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Concentrating Vaccines in Neighborhoods with High Covid-19 Burden

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Early racial disparities in Covid-19 vaccination are evident across the United States. The present article describes the San Francisco Health Network's early experiences with the implementation of a vaccination program centered on health equity. Thus far, the network has vaccinated more Black, Latinx, and residents of neighborhoods with a high Covid-19 burden as compared with San Francisco residents as a whole. The authors first share a cautionary tale about Web-based scheduling, which attracted more affluent individuals rather than their elderly safety-net patients. Successful interventions to vaccinate diverse people have included communication through text, telephone, and mass media, and the establishment of drop-in vaccine sites. To address nationwide disparities, the authors urge vaccinating entities to reduce reliance on Web-based scheduling in favor of drop-in sites and other low-barrier approaches.

Low-income, Black, Latinx, and American Indian/Alaska Native (AI/AN) urban communities have experienced disproportionate Covid-19 infections, hospitalizations, and deaths.[1,2] Unfortunately, early national data suggest the emergence of Covid-19 vaccine disparities, with Black, Latinx, and AI/AN individuals having been vaccinated at lower rates than their white counterparts across 23 states.[3]

Low-barrier access is the most effective way to address racial and income disparities in influenza vaccination.[4] However, Covid-19 vaccine delivery has been rife with barriers. California is investing in a statewide Web-based sign-up, whereas private health care systems often require patients to use

of an online portal to sign up for vaccines.[5] Online scheduling is operationally expedient for vaccine sites, but it hampers vaccine access for those with limited English proficiency, limited digital literacy, or minimal Internet access. A recent National Institute on Healthy Aging poll found that nearly half of older adults had not set up patient portal accounts to communicate with their health care teams, with lower rates of portal usage among Black and Latinx elders.[6]

Public health care delivery systems, including public hospitals and federally qualified health centers, have played a pivotal role in the pandemic response for low-income, diverse communities.[7] They have been asked to play an even larger role in vaccination. In the present article, we share the early experience of the San Francisco Health Network (SFHN) in prioritizing the delivery of Covid-19 vaccines to heavily Covid-19–impacted neighborhoods that have predominantly Black and Latinx residents. We offer a cautionary tale of an outreach approach gone awry, followed by methods that were most effective in vaccinating our vulnerable communities.

Demographic Data

The SFHN provides primary care to approximately 90,000 publicly insured and uninsured people across an integrated public health-care delivery system. Demographic data on our vaccinated senior patients and the San Francisco population are shown in Figure 1 and Table 1.

FIGURE 1

San Francisco Incident Covid Cases by Zipcode (left) vs Neighborhood Distribution of SFHN COVID Vaccines (right)
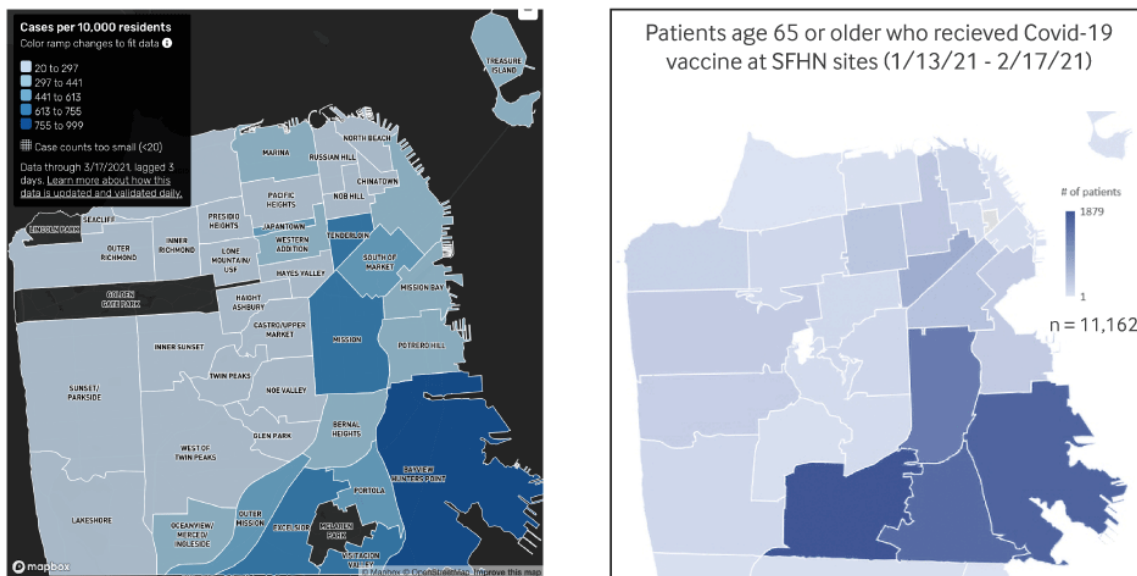
Source: SF Dept Public Health, SFHN electronic health record
NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Table 1. Demographic Data on Patients ≥65 Years of Age Vaccinated in SFHN as Compared with the San Francisco Population (January 15, 2021 – February 17, 2021)

Sociodemographic Traits	No. of Vaccinated Residents(N = 11,162)*	Percentage of San Francisco Population(N = 881,549)†
Race/ethnicity		
Asian	4,960 (44.4%)	34.90%
Black/African American	1,384 (12.4%)	5.50%
Latinx	2,299 (20.6%)	15.20%
Non-Hispanic white	1,836 (16.4%)	45.20%
Native Hawaiian/Other Pacific Islander	42 (0.4%)	0.40%
American Indian/Alaskan Native	25 (0.2%)	0.40%
Other	477 (4.3%)	5.70%
Not reported	139 (1.2%)	—
Non-English Language	5,848 (52.4%)	24.10%
Insurance		
Medicaid	1,458 (13.1%)	17.60%
Medicare	4,054 (36.3%)	16.30%
Private	100 (0.9%)	76.20%
Uninsured	229 (2.1%)	3.80%
Healthy Worker‡	1,104 (9.9%)	—
Blank	4,210 (37.7%)	—
VA	7 (0.1%)	0.90%
Residence in zip codes with high Covid-19 burden (94112 94134, 94124, 94110, 94102, 94103)§	7,653 (68.6%)	35.8%

*Vaccine data source: SFHN Electronic Health Record. †Population data source: 2010 US Census. ‡Healthy Workers is a commercial insurance product specifically for San Francisco In-Home Supportive Services (IHSS) workers and their families. §Neighborhoods with >313 cases/10,000 residents are considered "high burden". Data source: https://data.sfgov.org/stories/s/Map-of-Cumulative-Cases/adm5-wq8i/.

A Cautionary Tale: Web-Based Appointment Scheduling

Our first patient-facing effort was to vaccinate In-Home Supportive Services (IHSS) workers and adults ≥65 years of age. IHSS workers are home-based caregivers for individuals with disabilities and are considered health care workers. SFHN developed a Web-based tool (the "webform") for staff vaccination that allowed for self-certification of eligibility, the collection of demographic information, and self-scheduling of appointments. This webform was adapted for SFHN patients and then was sent by text message to those who were eligible. The San Francisco Health Plan, our largest insurer and a Medicaid managed-care plan, provided a multilingual telephone support line to assist patients in completing the online form.

> *To reverse the incipient disparities in Covid-19 vaccination, all vaccine providers, especially mass vaccination sites, should identify low-tech sign-up alternatives as well as focused efforts to vaccinate hard-hit communities."*

We sent text messages to 2,285 patients from January 13 to January 15, 2021. The text was in English, Spanish, and Chinese, whereas the webform was in English only. Early webform uptake was poor: only 12.5% of those who received the test message successfully scheduled appointments, and close to half of those individuals required support-line assistance. On January 16, the webform "went viral." Despite requiring patients to attest that they received care in our network, 768 ineligible people scheduled vaccine appointments in a 48-hour period. These individuals were privately

insured, 97% spoke English, and only 5.8% resided in zip codes with a high Covid-19 burden (Figure 2). When the breach was discovered, the webform was taken down and the appointments were cancelled.

FIGURE 2

San Francisco Incident Covid Cases by Zipcode (left) vs Neighborhood Distribution of Appointments Scheduled Inappropriately Using the Webform
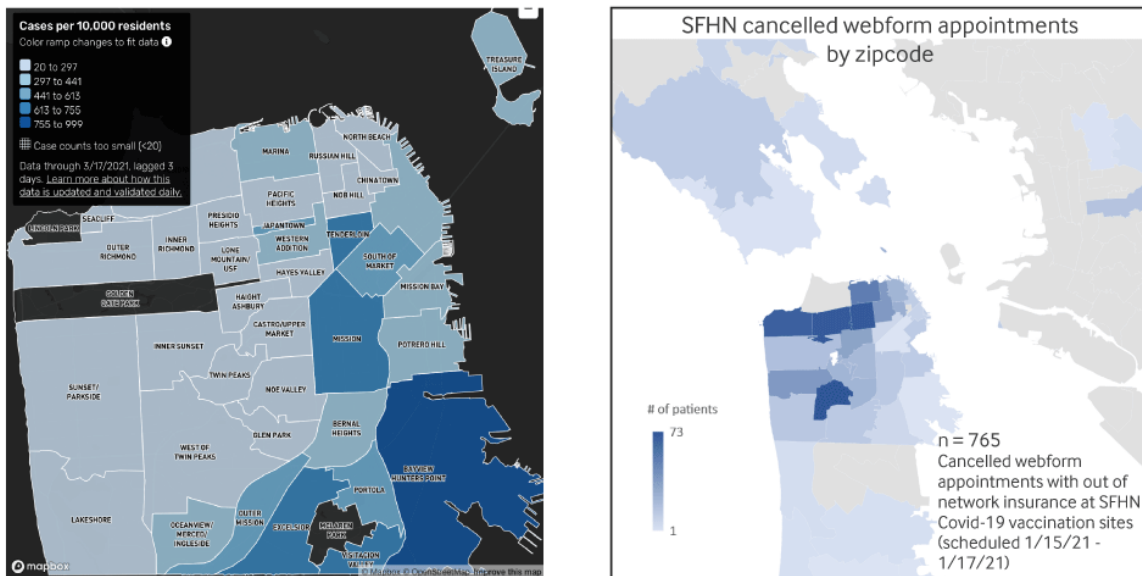
Source: SF Dept Public Health, SFHN electronic health record
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More Effective Strategies

After it became clear that Web-based scheduling did not effectively serve Covid-19–impacted communities, we pivoted our outreach and scheduling strategies. Four weeks after starting Covid-19 vaccinations for patients, we had successfully concentrated vaccines in low-income, Black, and Latinx neighborhoods. We deployed three strategies to vaccinate our hardest-hit neighborhoods: (1) evidence-based communication strategies, (2) drop-in vaccine sites, and (3) data-driven course corrections.

Learning from the low uptake of our webform, we focused on communication modalities with high penetration in our patient populations: telephone calls and text messages. Although not all individuals own or use smartphones, it has been estimated that 96% of Black adults and 98% of Latinx adults own cell phones.[8] We mobilized multilingual clinic staff, from nurses to clerks to primary care providers, to call eligible individuals and invite them for vaccines. Nine hundred appointments were scheduled within 3 days. Uptake was high, and personalized phone calls

continue to be leveraged for hard-to-reach populations. However, this method was too labor-intensive for the purpose of scheduling thousands of vaccine appointments each day.

Once it became clear that our patients could not use Web-based self-scheduling and that staff-driven scheduling was too labor-intensive, we began offering drop-in vaccinations in six neighborhoods with very high Covid-19 burden: Bayview-Hunters Point, the Excelsior, the Mission, the Outer Mission, Portola, and Visitacion Valley, which are the areas with the darkest shades of blue on the Covid-19 incidence map (Figure 1). These neighborhoods have large numbers of Black/African American, Latinx, and Asian residents. We distributed simple information about vaccine drop-in hours to SFHN patients in short, multilingual text messages and robocalls.

Our vaccine clinic in Bayview-Hunters Point extended vaccines beyond the SFHN patient base and invited all residents in the Bayview-Hunters Point zip code who were ≥65 years of age to be vaccinated. Elected officials and community groups reached out to their residents via social media, and the clinic was featured on local television news.[9] As news of the clinic spread through the community, the number of patients vaccinated at the drop-in clinic increased by almost fivefold over a 2-day period. A few days later, on the basis of the success of this effort, we expanded the same drop-in model for patients ≥65 years of age who lived in the zip codes of the remaining five neighborhoods listed above.

> "
> *Drop-in hours have been both the most effective and the most operationally challenging means of vaccinating our hard-hit communities."*

Drop-in hours have been both the most effective and the most operationally challenging means of vaccinating our hard-hit communities. As of March, at least 5,000 individuals had been vaccinated in SFHN drop-in clinics. Table 2 details operational considerations for running drop-in clinics in Covid-19–impacted communities.

Early and accessible scheduling and prevalence data allowed us to develop and refine our equity-based vaccination strategy. We regularly compare the race, language, insurance, and area of residence of our vaccinated patients with those of the communities with highest Covid-19 incidence. Doing so has allowed us to identify lower vaccination rates in specific populations — for example, seniors living in the Tenderloin neighborhood. We have thus prioritized Tenderloin seniors for the following interventions: labor-intensive "live" telephone outreach, transportation to vaccine sites, and mobile vaccine deliveries to permanent supportive housing. These data also have been leveraged to communicate our intent to prioritize equity across our organization and to external partners.

Lessons Learned

The SFHN has had early success in providing Covid-19 vaccines to neighborhoods and racial/ethnic groups that have been disproportionately impacted by Covid-19. We attribute this success to

Table 2. Operational Best Practices for Drop-In Covid-19 Vaccine Clinics

Challenge	Approach
Directing vaccines to members of Covid-19–impacted communities	• Create clear requirements for drop-in vaccines, such as residence in a Covid-19–impacted zip code. • Avoid burdensome documentation requirements such as employer letters. • Partner with community-based organization to offer direct referrals for their clients.
Notifying diverse communities of available vaccines	• Communicate via text, robocall, and mass media rather than e-mail or online patient portal. • Leverage elected officials and community leaders to spread the word.
Obtaining registration information at the time of vaccination	• Compared to appointment-based vaccine sites, drop-in vaccine sites require many more greeter and check-in staff appointments to enter demographic data and conduct required screening. These individuals do not need medical training and can be volunteers.
Matching vaccine supply to drop-in demand and ensuring no vaccine is wasted	• Be conservative when estimating how many vaccine doses to thaw as it is easier to thaw more than manage excess vaccine. • Count the number of patients in the drop-in line and close the line when the number of patients matches the number of thawed doses. • At the end of the day, ensure that all vaccinators are drawing from no more than two vials. This reduces leftover doses. • Have clear protocols for how extra vaccine is distributed.
Accommodating elderly and disabled individuals	• Maintain a blend of scheduled and drop-in appointments, preferably at different times of day. • Create an "express lane" for those with impaired mobility.
Maximizing patient flow	• "Float" staff to alleviate bottlenecks in registration, vaccination, or recovery monitoring. • Hold daily operational huddles to troubleshoot flow.
Planning for second dose demands	• Schedule second-dose appointments before individuals depart the drop-in site.

Source: The authors.

abandoning our Web-based sign-up system in favor of strategies such as drop-in vaccination, text communication, and social/mass media advertising. We suspect that reliance on Web-based sign-ups is a major barrier to vaccinations for multilingual, low-income people nationwide. To reverse the incipient disparities in Covid-19 vaccination, all vaccine providers, especially mass vaccination sites, should identify low-tech sign-up alternatives as well as focused efforts to vaccinate hard-hit communities.

> *Public health care systems are a convenient and reliable source of care for hard-hit communities. For this reason, public health care systems should be supported to manage the logistics and staffing required to directly deliver Covid-19 vaccines to the communities that they know and serve."*

Two partnerships have amplified the reach of our vaccine efforts, including one payer–health system partnership and one academic-community partnership. First, the San Francisco Health Plan offered a crucial tool in our vaccine operations: a multilingual vaccine-scheduling hotline. As a health system deploying vaccine during California's most severe Covid-19 surge, we did not have available staff for this endeavor. The San Francisco Health Plan was able to leverage many remote staff who were enthusiastic to contribute to Covid-19 vaccination efforts. The seniors whom we serve have repeatedly cited this hotline as the most accessible way for them to obtain a vaccine appointment. Second, SFHN also has an affiliation agreement with the University of California, San Francisco (UCSF), that is >100 years old. UCSF faculty and staff have contributed staffing to vaccine sites as well as operational and analytical expertise.

We also have been successful because, like many other public hospitals and Federally Qualified Health Centers, we operate in San Francisco's most heavily impacted communities and have cared for these communities for decades. Public health care systems are a convenient and reliable source of care for hard-hit communities. For this reason, public health care systems should be supported to manage the logistics and staffing required to directly deliver Covid-19 vaccines to the communities that they know and serve.

Despite adequate vaccine supply, only 60% of our eligible population of individuals ≥65 years of age have been vaccinated. Suspected causes include the imperfect reach of text messaging, the challenges of traveling to vaccine sites in a city in which few low-income people own cars, and lack of confidence in the vaccine. Entities delivering the vaccine must rapidly reevaluate their vaccine-delivery models to address those barriers. Actionable guidance from scientists and public health authorities is urgently needed to better understand and address those barriers.

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References

1. Mackey K, Ayers CK, Kondo KK. Racial and ethnic disparities in COVID-19-related infections, hospitalizations, and deaths: a systematic review. Ann Intern Med. 2021;174(6):362-73

2. Webb Hooper M, Nápoles AM, Pérez-Stable EJ. COVID-19 and Racial/Ethnic Disparities. JAMA. 2020;323(6):2466-7

3. Ndugga N, Pham O, Hill H, Artiga S, Alam R, Parker N. Latest Data on COVID-19 Vaccinations Race/Ethnicity. Kaiser Family Foundation. February 3, 2021. Accessed February 12, 2021. https://www.kff.org/coronavirus-covid-19/issue-brief/latest-data-covid-19-vaccinations-cases-deaths-race-ethnicity/.

4. Prins W, Butcher E, Hall LL, Puckrein G, Rosof B. Improving adult immunization equity: Where do the published research literature and existing resources lead? Vaccine. 2017;35(6):3020-5

5. California Department of Public Health. COVID-19 Vaccination: Find Out If It's Your Turn. Accessed February 12, 2021. https://myturn.ca.gov/.

6. Gavin K. 45% of Adults Over 65 Lack Online Medical Accounts, Which Could Affect COVID-19 Vaccination. Michigan Medicine Health Lab, University of Michigan. January 15, 2021. Accessed February 12, 2021. https://labblog.uofmhealth.org/health-tech/45-of-adults-over-65-lack-online-medical-accounts-which-could-affect-covid-19.

7. Heintzman J, O'Malley J, Marino M, et al. SARS-CoV-2 testing and changes in primary care services in a multistate network of community health centers during the COVID-19 pandemic. JAMA 2020 Aug 31:e2015891 [Online ahead of print].

8. .

9. Walton S. D10 COVID-19 Vaccine Update. Twitter. February 2, 2021. Accessed February 12, 2021. https://twitter.com/shamannwalton/status/1356485679996231681.