

announced incentive programs to motivate COVID-19 vaccination, including lotteries for \$1 million.² However, these large but uncertain financial prizes benefit only a few lucky winners and do not broadly address access barriers to vaccination.^{3,4} In contrast, guaranteed small financial incentives can offset costs related to lost wages, transportation, and childcare.

Methods | This quasi-experimental study used a 2-week pilot incentive program that guaranteed a \$25 cash card to adults who either received or drove someone to receive their first dose of COVID-19 at participating sites in 4 counties in North Carolina. Drivers could earn \$25 for each trip but were not paid twice for the same trip (eg, receiving a vaccine while also bringing someone else). The pilot program distributed 2890 cash cards to vaccine recipients and 1374 to drivers. Analyses of COVID-19 vaccine first doses used a difference-in-differences approach. A competing risk model included constant hazard functions for 3 defined competing events: being vaccinated at (1) intervention sites, (2) elsewhere in the same 4 counties, and (3) elsewhere in the state. For each event, the model compared different hazards for 2 baseline periods (April 28-May 11, 2021, and May 12-25, 2021) with the intervention period (June 2-8, 2021); analyses censored the intervening pilot program week owing to staggered site launches in that week (eFigure 1 and eFigure 2 in the [Supplement](#)). The evaluation also characterized incentive recipients with a cross-sectional survey of vaccine recipients who received a cash card at the intervention sites.

Statistical analysis was performed from June 10, 2021, to August 27, 2021, using R, version 3.6.1 (The R Foundation for Statistical Computing). For the survey analyses, we used Stata, release 15.0 (StataCorp LLC). Tests were 2-tailed and statistical significance was set at $P < .05$.

The study's vaccine initiation analyses were approved by the institutional review board of the University of North Carolina at Chapel Hill, and its survey data collection protocol and analyses by the institutional review board of North Carolina Central University. The study followed the Strengthening the Reporting of Observational Studies in Epidemiology ([STROBE](#)) Statement reporting guidelines.

Results | Vaccine initiation analyses relied on data aggregated for clinics, thus data on patient race and ethnicity were unavailable. During the baseline periods, COVID-19 vaccine initiation increased in the intervention clinics (46.2%), declined elsewhere in the 4 counties (-9.5%), and increased elsewhere in the state (1.7%; all $P < .001$; [Table 1](#)). From the second baseline period to the intervention period, COVID-19 vaccine initiation declined less at sites offering the guaranteed financial incentive when compared with elsewhere in the same counties (-26.4% vs -51.1%) and the rest of the state (vs -48.6%; both difference-in-differences, $P < .001$).

Among 401 vaccine recipients surveyed (response rate, 92.4%; mean [SD] age, 41.8 [14.9] years; 207 [52%] women; 187 [47%] Black individuals), 41% reported the cash card was an

Guaranteed Financial Incentives for COVID-19 Vaccination: A Pilot Program in North Carolina

Uptake of the COVID-19 vaccine remains too low in the US as COVID-19 variant cases and hospitalizations continue to rise. Nudges that remove barriers and facilitate action can increase vaccine uptake.¹ Many states, North Carolina included, have

Table 1. First Doses of COVID-19 Vaccine Delivered During Baseline and Financial Incentive Intervention Periods (N = 4 099 860), North Carolina, April 2021 to June 2021

Clinics	Baseline period vaccination rate ^a				Intervention period vaccination rate ^a		
	April 28-May 11	May 12-May 25	% Change vs previous period	P value ^b	June 2-June 8	% Change vs second baseline	P value ^c
Intervention sites ^d	0.82	1.20	46.28	<.001	0.88	-26.35	NA
County comparison ^e	5.65	5.11	-9.52	<.001	2.50	-51.09	<.0001
State comparison ^e	23.26	23.67	1.77	<.001	12.18	-48.56	<.0001

Abbreviation: NA, not applicable.

^a The vaccination rates are doses received per 10 000 unvaccinated persons per day.

^b P values are for difference over time (relative change from the first to second baseline period).

^c P values are for difference-in-differences (relative change from the second baseline period to the intervention period for intervention sites vs the rest of

country and vs the rest of state).

^d Intervention sites are vaccine clinics that participated in the incentive pilot program period.

^e County and state comparisons are clinics elsewhere in the 4 counties where intervention sites were located and elsewhere in the state, respectively.

Source: Data came from the North Carolina COVID-19 Vaccine Management System and the federal retail pharmacy program for North Carolina.

Table 2. Characteristics of Survey Participants Who Reported That Receiving a Financial Incentive or Being Driven to a Vaccination Site for First Dose of COVID-19 Was Important (n = 401)

Characteristic	No.	Received financial incentive ^a		Was driven to vaccination site	
		No. (%)	OR (95% CI)	No. (%)	OR (95% CI)
Race and ethnicity					
Black	187	75 (40)	1.47 (0.87-2.49)	97 (53)	1.74 (1.04-2.91)
Hispanic	75	34 (48)	2.00 (1.05-3.79)	44 (62)	2.51 (1.32-4.77)
White	95	29 (32)	1 [Reference]	35 (39)	1 [Reference]
Other ^b	44	28 (68)	4.68 (2.12-10.32)	22 (55)	1.89 (0.89-4.01)
Income ^c					
<\$20 000	85	44 (54)	2.36 (1.25-4.44)	59 (72)	6.09 (3.09-12.0)
\$20 000-\$39 999	82	39 (49)	1.94 (1.03-3.66)	42 (54)	2.77 (1.44-5.32)
\$40 000-\$59 999	53	17 (33)	1.02 (0.48-2.14)	15 (30)	1.02 (0.47-2.20)
≥\$60 000	84	27 (33)	1 [Reference]	24 (30)	1 [Reference]
Declined to answer	97	39 (41)	1.42 (0.77-2.63)	58 (63)	4.05 (2.14-7.67)
Age, y ^c					
18-29	97	38 (40)	1 [Reference]	39 (41)	1 [Reference]
30-39	89	28 (33)	0.74 (0.40-1.35)	34 (40)	0.96 (0.53-1.73)
40-49	79	35 (46)	1.27 (0.69-2.33)	42 (55)	1.81 (0.98-3.32)
≥50	123	59 (48)	1.43 (0.83-2.46)	77 (66)	2.89 (1.65-5.05)
Sex ^c					
Men	187	85 (46)	1 [Reference]	90 (51)	1 [Reference]
Women	207	80 (40)	0.77 (0.51-1.15)	106 (53)	1.10 (0.74-1.65)

Abbreviation: OR, odds ratio.

^a Adults who drove someone to the vaccination site for a first vaccine dose were also eligible for an incentive cash card.

^b Other races and missing data were combined into "other" owing to small cell sizes.

^c The sum of respondents for these characteristics is <401 owing to missing data.

Source: Data are from surveys administered to COVID-19 vaccine recipients at participating intervention sites.

important reason for vaccination (Table 2). Respondents more commonly identified cash cards as being important if they were of Hispanic ethnicity or other race (OR, 2.00-4.68) rather than White and had lower income (<\$40 000 annual) than higher income (ORs, 1.94-2.36). About 9% reported they would not have been vaccinated if the cash card had not been offered, and 15% waited to get vaccinated until they found an event that gave a cash card or other incentive. "Someone driving me here today," was an important reason for 49% of respondents, more commonly among Black (OR, 1.74; 95% CI, 1.04-2.91), Hispanic (OR, 2.51; 95% CI, 1.32-4.77), and lower income individuals (OR, 2.77-6.09; Table 2). Individuals with lower income (OR, 2.10-3.97) and older individuals (≥50 years;

OR, 2.30; 95% CI, 1.33-3.98) were more likely to have been brought by a driver who received a cash card.

Discussion | Providing a guaranteed small financial incentive is a potentially promising strategy to increase COVID-19 vaccination uptake. In this pilot program in North Carolina, incentives slowed the decline in vaccination and promoted more equitable distribution by alleviating barriers to vaccination, particularly for low-income, Black, and Hispanic individuals.

The use of a nonrandomized evaluation design makes conclusions about causal effects preliminary. The generalizability of these findings to other states and phases of the pandemic remain to be established.

With vaccination rates lagging in areas with higher social vulnerability, small financial incentives should be considered in conjunction with other equity-promoting strategies.^{5,6} The social incentive of cash cards for drivers may also encourage people to help get their friends and family vaccinated, a powerful motivator for those undecided about vaccination. With hundreds of millions of dollars being spent to accelerate COVID-19 vaccine uptake, these study findings suggest that this strategy for increasing vaccination merits greater investment.

Charlene A. Wong, MD, MSHP
William Pilkington, DPA, MPA, PhD
Irene A. Doherty, PhD, MPH
Ziliang Zhu, PhD
Hattie Gawande, BA
Deepak Kumar, PhD
Noel T. Brewer, PhD

Author Affiliations: Office of the Secretary, North Carolina Department of Health and Human Services, Raleigh (Wong, Gawande); Advanced Center for COVID-19 Related Disparities (ACCORD), Julius L. Chambers Biomedical Biotechnology Research Institute, North Carolina Central University, Durham (Pilkington, Doherty, Kumar); Department of Biostatistics, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill (Zhu); Department of Health Behavior, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill (Brewer).

Accepted for Publication: September 4, 2021.

Published Online: October 25, 2021. doi:10.1001/jamainternmed.2021.6170

Corresponding Author: Charlene A. Wong, MD, MSHP, Office of the Secretary, North Carolina Department of Health and Human Services, 101 Blair Dr, Raleigh, NC 27603 (charlene.wong@dhhs.nc.gov).

Author Contributions: Dr Kumar had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Wong, Gawande, Kumar, Brewer.

Acquisition, analysis, or interpretation of data: Wong, Pilkington, Doherty, Zhu, Kumar, Brewer.

Drafting of the manuscript: Wong, Pilkington, Doherty, Gawande, Brewer.

Critical revision of the manuscript for important intellectual content: Wong, Doherty, Zhu, Kumar, Brewer.

Statistical analysis: Wong, Pilkington, Doherty, Zhu, Brewer.

Obtained funding: Wong, Kumar, Brewer.

Administrative, technical, or material support: Pilkington, Gawande, Kumar, Brewer.

Supervision: Wong, Gawande, Kumar.

Conflict of Interest Disclosures: Dr Brewer reported grants from the North Carolina Department of Health and Human Services during the conduct of the study, and personal fees from the World Health Organization, the US Centers for Disease Control and Prevention, and Merck outside the submitted work. No other disclosures were reported.

1. Brewer NT, Chapman GB, Rothman AJ, Leask J, Kempe A. Increasing vaccination: putting psychological science into action. *Psychol Sci Public Interest*. 2017;18(3):149-207. doi:10.1177/1529100618760521

2. National Governors Association. COVID-19 vaccine incentives. 2021. Accessed June 22, 2021. <https://www.nga.org/center/publications/covid-19-vaccine-incentives/>

3. Volpp KG, Cannuscio CC. Incentives for immunity—strategies for increasing COVID-19 vaccine uptake. *N Engl J Med*. 2021;385(1):e1. doi:10.1056/NEJMp2107719

4. Walkey AJ, Law A, Bosch NA. Lottery-based incentive in ohio and COVID-19 vaccination rates. *JAMA*. 2021;326(8):766-767. doi:10.1001/jama.2021.11048

5. Barry V, Dasgupta S, Weller DL, et al. Patterns in COVID-19 vaccination coverage, by social vulnerability and urbanicity—United States, December 14,

2020-May 1, 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(22):818-824. doi:10.15585/mmwr.mm7022e1

6. Wong CA, Dowler S, Moore AF, et al. COVID-19 vaccine administration, by race and ethnicity—North Carolina, December 14, 2020–April 6, 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(28):991-996. doi:10.15585/mmwr.mm7028a2