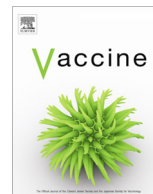




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Commentary

Supporting immunization programs to address COVID-19 vaccine hesitancy: Recommendations for national and community-based stakeholders

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At the same moment we face the prospect that a sustainable end to the COVID-19 pandemic will not be possible without widespread vaccination, as of June 2021, approximately 24% of Americans still express hesitancy about receiving a COVID-19 vaccine [1]. Although routine vaccination generally remains a well-accepted practice, vaccine hesitancy, defined as the delay in acceptance or refusal of vaccines despite availability of vaccine, is a concerning and complex trend [2].

Research demonstrates that vaccine hesitancy is a psychological and sociological state that includes elements of trust, fear, belief, doubt, emotions, moral values, perceived risk, and social norms. Hesitancy can differ based on vaccine, religion, race, culture, politics, location, and time and can range in severity from those who are uniformly and passionately “anti-vaccine” to those who support vaccinations but worry about timing and spacing of vaccination. However, experts in vaccine equity argue the term “vaccine hesitancy” is misleading due to the historical focus on individual decision making. New terminology has been proposed that embraces the need for institutions to be trustworthy, transparent, and engage in vaccine equity [3]. Keeping this framing in mind, this paper uses the term vaccine hesitancy for consistency with the literature and ease of understanding for stakeholders.

The 64 state, local, and territorial immunization programs (IPs) are key players in national efforts to address the complexities of vaccine hesitancy. IPs involvement can include attending to public and policy maker concerns, managing misinformation on social media, developing training for healthcare providers, characterizing and addressing under-vaccination in schools, and addressing disease outbreaks in under-vaccinated communities [4] (see Fig. 1). However, IPs have historically had varying levels of experience and success managing vaccine hesitancy, in part due to competing resources and the chronic underinvestment in public health infrastructure that has become even more evident during COVID-19 [4].

To bring the COVID-19 pandemic to a swift end, IPs need national and community-based stakeholders to unify with them in efforts to address vaccine hesitancy. These stakeholders include those with decision making authority, community influence and/or resources, such as state and local policy makers, government agencies, business leaders, faith institutions, academia, and community, business, and philanthropic organizations. It is urgent we act collectively to prevent existing uncertainty from solidifying into widespread deferral or rejection of a safe and effective COVID-19 vaccine. Specifically, the following IP challenges must be acknowledged and addressed through unified stakeholder engagement and support.

1. Gauging the severity of vaccine hesitancy

1.1. Challenge

Addressing vaccine hesitancy is complex; the approach to improve vaccine confidence depends on the degree of initial vaccine acceptance, which exists on a continuum ranging from unreserved acceptance of all recommended vaccines to refusal with conviction [5]. Vaccine acceptance can also vary by race and ethnicity, partially due to the racist history of medical experimentation, health disparities, and racial bias in healthcare settings [6]. Thus, addressing vaccine hesitancy effectively requires investigation and understanding of the reasons for low coverage at the community level.

IPs frequently use exemptions to school entry requirements to gauge vaccine acceptance; yet this only provides insight into caregivers of primary school-age children. Other IPs utilize immunization information systems (IIS) to gauge acceptance, but most IIS do not capture the reasons for an individual's delay, interruption, or refusal of vaccine, and there are substantial gaps in collecting race and ethnicity demographics. Even if the ability exists, health-

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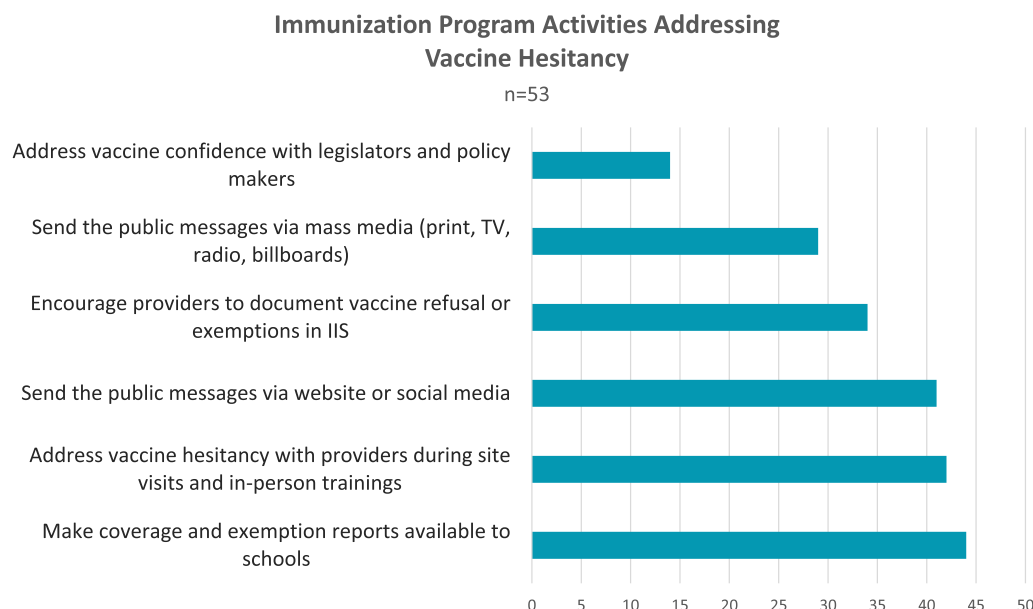


Fig. 1. Findings from 2019 AIM Annual Survey on immunization program activities to address vaccine hesitancy. Eighty-three percent (53 of 64) of immunization programs responded to the survey.

care providers may not consistently submit the information to the IIS or integrated databases (e.g., Medicaid/Medicare, vital records, surveillance systems, electronic health records {EHR}) and/or the demographic variables are defined differently, which results in incompatible data exchange. For example, as of June 28, 2021, CDC's COVID Data Tracker showed that race/ethnicity data was known for just 57% of people receiving at least one dose of the vaccine [7].

Furthermore, IPs struggle to measure the breadth and degree of vaccine hesitancy in their jurisdiction because they lack the time and resources to analyze coverage rates and/or engage schools/day-cares, providers, or caregivers to pinpoint the community-specific factors. Even if federal funding is available to increase the workforce, state and local policies, like hiring freezes and contract limitations, impede IPs' ability to acquire adequate staff [4].

1.2. Recommendation

Federal and state governments should invest to develop and standardize IIS variables related to vaccine delay and under-vaccination, including race/ethnicity demographics, vaccine refusal, and reasons for vaccine refusal or delay [8]. Equally, healthcare, pharmacy, insurance carriers, and provider organizations should encourage completeness of these key variables through homogeneous adaptation of integrated databases and implementation of healthcare provider requirements and incentives for IIS and EHR data completion.

The federal and state government should consistently fund IPs to hire additional IIS and epidemiologist staff to build internal capacity to better characterize vulnerable communities within the jurisdiction. Likewise, state and local governments should not delay establishing positions supported by federal funding and remove barriers for hiring employees and contractors for these roles.

Government, pharmaceutical and philanthropic organizations should develop a funding mechanism for public health-academic partnerships to support well-designed and executed efforts to identify groups with low vaccine confidence and to implement, evaluate, and refine interventions. IPs not only need sufficient staff with expertise—they need the support of external academic partners who can help develop and support research agendas to produce findings generalizable to other states (Table 1).

2. Managing legislative and policy efforts

2.1. Challenge

Most IPs take an active role in the legislative process, such as drafting educational materials, testifying or supporting state health officials in testifying, responding to the press, holding public hearings, and implementing programs related to new laws [4]. Even now, as IPs are at the center of the COVID-19 vaccination campaign, many must simultaneously manage an array of new bills triggered by the COVID-19 pandemic. For example, in the first half of 2021 over 320 bills were introduced in all 50 states and D.C. related to mandatory workplace vaccination, school entry requirements, authority to vaccinate, data management, vaccine payment and billing policies.

Not only does legislative activity increase the IP administrative burden, but legislative deliberations also are increasingly accompanied by organized anti-vaccine groups that rally to overturn policy efforts intended to protect communities from vaccine preventable diseases (VPDs); such activities have recently taken place in Oregon, Colorado, and New Jersey. Savvy — and at times, intimidating — anti-vaccine activists challenge IPs and public health departments by actively targeting and harassing those who assert pro-vaccine positions.

2.2. Recommendation

Community-based organizations, business leaders, and faith institutions should rally to advocate for supportive immunization policies that keep communities healthy and business running. Efforts should focus on collaborating to educate mis-informed policy makers and supporting pro-immunization legislation by contacting local elected officials and providing official oral and written testimony.

Federal and state government agencies should provide resources and support so IPs can more effectively manage the policy/legislative process, including training on effective engagement with policymakers. IPs need jurisdictional policies and resources to support successful management and engagement of policy related public forums (e.g., security protocols, stress counseling, de-escalation training) and guidance for managing aggression and attacks

Table 1
Recommended stakeholder actions to decrease vaccine hesitancy.

Stakeholders	Recommendations/Actions
ALL (including policy makers)	<ul style="list-style-type: none"> • Help establish and participate in a coordinated nationwide social media pro-vaccine network. • Support pro-vaccine advocacy groups countering misinformation. • Promote sound immunization policies. • Identify and address the needs of vulnerable subpopulations. • Implement evidence-based strategies to promote the value of vaccination, and combat misinformation online.
Government agencies	<ul style="list-style-type: none"> • Invest to develop and standardize IIS variables related to vaccine delay and under-vaccination, including race/ethnicity demographics, vaccine refusal, and reasons for vaccine refusal or delay. • Fund IPs to hire IIS and epidemiologist staff to better characterize vulnerable communities within the jurisdiction. • Help remove barriers for hiring employees and contractors for these roles. • Develop a funding mechanism for public health-academic partnerships to support efforts to identify groups with low vaccine confidence and to implement, evaluate, and refine interventions. • Provide resources and support to help IPs manage the policy/legislative process. • Help IPs develop policies and resources to support successful management and engagement of policy related public forums (e.g., security protocols, stress counseling, de-escalation training). • Help develop guidance for managing aggression and attacks directed toward IP staff by those who oppose pro-immunization policies.
Academia	<ul style="list-style-type: none"> • Help design and execute efforts to identify groups with low vaccine confidence and to implement, evaluate, and refine interventions. • Help develop and support research agendas to produce findings generalizable to other states. • Partner to research and evaluate the most effective means of social media outreach and/or targeted outreach.
Business leaders, faith- and community-based organizations	<ul style="list-style-type: none"> • Advocate for supportive immunization policies that keep communities healthy and business running. • Collaborate to educate mis-informed policy makers. • Support pro-immunization legislation by contacting local elected officials and providing official oral and written testimony
Healthcare organizations (e.g., hospitals, pharmacies, insurance carriers, provider organizations)	<ul style="list-style-type: none"> • Encourage completeness of key IIS variables (including race/ethnicity demographics, vaccine refusal, and reasons for vaccine refusal or delay) through homogenous adaptation of integrated databases and implementation of healthcare provider requirements and incentives for IIS and EHR data completion
Philanthropic and pharmaceutical organizations	<ul style="list-style-type: none"> • Develop a funding mechanism for public health-academic partnerships to support efforts to identify groups with low vaccine confidence and to implement, evaluate, and refine interventions.

directed toward IP staff by those who oppose pro-immunization policies (Table 1).

3. Countering misinformation online

3.1. Challenge

Although anti-vaccine messaging has been around since the first vaccine, the introduction of social media to the equation has amplified falsehoods about the dangers of vaccines. Many IPs take an active role in managing social media, ranging from having sole responsibility to develop content, or providing input or guidance into content and strategies implemented by another department or agency [4].

IPs are increasingly faced with the aftermath of vaccine misinformation spread on social media platforms. Even as social media platforms have updated their policies to curtail vaccine mis/disinformation, anti-vaccine messaging maintains a strong social media presence and those who oppose anti-vaccine messages can face vigorous social media attacks. Although there are new tools to gauge the scope of misinformation by jurisdiction, IPs need stakeholders to unite with them to counter these misinformation and disinformation campaigns that will continue to evolve rapidly over time as new claims find resonance with public sentiment. The ability to address vaccine mis/disinformation more effectively will be crucial to the success of the COVID-19 pandemic vaccination program.

3.2. Recommendation

All stakeholders should work to establish and participate in a coordinated nationwide social media pro-vaccine network to counter misinformation and the influence of anti-vaccine messages online [9]. Academic institutions should partner to evaluate these

methods and research the most effective means of social media outreach and/or development of more effective means of targeted outreach. Investment and collaboration among stakeholders must support all pro-vaccine advocacy groups that are able to effectively counter misinformation by employing standard social media influencing strategies and tactics already used to great effect by anti-vaccine groups (e.g., rapid messaging, integrated stakeholder network, emotional response, celebrity engagement) (Table 1).

4. Conclusion

The 64 state, local and territorial IPs are the backbone of the US immunization system, so we advocate for engagement of all stakeholders to directly support IPs in addressing vaccine hesitancy within their jurisdictions. To maintain routine vaccination coverage rates and implement a successful COVID-19 vaccination campaign, IPs need engagement of stakeholders at all levels to promote sound immunization policies, identify and address the needs of vulnerable subpopulations, implement evidence-based strategies to promote the value of vaccination, and combat misinformation online. IPs, with support of stakeholders, are the key to effectively addressing the complex challenges of vaccine hesitancy in order to bring the pandemic to a swift end.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Dr. Moore serves as an external advisor/consultant on advisory boards for Pfizer on its COVID-19 vaccine candidate and other vaccines. She also serves on vaccine advisory boards for Sanofi Pasteur and Seqirus. The remaining authors do not have any financial relationships or conflicts of interest to disclose.

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