

# Promising Strategies to Support COVID-19 Vaccination of Healthcare Personnel: Insights from the VHA National Implementation

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## Research Article

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# Abstract

## Background

As of August 2021 up to 30% of Americans were uncertain about taking the COVID-19 vaccine. Some healthcare personnel (HCP) also delayed or declined vaccination.

## Objective

Identify barriers and facilitators of Veterans Health Administration (VHA) HCP vaccination program

## Design:

Key informant interviews with employee occupational health (EOH) providers

## Participants:

38 VHA EOH providers representing 26 of VHA's regionally diverse healthcare systems.

## Approach:

Thematic analysis elucidated 5 key themes, and specific strategies recommended by EOH

## Key Results:

Implementation themes included: 1) Leverage diverse skillsets through multidisciplinary effort, specifically COVID-19 vaccination teams with clear goals/roles. 2) "*Focus like a laser*": invest in processes and align resources with priorities, including specific strategies of: creating detailed processes, eg. logistics plan to prevent wastage and allocate excess vaccine doses; addressing time trade-offs for personnel involved in vaccine clinics by suspending everything non-essential; designating process/authority to shift personnel where needed; and proactively involving leaders to support resource allocation/alignment. 3) Expect and accommodate vaccine buy-in occurring over time, including specific strategies of: preparing for some HCP slow buy-in; aligning buy-in facilitation with identities and motivation; encouraging word-of-mouth and hyper-local testimonials. 4) Overcome misinformation through trustworthy communication, with specific strategies including: tailoring communication to individuals and addressing COVID vaccines "in every encounter"; leveraging proactive institutional messaging (e.g., townhalls, Q&As) to reinforce information; inviting bi-directional conversations about hesitancy. 5) Use existing and newly developed communication channels to foster sharing and learning across teams and sites, eg. a national VHA EOH listserv.

# Conclusions

Expecting deliberation allows systems to prepare for complex distribution logistics, and conversations that are trustworthy, bi-directional, and identity-aligned - overall supporting mandate goals. Ideally, organizations 1) provide time for conversations about vaccines; those conversations would 2) address individual concerns and foster bi-directional shared decision-making, 3) be informed by identity-based motivation, and 4) delivered by identity-concordant individuals.

## Background

As of August 2021, up to 30% of Americans were uncertain about taking the COVID-19 vaccine, or opposed to it.<sup>1-3</sup> Individuals delaying vaccination reported concern related to COVID-19 vaccines rooted in rapid vaccine development, novelty of the technology, inconsistent messaging, and social media misinformation.<sup>4,5</sup> Interestingly, despite high exposure risks, health literacy, and obligations to protect patients, some healthcare personnel (HCP) also planned to delay or decline COVID-19 vaccination, citing primary concerns associated with how quickly COVID-19 vaccines were developed and approved, and personal safety (eg. side effects) and efficacy of vaccines.<sup>6,7</sup> Trust was also a major issue in HCP COVID-19 vaccine delay, with distrust in government, regulatory processes, and public health experts connected to vaccine hesitancy.<sup>7,8</sup>

COVID-19 vaccine mandates are on the horizon for employers in the US, particularly in healthcare settings. Factors contributing to increased pressure on HCP to vaccinate include COVID-19 surges (attributed to the spread of the B.1.1.7 and delta coronavirus variants),<sup>9</sup> nationwide primary school opening,<sup>10</sup> and formal approval of the COVID-19 Pfizer vaccine by the US Food and Drug Administration (FDA).<sup>11,12</sup> On September 10th, 2021, the US White House called for a new Occupational Safety and Health Administration (OSHA) rule mandating COVID-19 vaccinations or weekly COVID-19 testing for individuals in companies with over 100 employees.<sup>13</sup>

Vaccine mandates come in many shapes and sizes, informed by politico-cultural context and policy history.<sup>14</sup> For COVID-19, large institutions such as the Veterans Health Administration (VHA) have already adopted both flu and COVID-19 vaccine mandates, with a HCP mandate for COVID-19 vaccines issued on July 28, 2021, and extension to volunteers and contractors on August 13, 2021, impacting 360,000 HCP.<sup>15</sup> Previous studies suggest that mandate efficacy in successful HCP vaccination is achievable with the right resources and approaches; an international systematic review of HCP flu vaccination programs identified vaccine uptake facilitators to include mandates or active decline processes, free and accessible vaccines, education and incentive activities, organizational support over time, and dedicated personnel.<sup>16</sup> At a positive extreme, a 10-year US medical center flu vaccine mandate that included employment termination as a consequence of noncompliance has been highly successful, with 99% HCP immunization and positive impacts on patient safety.<sup>17</sup> Another study comparing six national or

statewide mandates recommended strategies to reduce the risk of mandate repeal: pairing mandates with public trust campaigns, and exerting minimal coercion.<sup>14</sup>

Even in a medical context, the first year of vaccine mandating can be challenging, with potentially acute impacts on healthcare delivery and staffing. One study of a quaternary pediatric hospital found that 1.6% of HCP were placed on administrative leave in year 1 of a flu vaccine mandate program<sup>17</sup>; translating to the VHA, nearly 6000 HCP could be out on leave related to COVID-19 mandates in 2022. In rural New York, impacts of HCP COVID-19 vaccine resistance forced a hospital to temporarily close maternity wards in September 2021, when too many maternity staff resigned instead of taking the COVID-19 vaccine.<sup>18</sup> Indeed, some predict that lack of mandates and/or enforcement may become a hospital recruiting tool; in areas that already experience HCP workforce shortages, desperate need may incentivize systems to delay or not introduce mandates in hopes of recruiting and retaining HCP who might otherwise considered leaving.<sup>19</sup> With these kinds of healthcare delivery disruption risks, even with a mandate there is still a critical role for addressing HCP concerns in order to meet immunization goals, and smooth and streamline implementation.

As expectations and regulations evolve around mandates, communication will continue to be a vital aspect of any implementation. Considering this, we may expect the role of employee occupational health (EOH) to increase, encompassing logistics of vaccine/testing monitoring as well as communication, both in terms of EOH principles informing communiques from leadership to staff and in terms of EOH provider individual facilitation with employees making decisions about vaccination.<sup>20</sup> US vaccination rates in September 2021 range from roughly 10% to upwards of 70% by county.<sup>21</sup> In some parts of the country, then, this could mean individual COVID-19 vaccine conversations conducted by EOH providers with as many as 90 out of 100 employees.

In this study we examine barriers and facilitators to vaccinating healthcare personnel in a national integrated healthcare system, specifically, the United States Veterans Health Administration (VHA), in the context of the 2020-21 effort to administer COVID-19 vaccines to staff, pre-mandate. Because the stakes are so high for HCP, hospitals, and patients, we aimed to identify challenges and strategies for COVID-19 vaccine delivery to HCP from the first six months of vaccines in hopes that lessons learned would inform systems, strategies, and communication approaches for ongoing mandated COVID-19 vaccination as well as HCP vaccination in non-mandated settings.

## **Methods:**

### **Interviews:**

We interviewed employee occupational health (EOH) providers about roles and needs for vaccine distribution to the VHA's HCP. EOH providers have perhaps the deepest view of health-related issues for health care workers, including vaccinations, and thus are ideal subject-matter experts for key informant

interviews. Interview topics covered EOH roles generally in keeping the healthcare workforce safe during COVID-19, and vaccination planning and delivery.

Our interview guide leveraged both implementation science frameworks and organizational theories. Specifically, the interview guide was informed by the Consolidated Framework for Implementation Research (CFIR),<sup>22</sup> where we looked for barriers and facilitators to vaccine delivery. We also looked to the role-readiness literature for probes relating to what might help the frontline EOH providers feel more ready or prepared to support new and dynamically changing processes.<sup>23</sup> Looking to give feedback to leaders in the national program office, we probed into what support frontline occupational health wanted and needed from various managers and leaders.<sup>24-27</sup> Our interview guide was developed by a team with qualitative research expertise (KG, CBJ) and EOH subject matter experts (SG and WT).

Participants: We used purposive sampling<sup>28</sup> to ensure key informant participants represented diverse geographies, urbanicity, site sizes, and roles. Specifically, we optimized respondent sampling for geographic spread (e.g., Northwest, Mid-Atlantic, Midwest, South, Southwest, and West), site size (small, midsize, and large), and urbanicity (urban vs sites serving more rural populations). Interviews occurred over 9 months across: 1) the shift to mandated flu vaccinations, 2) the emergency use authorization of the first COVID-19 vaccines in December 2020, and 3) vaccine distribution as late as end of March 2021 (see Fig. 1 for interview timing).

Data collection: We used a snowball sampling approach,<sup>28</sup> starting with known EOH subject matter experts, and also paid attention to variation in the sample in order to capitalize on diverse perspectives. Potential participants were sent an email inviting them for a research interview and contacted two more times by email (3 total possible email contacts). During the phone interviews conducted by PhD-trained qualitative researcher CBJ, we obtained verbal consent for participation and audio recording. Interview questions and procedures were reviewed by an interdisciplinary research advisory team with both organizational behavior and medical expertise (SS, KL, and EY). Research notes were captured during interviews for rapid analysis, and verbatim transcripts were created from audio recordings.

Analysis: We derived key findings using a rapid qualitative analysis approach<sup>29</sup> to identify primary themes in real time from key informant interviews. Within the VHA, rapid qualitative approaches have previously successfully been used to provide real-time insights backed by high-quality rigorous research methods.<sup>30</sup> We continued debriefing interviews as a team in weekly meetings to consolidate findings into five themes representing strategies for supporting vaccination of HCP through a process of constant comparison.<sup>31</sup> We identified exemplary quotes from transcripts representing the major themes. Themes were validated by two EOH stakeholders as a member check.<sup>32</sup> Our study meets the COREQ criteria for reporting qualitative research.<sup>33</sup> This study was approved by the Stanford IRB, #56617, and funded by VA Health Services Research and Development Service (HSR&D) C19 20-207.

## Results:

We interviewed 38 VHA EOH providers including 18 physicians, 16 nurse practitioners (NP), and 4 registered nurses (RN), from 26 of VHA's medical centers throughout the US (see Table 1). Interviews lasted approximately 30-60 minutes. Respondent medical centers represented diversity of geographic regions (6 Northwest, 8 Mid-Atlantic, 4 Midwest, 3 South, 1 Southwest, and 4 West), site size (7 small, 8 midsize, and 11 large), and urbanicity (13 urban and 13 rural). Rapid thematic analysis elucidated 5 key themes for vaccine delivery/implementation across sites: leverage diverse skillsets through multidisciplinary teams; invest in process and resources; expect vaccine buy-in to occur over time; overcome misinformation with trustworthy communication; share learnings across teams/sites. See Appendix A for overarching themes, specific strategies, and example occupational health provider quotes.

### **Theme 1. Leverage diverse skillsets through multidisciplinary effort for vaccine implementation**

EOH providers perceived COVID-19 vaccination as an unprecedented, urgent problem requiring diverse skillsets (clinical, leadership/incident command, public health, bioinformatics, administrative, etc.) to plan and execute effectively. Participants noted the specific strategy of creating multidisciplinary COVID-19 vaccination teams with clear goals and roles as a major part of vaccine delivery success. Conversely, misalignment of goals and inflexible reporting structures slowed implementation and created unnecessary conflicts across siloed disciplines. At one site, managers of four disciplines (Information Technology - IT, Nursing, EOH, and Management) needed to connect to reduce conflict around vaccination related tasks. One NP reiterated: *"It's multidisciplinary... employees from social work and education have been very responsive."*

VHA leveraged existing bureaucratic structures, such as the COVID-19 emergency response *"incident command"* site leadership teams, to rapidly deploy multidisciplinary teams. Diverse skillsets from these COVID-19 vaccination teams helped overcome logistical barriers. Vaccine dissemination was *"just not a one person job."* One physician explained, *"if we could have had anything else, it would have been to have more of an employee health team when this [vaccine campaign] rolled out."* Providers valued bringing together multiple disciplines, departments, and organizational levels to leverage diverse expertise, including both clinical and non-clinical parties.

Beyond multidisciplinary teams, integrated workflows allowed team members to share task load and create efficiencies. An ideal process might include techs/nurses documenting vaccines, pharmacy administering vaccines, and physicians monitoring for post-vaccine adverse events. When designating stable vaccine-specific teams was not possible, providers benefitted from clearly delineated tasks that recognized interdepartmental coordination and collaboration. Through leveraging interdisciplinary

expertise, vaccination teams were positioned to become *“really well-oiled machine[s],”* rapidly distributing vaccines to HCP.

## **Theme 2. “Focus like a laser”: invest in processes and align resources with priorities**

EOH providers reported that the COVID-19 vaccine roll out was layered on already overwhelming COVID-19 demands: *“You need to be an octopus to get everything done.”* The need for focus was critical, particularly during early implementation. Participants noted specific supporting strategies of: creating detailed processes, for instance a logistics plan to prevent wastage and allocate excess vaccine doses; addressing time trade-offs for personnel involved in vaccine clinics by suspending everything non-essential; designating process/authority to shift personnel where needed; and proactively involving leaders to support resource allocation/alignment

Detailed processes were critical due to vaccine complexity: *“It’s not like the flu shot where we can just go and grab a pre-filled syringe and administer it at any point in time.”* One site’s greatest success was a *“great process”*: *“our wastage has been incredibly low because we planned very well for this.”* Their plan involved having morning walk-in clinics to support shift-change vaccinations, and a systematic approach to site-wide communication about ad hoc opportunities to use opened but unused doses. This allowed time throughout the day to find extra vaccine recipients once a vial was open in the morning.

Frontline staff appreciated when leaders supported resource allocation and were available to *“approve”* extra hands and *“suspend”* other activities, proactively addressing time trade-offs. Specifically, everything *“worked better”* when there was designated process/authority to re-assign personnel to high-need situations. Indeed, proactively involving leaders in supporting resource alignment was *“critical”*: *“the right kind of support... was more leadership support... They had to approve the extra hands.”* Conversely, when authority for assigning vaccine tasks was unclear, problems arose: *“My manager was not giving me any management responsibility...I couldn’t really tell anyone what to do. So that caused some problems”* (NP).

## **Theme 3. Expect and strategically prepare for vaccine buy-in occurring over time.**

Even among EOH providers, some reported *“wait[ing]”* on vaccination, in addition to noting some HCP reluctance. EOH providers perceived vaccine reluctance to be related to various factors beyond mistrust, including *“health literacy”* and *“ideology.”* EOH providers noted *“how politicized COVID has become,”* and how *“it’s hard to disentangle the political aspects from the public health aspects.”*

Specific strategies to account for some vaccine hesitancy included preparing for some HCP slow buy-in, aligning buy-in facilitation with identities and motivation, and encouraging word-of-mouth and hyper-local testimonials. EOH providers disclosed that expecting slow buy-in among some HCP primed them to think strategically about facilitating vaccine acceptance over time. Important approaches to facilitating HCP buy-in included being alert to individual employee concerns and background, and aligning motivations with identities. For individual employee concerns, EOH providers reflected on belief systems and/or personal experiences that might have guided vaccination choice, allowing them to better meet HCP where they might be at in their thinking: *“maybe due to their ethnicity or culture and past experience, they’re more fearful of getting vaccinated.”* By attempting to understand HCP perspectives, EOH providers could foster vaccination buy-in through conversations that aligned HCP personal motivations with important identities, for instant parent (e.g., *“Do you want to bring this home to your kids?”*).

Hyper-local testimonial, and word-of-mouth accounts from EOH providers and HCP peers was also a strategy to support acceptance: *“The buy-in came because people were getting it and not having side effects, and then it was sort of like a tsunami... ‘Okay, well you got yours; I’ll get mine.’”* Some EOH providers emphasized the importance of sharing their own personal story— reasons why they had chosen to receive the vaccine (e.g., to see elderly parents, because they had witnessed even very careful co-workers contract it at work, because someone they knew personally had died) and their experience with vaccination. EOH staff reported that with such efforts, previously reluctant employees accepted vaccination. One MD described the process: *“The vast majority of employees [got] vaccinated [right away], followed by a long trail, a slow trickle of employees that’s been pretty steady.”*

#### **Theme 4. Overcome misinformation through trustworthy communication**

EOH providers noted feeling that they were *“swimming upstream”* against massive amounts of misinformation online, particularly on social media or targeting specific groups: *“I think there’s a terrible misinformation campaign on the internet...many of the minorities who suffered a lot through the COVID pandemic are adversely affected by this misinformation.”*

To address vaccine reluctance related to misinformation, EOH providers enumerated specific strategies that embrace trustworthy communication and promote trust-building, including tailoring communication to individuals and addressing COVID vaccines *“in every encounter”*; leveraging proactive institutional messaging (e.g., townhalls, Q&As) to reinforce information access and clear communication; and inviting open bi-directional conversations about hesitancy. One EOH provider noted, *“take it one person at a time”* in tailored communication to individuals, and suggested trust-building by addressing personal HCP

concerns and fears *“in every encounter”*: *“if someone comes in to get a COVID swab, I think we should be talking about the vaccine”* (MD). On a larger scale, EOH providers had a strategy of communicating clear institutional messages for HCP through townhalls, email campaigns, educational presentations, and/or Q&A sessions that also allowed bi-directional communication (*“We had several townhalls to allow employees to ask questions.”*). EOH providers recommended expecting decisions to occur over time and through multiple bi-directional communications, including invited *“shared decision-making”* conversations that empower HCP.

## **Theme 5. Foster sharing and learning across teams and sites**

EOH providers reported exhaustion from the constant experience of *“reinventing the wheel,”* resulting in the desire to learn from the ongoing experiences of other staff at their site and beyond: *“it would have been so nice if people brainstormed together.”*

EOH providers reported a primary strategy for sharing learning, which was to create or leverage infrastructure for cross-site learning and information sharing. Within their own sites, EOH providers cited email campaigns and memos from local site champions (who represented various disciplines and typically aided local vaccination campaigns) as key local sources for sharing information. VHA supported EOH teleconferences across multiple sites which were a well-received innovation to foster shared learning. For the flu mandate, EOH providers reported that the VHA allocated central resources to answer potential HCP questions.

Among EOH providers, a VHA-wide listserv was used to raise questions and share information about relevant topics, including the flu vaccine mandates and COVID-19 vaccine launch. As one respondent noted, *“the listserv has been a big advantage...they can ask a question, and anybody can answer those questions.”*

## **Discussion:**

This novel study leverages employee occupational health (EOH) provider subject matter expertise from a national health system to explore barriers and facilitators to COVID-19 vaccine delivery, including vaccine uptake and buy-in by healthcare professionals (HCP). Since the VHA is the US’s only country-wide healthcare system, this exploration of COVID-19 vaccine delivery illuminates challenges that large and networked systems may face, and identifies promising strategies to smooth and speed vaccine deployment, which could be applied to settings with or without vaccine mandates. Frontline EOH providers identified vaccine implementation strategies and barriers that were operational/logistical as well as interpersonal. Themes around implementation and promotion of COVID-19 vaccination included

leveraging interdisciplinary teams, aligning process and resources, strategically preparing for slow buy-in among some HCP, prioritizing trustworthy communication, and facilitating sharing learnings across sites.

Providers in our study observed divergent groups: for many, there was an early “*tsunami*” of adoption, but in some settings many HCP were hesitant. For the early “*tsunami*,” the leading edge of a standard diffusion of innovation curve was perhaps compressed by a compelling need for rapid adoption to prevent unnecessary life loss. The front of the curve was compressed, but without ongoing compelling needs for rapid adoption (eg. mandates/ new highly-contagious variants), we could predict regression to a more standard diffusion of innovations curve<sup>34</sup>: a long “*slow trickle*” of employees embracing vaccination over time. As with any innovation, particularly one that is complex and early in terms of stage of evidence, we need real implementation strategies for later adopters; having the expectation that some HCP will delay vaccination gives implementers, facility leaders, and policy makers an appropriate orientation of needing to continue to allocate resources, time, and expertise to adoption facilitation over time.

Vaccine mandates are swiftly approaching, particularly in medical contexts where unintentional COVID-19 exposure may harm vulnerable patients. Our results point to four aspects needed to move those HCP who may still be deliberating towards vaccination. Organizations would ideally 1) provide adequate time for HCP to have conversations with informed providers, such as those in EOH roles; those conversations would 2) address individual concerns and foster bi-directional shared decision-making. Further, conversations and communication with HCP who are still deliberating would be 3) informed by identity-based motivation, and 4) delivered by identity-concordant individuals, who may be occupational health (EOH) providers or part of the larger multi discipline vaccine delivery team.

*1) Employee occupational health (EOH) providers need adequate time for conversations.* EOH providers in our study were on track in attempts to allocate time for in-depth conversations with HCP. Our study revealed themes around a suite of strategies related to vaccine promotion that rely strongly on interpersonal interactions, including word-of-mouth peer accounts of taking the vaccine without major side effects; hyper-local testimonials, tailored to specific identities; and EOH providers sharing their own personal stories. EOH providers reported needing additional time to support communication during interpersonal interactions, facilitate vaccine buy-in, and solidify their role as trusted provider. This trust-building deserves dedicated attention and time; a study examining concepts of trust and hesitancy in the context of flu vaccine uptake documented that the impact of trust on vaccine acceptance operates independent of hesitancy.<sup>35</sup> Furthermore, even in situations of high vulnerability for employees, trust in EOH providers can increase with more contact between employees and providers.<sup>36</sup> Moving forward, healthcare systems need to ensure increased staffing of EOH or other appropriate roles so that these

providers have the flexibility to engage in in-depth conversations about vaccination with HCP who may be uncertain about COVID-19 vaccines.

*2. Conversations with HCP need to address individual concerns and foster bi-directional shared decision-making.* Surveys have emphasized varying approaches to facilitating vaccine acceptance through the mechanisms of shared decision-making – essentially meeting people where they are.<sup>3,37</sup> Indeed, vaccine delay can reflect dissent,<sup>38</sup> deliberation,<sup>39</sup> distrust,<sup>40</sup> and/or indifference,<sup>41</sup> each of which would require its own facilitation approach.<sup>42</sup> For instance, a March 2021 survey revealed that among those who wanted to *wait and see* before receiving the COVID-19 vaccine, education about efficacy in preventing hospitalization and death promoted vaccine acceptance.<sup>3</sup>

*3. Conversations with HCP need to be informed by identity-based motivation.* Our findings highlight the impact of the diverse identities of HCP, which span professional and personal lives, on COVID-19 vaccine decision making. HCP are situated in communities with distinctive belief systems and communal identities, both inside and outside their workplace. Social psychology literature emphasizes links between context and cognition; relevant to vaccine buy-in, individuals' decisions are informed by context.<sup>43</sup> Further, HCP may embody multiple identities simultaneously, and even in competition.<sup>44</sup> Planning for some slow buy-in, systems/implementers need to be truthful and persuasive. Key elements include identity-aligned communication coupled with identity-based motivation (i.e., *you are HCP and HCP get vaccinated to protect vulnerable patients*),<sup>45</sup> and community and system level communication approaches to combat systemic misinformation.<sup>42</sup>

*4. Communication with HCP is ideally delivered by identity-concordant providers.* Communication delivered by identity-concordant individuals is needed to reinforce identity-based motivation. Surveys suggest that vaccine education may be even more persuasive if delivered by providers with concordant identities, e.g. same race/ethnicity, same community.<sup>46</sup> EOH providers in our study also spoke to the value of overcoming misinformation and building trust through educational campaigns, which could be delivered by multiple members of a multidisciplinary vaccine implementation team to increase likelihood that HCP would perceive the messages as coming from someone who is identity-concordant. From public health campaigns, we could predict that education would be more effective in promoting vaccine acceptance among HCP if backed by anecdotes from providers with concordant identities, such as those rooted in race/ethnicity, background, or even training (nurses vs doctors, etc.). As spread of transmissible variants threatens regions or populations where vaccination is not pervasive,<sup>9</sup> fostering vaccine acceptance while being conscious of aligning not only the message content, but also the message delivery, with HCP identities is of critical importance.

**Strengths and limitations:** This study has two limitations. First, we focused on EOH providers and thus do not have direct perspectives from delaying or hesitant HCP. Second, although we have strong recommendations to make time for shared decision-making conversations, we did not directly observe or record conversations to know how these actually happen in changing HCP perspectives. Future studies should deeply examine the perspective of HCP who are hesitant or even resistant to vaccines (i.e. “anti-vaccine”). We know of one such study underway examining motivations for HCP COVID-19 vaccination delay that would serve as a good complement to this perspective. Secondly, observation of successful conversations pertaining to the COVID-19 vaccine would be ideal and could be a future step in this work.

## Declarations

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## Conclusions

Like any innovation, COVID-19 vaccine uptake may follow an adoption curve, including individuals who delay vaccination and need to be facilitated over time. Strategies to facilitate vaccine buy-in that address individual and communal identities may be supportive of adoption; hyper-local testimonials were helpful in aligning the HCP community in one facility, spurring vaccine acceptance. Even when COVID-19 vaccination is mandatory, encouraging healthcare personnel to choose vaccination is critical; expecting some gradual acceptance will allow providers and systems to focus efforts, prepare logistically, and have trustworthy, bi-directional conversations. To support HCP choice of vaccination, ideally organizations 1) provide time for conversations about vaccines; those conversations would 2) address individual concerns and foster bi-directional shared decision-making, 3) be informed by identity-based motivation, and 4) delivered by identity-concordant individuals.

# References

1. Hamel L, Krizinger A, Lopes L, Kearney A, Sparks G, Brodie M. KFF COVID-19 Vaccine Monitor: January 2021. KFF COVID-19 Vaccine Monitor. Published January 22, 2021. Accessed August 28, 2021. <https://www.kff.org/coronavirus-covid-19/report/kff-covid-19-vaccine-monitor-january-2021/>
2. Dubé E, Laberge C, Guay M, Bramadat P, Roy R, Bettinger J. Vaccine hesitancy: an overview. *Hum Vaccin Immunother.* 2013;9(8):1763–1773. doi:10.4161/hv.24657
3. Huetteman E. Covid Vaccine Hesitancy Drops Among All Americans, New Survey Shows. Kaiser Health News. Published March 30, 2021. Accessed August 23, 2021. <https://khn.org/news/article/covid-vaccine-hesitancy-drops-among-americans-new-kff-survey-shows/>
4. Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nat Hum Behav.* 2021;5(3):337–348. doi:10.1038/s41562-021-01056-1
5. Wouters OJ, Shadlen KC, Salcher-Konrad M, et al. Challenges in ensuring global access to COVID-19 vaccines: production, affordability, allocation, and deployment. *Lancet.* 2021;397(10278):1023–1034. doi:10.1016/S0140-6736(21)00306-8
6. Shekhar R, Sheikh AB, Upadhyay S, et al. COVID-19 Vaccine Acceptance among Health Care Workers in the United States. *Vaccines.* 2021;9(2):119. doi:10.3390/vaccines9020119
7. Lucia VC, Kelekar A, Afonso NM. COVID-19 vaccine hesitancy among medical students. *J Public Health (Oxf).* Published online December 26, 2020:fdaa230. doi:10.1093/pubmed/fdaa230
8. Li M, Luo Y, Watson R, et al. Healthcare workers' (HCWs) attitudes and related factors towards COVID-19 vaccination: a rapid systematic review. *Postgraduate Medical Journal.* Published online June 30, 2021. doi:10.1136/postgradmedj-2021-140195
9. Mahase E. Delta variant: What is happening with transmission, hospital admissions, and restrictions? *BMJ.* 2021;373:n1513. doi:10.1136/bmj.n1513
10. Fefferman N, Blacker K-A, LoBue V. *When Do Children Avoid Infection Risks: Lessons for Re-Opening Schools During the COVID-19 Pandemic.* Social Science Research Network; 2021. doi:10.2139/ssrn.3874129
11. Tanne JH. Covid-19: FDA approves Pfizer-BioNTech vaccine in record time. *BMJ.* 2021;374:n2096. doi:10.1136/bmj.n2096
12. Rosenthal J, Gee E, Calsyn M. Mandatory COVID-19 Vaccination for Health Care Workers as a Condition for Medicare and Medicaid Participation. Center for American Progress. Published August 6, 2021. Accessed August 28, 2021. <https://www.americanprogress.org/issues/healthcare/news/2021/08/06/502409/mandatory-covid-19-vaccination-health-care-workers-condition-medicare-medicaid-participation/>
13. Hirsch L. Biden Asks OSHA to Order Vaccine Mandates at Large Employers. *The New York Times.* <https://www.nytimes.com/2021/09/09/business/osha-vaccine-biden-mandate.html>. Published

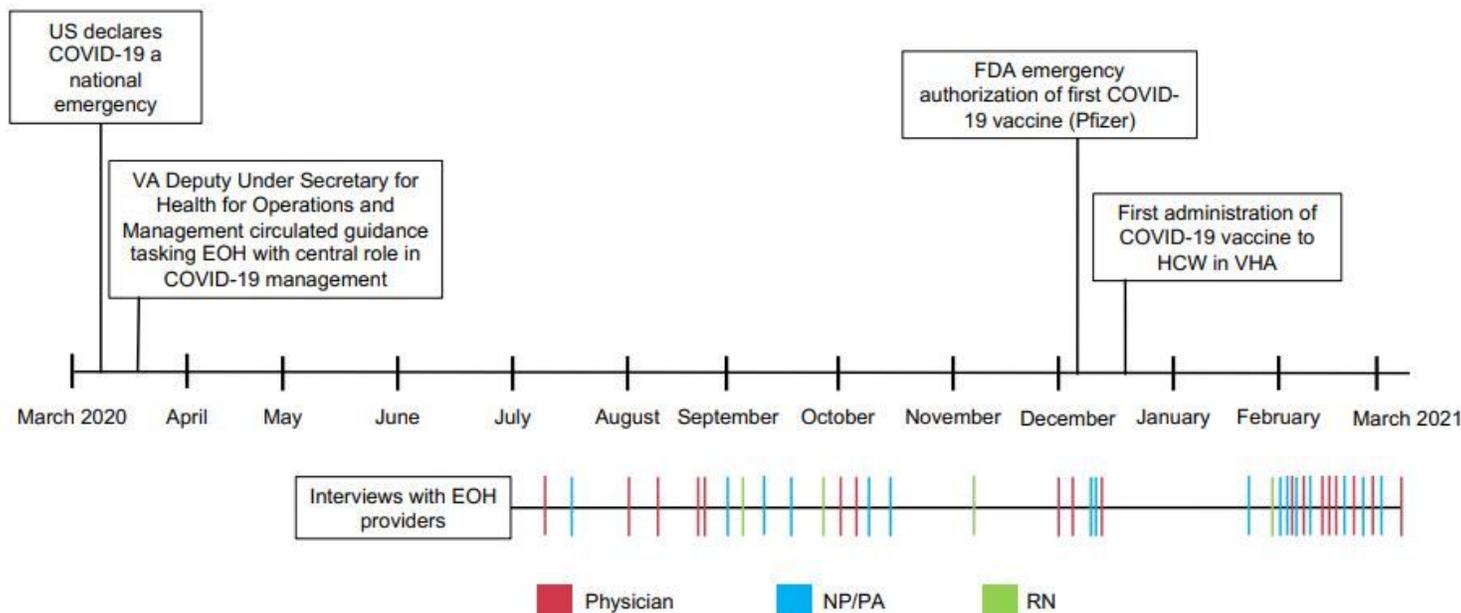
September 9, 2021. Accessed September 10, 2021.

14. Attwell K, Navin MC, Lopalco PL, Jestin C, Reiter S, Omer SB. Recent vaccine mandates in the United States, Europe and Australia: A comparative study. *Vaccine*. 2018;36(48):7377–7384. doi:10.1016/j.vaccine.2018.10.019
15. Shivaram D. Nearly 300,000 More Federal Health Workers Are Ordered To Be Vaccinated. *NPR*. <https://www.npr.org/sections/coronavirus-live-updates/2021/08/12/1027075086/covid-vaccine-hhs-va-federal-health-workers-vaccination-mandate>. Published August 12, 2021. Accessed August 28, 2021.
16. Paterson P, Meurice F, Stanberry LR, Glismann S, Rosenthal SL, Larson HJ. Vaccine hesitancy and healthcare providers. *Vaccine*. 2016;34(52):6700–6706. doi:10.1016/j.vaccine.2016.10.042
17. Kitt E, Burt S, Price SM, et al. Implementation of a Mandatory Influenza Vaccine Policy: A 10-Year Experience. *Clinical Infectious Diseases*. 2021;73(2):e290-e296. doi:10.1093/cid/ciaa782
18. Vendel C. Hospital to stop delivering babies after staff resigns instead of getting vaccinated. *pennlive*. Published September 10, 2021. Accessed September 14, 2021. <https://www.pennlive.com/news/2021/09/hospital-to-stop-delivering-babies-after-staff-resigns-instead-of-getting-vaccinated.html>
19. Weber L. Lack of a Vaccine Mandate Becomes Competitive Advantage in Hospital Staffing Wars. *Kaiser Health News*. Published online August 31, 2021. Accessed September 14, 2021. <https://khn.org/news/article/covid-hospital-staff-shortage-lack-of-mandate-competitive-advantage-worker-recruitment-retention/>
20. Wang TL, Jing L, Bocchini JA. Mandatory influenza vaccination for all healthcare personnel: a review on justification, implementation and effectiveness. *Current Opinion in Pediatrics*. 2017;29(5):606–615. doi:10.1097/MOP.0000000000000527
21. Times TNY. See How Vaccinations Are Going in Your County and State. *The New York Times*. <https://www.nytimes.com/interactive/2020/us/covid-19-vaccine-doses.html>. Published December 17, 2020. Accessed September 10, 2021.
22. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science*. 2009;4(1):50. doi:10.1186/1748-5908-4-50
23. Holt DT, Helfrich CD, Hall CG, Weiner BJ. Are You Ready? How Health Professionals Can Comprehensively Conceptualize Readiness for Change. *J Gen Intern Med*. 2010;25(Suppl 1):50–55. doi:10.1007/s11606-009-1112-8
24. Giannitrapani KF, Rodriguez H, Huynh AK, et al. How middle managers facilitate interdisciplinary primary care team functioning. *Healthc (Amst)*. 2019;7(2):10–15. doi:10.1016/j.hjdsi.2018.11.003
25. Giannitrapani KF, Glassman PA, Vang D, et al. Expanding the role of clinical pharmacists on interdisciplinary primary care teams for chronic pain and opioid management. *BMC Family Practice*. 2018;19(1):107. doi:10.1186/s12875-018-0783-9

26. Giannitrapani KF, Soban L, Hamilton AB, et al. Role expansion on interprofessional primary care teams: Barriers of role self-efficacy among clinical associates. *Healthc (Amst)*. 2016;4(4):321–326. doi:10.1016/j.hjdsi.2016.03.004
27. W B, Joanna J. Health Care Management During Covid-19: Insights from Complexity Science. *NEJM Catalyst Innovations in Care Delivery*. Published online October 9, 2020. Accessed August 23, 2021. <https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0541>
28. Bernard HR. *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. 4th ed. AltaMira Press; 2006.
29. Brown-Johnson C, Safaeinili N, Zionts D, et al. The Stanford Lightning Report Method: A comparison of rapid qualitative synthesis results across four implementation evaluations. *Learn Health Syst*. 2019;4(2). doi:<https://doi.org/10.1002/lrh2.10210>
30. Hamilton AB, Brunner J, Cain C, et al. Engaging multilevel stakeholders in an implementation trial of evidence-based quality improvement in VA women's health primary care. *Behav Med Pract Policy Res*. 2017;7(3):478–485. doi:10.1007/s13142-017-0501-5
31. Corbin J, Strauss A. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. 3rd edition. SAGE Publications, Inc; 2007.
32. Birt L, Scott S, Cavers D, Campbell C, Walter F. Member Checking: A Tool to Enhance Trustworthiness or Merely a Nod to Validation? *Qualitative Health Research*. Published online June 22, 2016. doi:10.1177/1049732316654870
33. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007;19(6):349–357. doi:10.1093/intqhc/mzm042
34. Rogers EM. *Diffusion of Innovations, 4th Edition*. Simon and Schuster; 2010.
35. Quinn SC, Jamison AM, An J, Hancock GR, Freimuth VS. Measuring vaccine hesitancy, confidence, trust and flu vaccine uptake: Results of a national survey of White and African American adults. *Vaccine*. 2019;37(9):1168–1173. doi:10.1016/j.vaccine.2019.01.033
36. Plomp HN, Ballast N. Trust and vulnerability in doctor–patient relations in occupational health. *Occupational Medicine*. 2010;60(4):261–269. doi:10.1093/occmed/kqq067
37. Thompson D. The Surprising Key to Combatting Vaccine Refusal. *The Atlantic*. Published February 28, 2021. Accessed August 23, 2021. <https://www.theatlantic.com/ideas/archive/2021/02/vaccine-hesitancy-isnt-just-one-thing/618164/>
38. Koltai K. Vaccine information seeking and sharing: How private Facebook groups contributed to the anti-vaccine movement online. *AoIR Selected Papers of Internet Research*. Published online October 5, 2020. doi:10.5210/spir.v2020i0.11252
39. Grumbach K, Judson T, Desai M, et al. Association of Race/Ethnicity With Likelihood of COVID-19 Vaccine Uptake Among Health Workers and the General Population in the San Francisco Bay Area. *JAMA Intern Med*. 2021;181(7):1008–1011. doi:10.1001/jamainternmed.2021.1445

40. Corbie-Smith G. Vaccine Hesitancy Is a Scapegoat for Structural Racism. *JAMA Health Forum*. 2021;2(3):e210434. doi:10.1001/jamahealthforum.2021.0434
41. Mann DL. Now That We Have an Effective Vaccine for COVID-19, Will It Also Inoculate Us Against the Virus of Indifference? *JACC Basic Transl Sci*. 2021;6(1):86–87. doi:10.1016/j.jacbts.2020.12.001
42. Burgess RA, Osborne RH, Yongabi KA, et al. The COVID-19 vaccines rush: participatory community engagement matters more than ever. *Lancet*. 2021;397(10268):8–10. doi:10.1016/S0140-6736(20)32642-8
43. Brown JS, Collins A, Duguid P. Situated Cognition and the Culture of Learning. *Educational Researcher*. 1989;18(1):32–42. doi:10.3102/0013189X018001032
44. Gaither SE. The multiplicity of belonging: Pushing identity research beyond binary thinking. *Self and Identity*. 2018;17(4):443–454. doi:10.1080/15298868.2017.1412343
45. Oyserman D, Destin M. Identity-based motivation: Implications for intervention. *Couns Psychol*. 2010;38(7):1001–1043. doi:10.1177/0011000010374775
46. Olanipekun T, Abe T, Effoe V, et al. Attitudes and Perceptions Towards Coronavirus Disease 2019 (COVID-19) Vaccine Acceptance Among Recovered African American Patients. *J Gen Intern Med*. 2021;36(7):2186–2188. doi:10.1007/s11606-021-06787-5

## Figures



**Figure 1**

Relational timeline of COVID-19 in the US and distribution of EOH interviews

## Supplementary Files

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- [AppendixA.docx](#)