptance or refusal of vaccines despite availability of vaccination services.” Vaccine hesitancy is complex; context specific; variable across time, place, and type of vaccine, as well as in the degree of completion of a vaccine series. It can also be influenced by factors such as complacency, convenience, and confidence.

Pathways of vaccine hesitancy vary and are subject to change over time. Populations experiencing health disparities may be more likely to experience skepticism about the trustworthiness of the source(s) of vaccination recommendations due to prior experiences of marginalization and mistreatment within the medical community. Cultural and religious factors may also influence vaccine uptake and low risk perceptions of disease. Upstream social determinants of health may act as barriers or facilitators to vaccine access, such as out-of-pocket costs, paid sick leave, having a primary care provider, clinician bias, access to health services, health systems policies, or vaccination policies. Likewise, other factors such as limited knowledge, limited information on vaccines, concerns about perceived safety, parental perceptions of vaccine safety, public uncertainty, low health literacy, considering immunization a low priority, and exposure to misinformation or disinformation via social media channels, all play a role in vaccine uptake. Individuals who experience multiple marginalized statuses, such as racial and ethnic minority groups living in rural areas or SGM persons from racial and ethnic minority groups may need tailored and targeted vaccine interventions. Communities, health care providers, and trusted messengers must partner to deliver effective interventions to address multiple contexts such as schools, workplaces, health systems and clinics, child care, community- and faith-based settings. Studies employing dissemination and implementation frameworks may also be helpful. Since vaccine uptake is complex, multidisciplinary studies examining or addressing factors at multiple levels and across multiple domains, per the NIMHD framework, are needed.

It is imperative to understand the etiology of vaccine hesitancy among these populations since multiple vaccines are recommended across one's lifespan, and health-related beliefs, attitudes, and behaviors change over time. Knowing which type of messaging works best and for whom is key as well as having accurate and timely information to effectively reach communities and reduce mistrust. More research is needed to understand underlying traits and beliefs behind vaccine hesitancy as well as community and societal levels of vaccine hesitancy. Examining how intergenerational pathways of vaccine hesitancy are shaped and change over time and across the life course is imperative as vaccine acceptance or refusal can have impacts beyond the individual level. Few studies exist examining intergenerational pathways of vaccine hesitancy among populations experiencing health disparities. For instance, parental perception of vaccine safety is an important factor in parents' decisions to vaccinate their children, and parental consent may be key for minors under 18 years of age.

Limited research exists on pathways and mechanisms of vaccine uptake, especially among SGM and populations who experience the intersection of multiple marginalized identities (e.g., being from a racial minority and an SGM). Although NIH has funded many studies on vaccines, there are limited studies on the mechanisms and interventions to promote vaccine uptake among populations experiencing health disparities. A recent portfolio analysis examining NIH research project grants funded Fiscal Years 2017-2022 indicated 45 NIMHD-funded studies, with most focusing on COVID-19, HPV, or influenza vaccine uptake mainly focusing on adults. There were 18 interventions and 15 etiology-based studies on vaccine uptake and 14 projects from the RADx-Underserved Populations (RADx-UP) COVID-19 testing initiative. Gaps still exist,

especially for studies using other vaccines such as HBV, pneumococcal, Tdap, shingles, or MMR; using the life course perspective; and among the following populations: SGM persons, individuals with intersecting minority status, and AI/AN individuals, especially children and parents.

**Description of Initiative:** This current initiative will solicit multidisciplinary projects both examining mechanisms and interventions at multiple levels to promote vaccine uptake among populations experiencing health disparities. Research topics may include but are not limited to the following among populations experiencing health disparities:

- Interventions within community-based clinics (e.g., federally qualified health centers) and other front-line clinical sites (e.g., pharmacies, urgent care clinics) to address misinformation and disinformation, and improve awareness promote vaccine uptake of prevention tools
- Evaluating the role of vaccine-related messaging and address misinformation on social media channels among racial and ethnic minority and SGM populations
- Determining critical timepoints for rapid outreach and targeted vaccine messaging on vaccine hesitancy uptake among rural and SGM populations
- Culturally adapted approaches for diverse populations and life stages
- Digital-based interventions, including those harnessing artificial intelligence (AI)
- Studies employing behavioral economics to understand effective vaccine uptake strategies
- Family-based interventions to promote vaccine uptake among parents and children in school-based, faith-based, child care, healthcare, or community settings
- Intergenerational studies to understand how vaccine hesitancy is formed and changes over time among individuals from racial and ethnic minority populations
- Health communication interventions to promote vaccine uptake
- Understanding beliefs and traits underlying vaccine hesitancy
- Using AI approaches to understand how vaccine misinformation and disinformation are created and transmitted
- Understanding vaccine hesitancy at the community and societal levels
- Community based interventions (e.g., community health worker models) to promote timely and accurate information on vaccines and promote vaccine uptake
- Policy studies on the effectiveness of vaccine mandates, vaccine promotion efforts, or awareness campaigns to address vaccine hesitancy
- Interventions in healthcare (e.g., ambulatory primary care settings) and non-healthcare settings (e.g., the workplace) to promote vaccine uptake across the lifespan and address emergent health conditions
- Multilevel studies on culturally specific and community-based approaches to address vaccine hesitancy and promote vaccine uptake
- Systems-level interventions to address barriers to vaccine access

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- Place-based interventions to address health behaviors and social determinants of health to promote vaccine uptake in geographic locations with underserved and vulnerable populations
- Brief interventions (e.g., brief screening with vaccine education) to improve awareness and promote vaccine uptake of behavioral mitigation strategies

