Moving the Needle: Association Between a Vaccination Reward Lottery and COVID-19 Vaccination Uptake in Louisiana

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Abstract

Objective: On June 17, 2021, Louisiana launched a lottery campaign to reward residents who received a COVID-19 vaccination. We investigated the association between the lottery and vaccination uptake by characteristics of parishes.

Methods: We constructed an interrupted time series based on daily parish-level data on COVID-19 vaccinations to analyze the association with the lottery. We used recursive partitioning to separate vaccination uptake due to the Delta variant from vaccination uptake due to the lottery and limited our study period to May 25 through July 20, 2021. We performed subanalyses that grouped parishes by political affiliation, hesitancy toward COVID-19 vaccines, race and ethnicity, and socioeconomic status to detect heterogeneous responses to the lottery by these characteristics. We ran models separately for parishes in the top and bottom tertiles of each sociodemographic indicator and used a z test to check for differences.

Results: The lottery was associated with an additional 1.03 (95% CI, 0.61-1.45; P < .001) first doses per parish per day. Comparing lottery impacts between top and bottom tertiles, we found significantly larger associations in parishes with lower vaccine hesitancy rates, higher percentage of Hispanic population, higher median annual household income, and more people with a college degree.

Conclusions: Results suggest that the lottery was associated with increased COVID-19 vaccination uptake in Louisiana. However, larger associations were observed in parishes with an already higher likelihood of accepting vaccines, which raises equity issues about the opportunity created by the lottery and its effectiveness as a long-term behavioral incentive.

Keywords

COVID-19, vaccine uptake, lottery incentive, heterogeneous associations, Louisiana

Despite the widespread availability of safe and effective vaccines in the United States against COVID-19, vaccine uptake continues to lag, especially in the Deep South.1 Just 1 month before the White House goal to have 70% of residents vaccinated by July 4, 2021, the vaccination rates of Mississippi, Louisiana, and Alabama were only 45% and sat at the bottom ranks among all states.2 Vaccination rates also varied across counties according to sociodemographic characteristics. Nationally, low income, low educational attainment, identifying as Black, and conservative political leaning were associated with high levels of vaccine hesitancy,3,5 and vaccination uptake was typically low in rural counties.6 counties with a high proportion of Republican Party (GOP) voters,7 and counties with high poverty rates.6

Sixteen state governors created COVID-19 lottery-based incentives with a jackpot of at least $1 million to increase vaccination rates, including the first vaccination lottery with a million-dollar prize in Ohio in May 2021.8 Following that strategy, Louisiana launched the first and only vaccine lottery campaign in the Deep South on June 17, 2021.9 This 6-week campaign, dubbed “Shot at a Million,” offered one $1-million jackpot and 4 additional $100 000 cash prizes to

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adults who had received at least 1 dose of COVID-19 vaccine and registered for the lottery by July 31, 2021.19

In contrast to smaller, guaranteed rewards, large but uncertain prizes such as cash lotteries are often used to nudge people toward health behaviors they would not spontaneously adopt or are reluctant to adopt. Lottery incentives capitalize on people’s psychology of overestimating small probabilities and have been successfully used to promote onetime behaviors such as vaccination and screening.11 Experimental evidence also suggests that lottery incentives tend to be more effective than guaranteed but smaller bonuses in promoting health interventions.12,13

Evidence of the effects of the first COVID-19 vaccine lottery incentive campaign in Ohio is mixed. Robertson et al14 analyzed 12 state vaccine lotteries, including the Ohio lottery, using cumulative vaccination data. Although they detected an increase in vaccination uptake for Ohio and 9 other states, the impact in Arkansas and California was not significant. In contrast, Walkey et al15 argued that increases in vaccinations in Ohio after the lottery could have resulted from the nearly contemporaneous authorization of the Pfizer vaccine for use in teenagers. In addition to these mixed findings, studies have not examined which attributes of local populations are most likely to be associated with increased lottery effectiveness.

Our work contributes to this existing literature in 2 important ways. First, we examined the association of the Louisiana lottery, the only COVID-19 vaccination reward lottery in the Deep South, with COVID-19 vaccination uptake. Second, we examined heterogeneous associations of the lottery with vaccination uptake by parish (county) attributes.

## Methods

We used an interrupted time-series design to measure changes in daily parish-level counts of first-dose vaccinations in Louisiana before and after the launch, on June 17, 2021, of the “Shot at a Million” lottery. Our study did not include human subjects; analysis was limited to publicly available data aggregated to the parish level and, as such, was exempt from institutional review board review.

## Data

We collected data for all parishes (N = 64) in Louisiana from several sources. First, we obtained the number of first doses, from any manufacturer, of COVID-19 vaccine administered on each day to working-age adults (people aged 18 to 64 years) from the COVID-19 Data Tracker published by the Centers for Disease Control and Prevention (CDC).16 To control for the severity of the pandemic, we also collected data on the daily COVID-19 death count from the Center for Systems Science and Engineering COVID-19 GitHub Repository of Johns Hopkins University.17 We used COVID-19 death counts instead of COVID-19 cases because we aimed to capture factors that influence vaccination choices and that may be more accurately proxied by a severe outcome such as death than by a less severe outcome (illness).

We analyzed heterogeneous lottery associations across 4 dimensions of parish-level sociodemographic characteristics: (1) political affiliation, (2) level of hesitancy toward COVID-19 vaccine, (3) racial and ethnic distribution, and (4) socioeconomic status. We measured political affiliation with the percentage of votes for the GOP in the 2020 presidential election.18 Vaccine hesitancy was measured by the percentage of the population with strong hesitancy toward the COVID-19 vaccine, data for which were adapted from the federal Household Pulse Survey from May 26–June 7, 2021, by the Office of the Assistant Secretary for Planning and Evaluation.19 We obtained parish-level data on racial and ethnic distribution from the US Census Bureau 2019 release.20 To measure socioeconomic characteristics, we used parish-level median annual household income, unemployment rate, and percentage of the population with ≥bachelor’s degree; data were obtained from the Economic Research Service at the US Department of Agriculture.21

## Methodology

We used the following interrupted time-series regression model to evaluate the lottery policy:

\[
\text{Dose}_{i,t} = \alpha + \beta T_i + \gamma D_i + \delta \times D_i \times T_i + \pi \text{CovidDeath}_{c,t} + \tau_i + \epsilon_{i,t}
\]

where \(D_i\) is a dummy indicating the days on and after the lottery announcement date (June 17, 2021), \(T_i\) is the running variable measured in days relative to the lottery announcement date, \(\delta\) measures the change in slope in the postlottery announcement period, and \(\gamma\) measures the discontinuity at the lottery intervention point. We used 7-day moving averages of both counts of first doses administered and COVID-19 deaths as dependent and control variables, respectively, to reduce the noise in the data resulting from fluctuations between weekdays and weekends and different working days of vaccine clinics. We included parish fixed-effect terms (\(\tau_i\)) to absorb time-invariant unobserved differences across parishes. SEs were clustered at the parish level. To examine whether the lottery impact varied among parishes according to characteristics, we ran the model separately for parishes in the top and bottom tertiles of each sociodemographic indicator. We also used z tests to analyze whether \(\delta\), the coefficient indicating the lottery effect, differed significantly between the models limited to the top and bottom tertiles of selected sociodemographic variables. The regression models were conducted in Stata version 16.0 (StataCorp LLC).

To isolate the association with Louisiana’s lottery from other factors that influenced COVID-19 vaccination uptake, we limited the study period to a few weeks before and after...
the lottery announcement. Our analysis window started on May 25, 2021; most COVID-19 restrictions were lifted on that date as COVID-19 hospitalizations in Louisiana dropped to one of their lowest points since the beginning of the pandemic. This start date was 2 weeks after the day the US Food and Drug Administration authorized the Pfizer-BioNTech COVID-19 vaccine for emergency use in adolescents aged 12 to 15 years, on May 10, 2021. We selected this start date to avoid the confounding that may have been present in the analyses of the Ohio lottery.

To remove the effect of the spread of the Delta variant on vaccination uptake, we closed our analysis window before the surge in Delta cases. We used a model-based recursive partitioning method to identify the kink point in the trend in vaccination uptake. This method fits a designated parametric model to subsets of data generated according to a partitioning variable and tests for parameter instability during the recursive process to identify the partition with the highest parameter instability. We applied this recursive partitioning method to our data from June 17 through July 31, 2021, to identify the date after which the coefficient of the running variable $T$ changed the most (ie, the date after which news of the Delta coronavirus variant started to affect vaccine uptake). To perform this analysis, we used the “partykit” package version 1.2-15 in R 4.1.1 (R Core Team). We found a change in trend on July 20, 2021. Thus, we set our final analysis window from May 25 through July 20, 2021.

Finally, we performed a simple calculation to estimate the total number of additional doses associated with the lottery for the 64 parishes during the 34 days after the lottery announcement (from June 17 through July 20). Using the parameters of the regression model, the total additional doses would be $(\gamma \times 34 + \delta \times 34 \times 34/2) \times 64$, where $\gamma$ is the parish-level discontinuity value and $\delta$ is the daily marginal increase in parish-level vaccinations.

## Results

Statewide Louisiana vaccinations increased more rapidly after the kink point identified by our recursive partitioning algorithm (July 20) (Figure panel A). The raw mean number of first-dose vaccinations rose from 43.7 doses per parish per day before the lottery announcement to 47.6 doses per parish per day afterward (Table 1). Statewide vaccine uptake also trended upward after the lottery was announced, whereas previously it was trending downward (Figure panel B). The interrupted time-series regression demonstrated a positive association between the lottery and vaccination uptake among working-age adults in Louisiana: the change in slope after the lottery announcement was both positive and significant (change in slope $= 1.03; 95\%$ CI, $0.61-1.45; \ P < .001$) (Table 2).

Using the regression results, we calculated 39,146 (95\% CI, 16,450-61,841) additional doses associated with the lottery for the whole state in the 34 days after the lottery announcement. Based on the 2020 Louisiana population, we calculated an increase of 1.37 (95\% CI, 0.58-2.17) percentage points in first-dose vaccination rate from a baseline rate of 37.5\% (the vaccination rate on June 17, 2021). Given $1.4$ million in total lottery prizes, we estimated that the cost per marginal vaccination was $35.76 (95\% CI, $22.64-$85.10).

The response to the lottery differed significantly between parishes in the top and bottom tertiles of vaccine hesitancy (Table 2). Although the association between the lottery and vaccination uptake was nominal in high-hesitancy parishes,
the association was more pronounced in low-hesitancy parishes: in low-hesitancy parishes, the change in slope after the lottery announcement was positive and significant (change in slope = 1.88; 95% CI, 0.79-2.97; \( P = .002 \)). Response to the lottery also differed to different degrees between parishes according to political affiliation but not significantly according to the \( z \) test (Table 2). This result suggests that the parishes in the top tertile of GOP voters also responded to the lottery, although the response was moderate (change in slope = 0.70; 95% CI, 0.05-1.35; \( P = .04 \)) compared with the response in counterpart parishes in the bottom tertile (change in slope = 1.21; 95% CI, 0.28-2.15; \( P = .01 \)).

The association of the lottery with vaccination uptake among parishes according to racial and ethnic structure was mixed (Table 3). We found no significant differences according to percentages of non-Hispanic Black and non-Hispanic White populations based on the \( z \) test. However, we found a significantly larger association (change in slope = 2.13; 95% CI, 1.01-3.24; \( P < .001 \)) in parishes in the top tertile of Hispanic population percentage.

The association between the lottery and COVID-19 vaccination uptake did not differ among parishes according to unemployment rates (Table 4). However, we found a significantly greater response to the lottery in parishes in the top tertile of median annual household income (change in slope = 1.81; 95% CI, 0.88-2.74; \( P < .001 \)) than in the bottom tertile. Parishes in the top tertile of population with a college degree also showed a significantly greater boost in COVID-19 vaccination uptake after the lottery announcement (change in slope = 2.39; 95% CI, 1.40-3.39; \( P < .001 \)) than their counterparts in the bottom tertile.

**Discussion**

Our analysis suggests a positive association between the COVID-19 vaccination reward lottery and vaccination uptake in Louisiana. The lottery was associated with 1.03 additional first doses per parish per day. This estimate is likely conservative because we excluded the lottery eligibility period that overlapped the Delta variant surge (July 21–July 31, 2021); there may have been additional lottery effects during that time.

Our analysis suggests a cost of $35.76 per marginal COVID-19 vaccine dose for the Louisiana lottery. Studies of other state lotteries found costs per induced dose of $68 or $75 (Ohio), $20.90 (New York), and $769.60 (West Virginia), with the average marginal cost per lottery of $55 across several states. Generally, the lottery in Louisiana had
Table 2. Regression results for all parishes and those in the top tertile and bottom tertile of political affiliation and attitudes toward COVID-19 vaccines, in an analysis of the policy impact of a COVID-19 vaccination reward lottery campaign, Louisiana, May 25 through July 20, 2021.

| Item                                      | All | Bottom tertile | Top tertile | Bottom tertile | Top tertile |
|-------------------------------------------|-----|----------------|-------------|----------------|-------------|
| Postlottery slope change<sup>a</sup>      | 1.03 (0.61 to 1.45) [−0.001] | 1.88 (0.79 to 2.97) [0.002] | 0.34 (−0.11 to 0.80) [0.13] | 1.21 (0.28 to 2.15) [0.01] | 0.70 (0.05 to 1.35) [0.04] |
| Lottery discontinuity<sup>b</sup>         | 0.48 (−2.81 to 3.77) [0.77] | 1.10 (−6.62 to 8.81) [0.77] | −0.95 (−5.67 to 4.73) [0.73] | 1.15 (−5.51 to 7.81) [0.72] | −0.71 (−5.45 to 4.02) [0.76] |
| No. of observations                       | 3648 | 1254 | 1140 | 1254 | 1197 |
| Adjusted R<sup>2</sup>                    | 0.90 | 0.88 | 0.72 | 0.91 | 0.89 |
| z test<sup>c</sup>                        | —    | 2.71 [0.006] | 0.93 [0.35] |

Abbreviations: —, not applicable; GOP, the Republican Party.

<sup>a</sup>On June 17, 2021, Louisiana launched a 6-week campaign that offered one $1-million jackpot and 4 additional $100 000 cash prizes to adults who had received ≥1 dose of COVID-19 vaccine and registered for the lottery by July 31, 2021. Vaccination data are from the Centers for Disease Control and Prevention’s COVID-19 Data Tracker<sup>16</sup>. All values are coefficient (95% CI) [P value] unless otherwise indicated. Coefficients were gained from interrupted time-series regressions controlled for parish-level fixed effects and the number of COVID-19 deaths. P < .05 was considered significant.

<sup>b</sup>Vaccine hesitancy data are from the Office of the Assistant Secretary for Planning and Evaluation<sup>19</sup>. Percentage of residents with strong hesitancy toward COVID-19 vaccines, in an analysis of the policy impact of a COVID-19 vaccination reward lottery campaign, Louisiana, May 25 through July 20, 2021.

<sup>c</sup>A z test was used to compare the coefficients of postlottery slope change between samples limited to the bottom and top tertiles<sup>22</sup>. Values are z score [P value].

Table 3. Regression results for parishes according to race and ethnicity structures, in an analysis of the policy impact of a COVID-19 vaccination reward lottery campaign, Louisiana, May 25 through July 20, 2021.

| Item                                      | Black<sup>b</sup> | Hispanic<sup>b</sup> | White<sup>b</sup> |
|-------------------------------------------|------------------|-----------------------|------------------|
| Percentage of residents who are non-Hispanic | Bottom tertile | Top tertile | Bottom tertile | Top tertile |
| Postlottery slope change<sup>a</sup>      | 0.84 (0.22 to 1.46) [0.01] | 1.07 (0.18 to 1.96) [0.02] | 0.45 (0.09 to 0.81) [0.02] | 2.13 (1.91 to 3.24) [0.001] | 1.32 (0.38 to 2.26) [0.08] | 0.88 (0.21 to 1.54) [0.01] |
| Lottery discontinuity<sup>b</sup>         | 1.08 (−3.82 to 5.99) [0.65] | 2.18 (−6.65 to 9.00) [0.51] | −0.07 (−3.97 to 3.83) [0.97] | 1.82 (−7.11 to 10.76) [0.67] | 1.28 (−5.21 to 7.77) [0.69] | 1.14 (−4.29 to 6.57) [0.67] |
| No. of observations                       | 1254 | 1197 | 1254 | 1197 | 1254 | 1197 |
| Adjusted R<sup>2</sup>                    | 0.89 | 0.89 | 0.86 | 0.88 | 0.91 | 0.90 |
| z test<sup>c</sup>                        | −0.44 [0.66] | −2.98 [0.003] | −2.98 [0.003] | −2.98 [0.003] | −2.98 [0.003] | −2.98 [0.003] |

Abbreviations: —, not applicable; GOP, the Republican Party.

<sup>a</sup>On June 17, 2021, Louisiana launched a 6-week campaign that offered one $1-million jackpot and 4 additional $100 000 cash prizes to adults who had received ≥1 dose of COVID-19 vaccine and registered for the lottery by July 31, 2021. Vaccination data are from the Centers for Disease Control and Prevention’s COVID-19 Data Tracker<sup>16</sup>. All values are coefficient (95% CI) [P value] unless otherwise indicated. Coefficients were gained from interrupted time-series regressions controlled for parish-level fixed effects and the number of COVID-19 deaths. P < .05 was considered significant.

<sup>b</sup>Percentage of residents who voted for GOP in 2020 presidential election.<sup>18</sup> Percentage of residents who are non-Hispanic Black<sup>b</sup>, Hispanic<sup>b</sup>, and White<sup>b</sup> in the five parishes with the lowest median annual household income, the five parishes with the highest median annual household income, and the counterpart parishes in the bottom tertile, despite the presumed greater need for income in the latter. This finding might be partly explained by the concentration of wealthy

Our research showed an increase of 1.37 (95% CI, 0.58-2.17) percentage points in the first-dose COVID-19 vaccination rate, from a baseline rate of 37.5%. Similar increases, ranging from 1.06 to 4.20 percentage points, were found in studies on text-reminder and small-value voucher incentives<sup>20,30</sup>. However, for mandate interventions, results varied from no impact to some positive impact<sup>31-33</sup>. Our study provided empirical evidence of the heterogeneous associations between the lottery and COVID-19 vaccination uptake across parishes with various sociodemographic characteristics. Our findings echoed the findings that predominantly Democratic parishes are more likely to show high levels of vaccination uptake<sup>7,34</sup> and that higher education levels are associated with a higher probability of vaccine acceptance<sup>35,36</sup>. We expanded on these findings by showing that parishes in the top quartile of education levels also responded to the lottery to a greater extent than parishes in the bottom quartile of education levels. Moreover, we found that parishes with strong antivaccine attitudes, regardless of the determinants of their antivaccine attitudes, were less likely than vaccine-accepting parishes to be nudged by monetary incentives in the form of a lottery.

Our analysis also produced some counterintuitive findings. First, parishes in the top tertile of median annual household income tended to be more responsive to the lottery than the counterpart parishes in the bottom tertile, despite the presumed greater need for income in the latter. This finding might be partly explained by the concentration of wealthy similar economic efficiencies to those of other statewide lotteries.
Table 4. Regression results for parishes with different socioeconomic characteristics, in an analysis of the policy impact of a COVID-19 vaccination reward lottery campaign, Louisiana, May 25 through July 20, 2021a

| Item                                    | Median annual household income* | Percentage of residents who are unemployedb | Percentage of residents with < bachelor's degreec |
|-----------------------------------------|---------------------------------|--------------------------------------------|-----------------------------------------------|
|                                        | Bottom tertile | Top tertile | Bottom tertile | Top tertile | Bottom tertile | Top tertile |
| Postlottery slope change               | 0.38 (0.09 to 0.68) [0.01]    | 1.81 (0.88 to 2.74) [0.001]           | 1.18 (0.49 to 1.86) [0.002]    | 1.19 (0.50 to 1.89) [0.002] | 0.21 (0.04 to 0.38) [0.02] | 2.39 (1.40 to 3.39) [0.001] |
| Lottery discontinuity                  | −1.06 (−4.73 to 2.62) [0.56] | −0.68 (−2.82 to 4.66) [0.54]          | 1.29 (−1.53 to 7.93) [0.49]   | 0.31 (−3.41 to 3.71) [0.95]  | −1.04 (−2.93 to 0.86) [0.98] | 5.10 (−9.93 to 23.13) [0.25] |
| Prelottery slope                       | −0.27 (−0.34 to 0.00) [0.05]  | −1.28 (−1.95 to −0.61) [0.001]        | −0.86 (−1.39 to −0.32) [0.003]| −0.79 (−1.26 to −0.32) [0.002] | −0.61 (−1.27 to 0.05) [0.17] | 1.29 (−5.35 to 7.93) [0.69]  |
| No. of observations                    | 1254                           | 1197                                      | 1368                          | 1197                         | 1254                           | 1197                            |
| Adjusted R²                            | 0.88                           | 0.91                                      | 0.87                          | 0.90                         | 0.86                           | 0.87                            |
| z test                                 | −3.04 (0.002)                  | −0.86 (0.40)                              | −1.84 (−1.93 to −1.12) [0.001] | −0.68 (−7.82 to 6.46) [0.84]  | −0.11 (−2.56 to 1.10) [0.20]   | −1.84 (−4.73 to 2.62) [0.56]  |

a On June 17, 2021, Louisiana launched a 6-week campaign that offered one $1-million jackpot and 4 additional $100 000 cash prizes to adults who had received ≥1 dose of COVID-19 vaccine and registered for the lottery by July 31, 2021. Vaccination data are from the Centers for Disease Control and Prevention’s COVID-19 Data Tracker. All values are coefficient (95% CI) [P value] unless otherwise indicated. Coefficients were gained from interrupted time-series regressions controlled for parish-level fixed effects.

b Parish-level socioeconomic data are from the Economic Research Service at the US Department of Agriculture.

c Postlottery slope change and lottery discontinuity indicate the impact of the lottery on COVID-19 vaccination uptake. Postlottery period is from June 17 to July 20, 2021.

Conclusions

Our research found a positive association between the COVID-19 vaccination reward lottery and COVID-19 vaccination uptake in Louisiana. We contribute to the current research on vaccine incentive lotteries by identifying heterogeneous associations of the lottery by parish characteristics. Typically, we found larger associations in parishes with higher COVID-19 vaccination uptake before the lottery was launched. This set of circumstances could raise equity issues if the public resources consumed by the lottery did not create equal opportunities across populations. Also, the effectiveness of lottery as a public behavioral incentive in the long run is unclear because it may bring about a spiral of expectations on rewards for socially beneficial behaviors such as vaccination.

Louisiana is the only Deep South state that launched a COVID-19 vaccination reward lottery. The positive association suggested by our research may add support to similar sociodemographic characteristics of the lottery participants or those of people who received the vaccine after the lottery started, thus running the risk of ecological fallacy in our parish-level analysis. Further research is needed to understand the individual-level response to the lottery. Second, the study had no control group, and the pre¬post design of the interrupted time-series method could have led to bias because the 2 segments did not cover the same period. For example, the intensity of vaccine misinformation circulating online may have differed between the periods before and after the lottery announcement, or local vaccination events may have taken place to coincide with the lottery in certain geographies. Either of these factors may have led to bias in our ecological study design. Finally, although we used the recursive partitioning method to identify the kink point (when the Delta variant started to confound our research), it is difficult to completely disentangle the impact of the Delta variant on vaccination uptake, which happened not long after the lottery campaign.

Limitations

Our study had several limitations. First, because of the lack of daily individual-level data, we could not compare the populations in urban areas, where exposure to media could increase both vaccine awareness and information on the lottery, and where the abundance of health resources may have facilitated access to vaccines. However, in the absence of individual-level data, the demographic characteristics of lottery participants are unknown, so some proportion of lottery participants may have come from low-income populations in urban areas. Second, we detected a stronger response to the lottery in parishes in the top tertile (vs bottom tertile) of Hispanic population. Although this finding is veiled by the absence of individual-level data on lottery participants, it may again signal a stronger effect of the lottery on urbanized parishes than on rural parishes in Louisiana, because Hispanic people are highly concentrated in metropolitan areas of the state.

While the heterogeneous effects of the lottery detected in the analysis may reflect differences between urban parishes, which may be wealthier, more educated, and more ethnically diverse than their rural counterparts in Louisiana, they nonetheless point toward the importance of tailoring large lottery-type incentive campaigns to the intended audiences. Our findings indicate that the Louisiana lottery may only have incentivized populations who were predisposed to taking the vaccine but could not nudge residents with deeply entrenched antivaccine attitudes. Furthermore, the lottery may have exacerbated existing differences in vaccination uptake because urban residents—with better exposure and access to health services than rural residents—had a “better shot” at participating in the lottery. Finally, it is impossible to discount the potential counterproductive effects of the incentive campaign; previous research noted that intended beneficiaries might become suspicious of the reasons behind the incentive and may be even less likely to adopt the promoted behavior.
practices in other states with politically conservative populations and relatively low vaccination rates. Although effective on the margin, a lottery alone may not be a particularly strong nudge for people with predisposed vaccine hesitancy. Other nonmonetary interventions targeted to spread vaccine knowledge and ease the vaccination process may need to be considered.

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