Can Text Messages Reduce Incarceration in Rural and Vulnerable Populations?*

Emily Owens CarlyWill Sloan

September 15, 2022

Abstract

Reducing failure to appear (FTA) in court is a top priority for criminal justice practitioners and advocates. However, existing work on reducing FTAs through text message reminders focuses on large urban jurisdictions and defendants who are housed. Using a field study in Shasta County, California, we evaluate whether text message outreach can increase court appearances for the housed and unhoused population. We find housed defendants randomly assigned to the treatment group were 10% less likely to miss their first scheduled court date than defendants in the control group. However, we find no difference in the FTA rate of unhoused individuals assigned to treatment or control groups. We find that improving the quality of contact information in Court records could lead to large reductions in FTAs, but partnering with local social service providers may not.

*Funding for this experiment was provided by the J-PAL SILL. This research would not have been possible without the support, cooperation, and collaboration of Shawn Watts, Doug Aarestad, and Steve Wilson at the Shasta County Superior Court, and Matthew Rivas at the Good News Rescue Mission. Many thanks to David Bjerk, Mathew Freedman, Eric Helland, Helen Ho, Rohit Naimpally, Yiping Li, Aurélie Ouss, David Phillips, Stephen Raphael, Jessica Sashihara, participants at the 2021 APPAM fall meeting, two anonymous J-PAL reviewers, and the staff of the JPAL-NA SILL program for feedback on many stages of the project. Carolyn Coles and Aria Golestani provided outstanding research assistance, as well as UCI undergraduate students Nicole Huaman and Eric Stone. This pilot was registered with the AEA RCT Registry (AEARCTR-0006606). All errors are our own. Owens: Department of Criminology, Law, and Society and Department of Economics, University of California, Irvine (e-mail: egowens@uci.edu). Sloan: Department of Social Sciences, United States Military Academy at West Point (email: carlywill.sloan@westpoint.edu)

1 Introduction

On a typical day in 2022, roughly 29% of the incarcerated US population is in jail, and over 80% of that jail population is detained while their case is adjudicated.[1] Incarceration, particularly for low level offenses or first time offenders, can have negative consequences for employment (Dobbie, Goldin and Yang, 2018), family formation (Lopoo and Western, 2005), and health (Sundaresh et al., 2020), which can persist for generations (Geller et al., 2012). While there is evidence of heterogeneity in these social impacts (Lee and Wildeman, 2021), the use of pre-trial detention has been identified as an important cause of persistent poverty and inequality in the US (e.g. (Kohler-Hausmann, 2018)) and a priority of criminal justice practitioners and advocates across the political spectrum.

Pre-trial detention is generally justified for one of two reasons: to increase public safety during a trial, or to maintain the integrity of the judicial process by ensuring that the defendant appears in court.[2] A growing number of studies have tested a variety of interventions aimed at reducing the probability that a defendant fails to appear at a scheduled court date, commonly referred to as an FTA, without relying on incarceration. Most of these have focused on simply alerting people that these court dates exist - and are required - via text-message based reminders (e.g., Emanuel and Ho, 2020; Lowenkamp, Holsinger and Dierks, 2018; Fishbane, Ouss and Shah, 2020) and direct mail (Bornstein et al., 2014). Randomized evaluations have demonstrated that reminders can have substantively important effects on FTAs, increasing the probability that people appear for required court dates by 23% to 38%.

We build on this literature by examining whether the promising results found in these existing studies generalize to two different contexts. First, evaluations of interventions aimed at reducing FTA rates have tended to focus on more dense, urban places ((Bornstein et al., 2014) is an exception to this, as both urban and rural jurisdictions were included in their sample). This emphasis is understandable, as crime victimization rates

[1] Estimates based on the Prison Policy Initiative report "Mass Incarceration: The Whole Pie 2022," available at https://www.prisonpolicy.org/reports/pie2022.html, last accessed 6/7/2022

[2] See the American Bar Association Criminal Justice Standards, Standard 10-1.1 "Purposes of the pretrial release decision," available at https://www.americanbar.org/groups/criminal_justice/publications/criminal_justice_section_archive/crimjust_standards_pretrialrelease_blk/#10-1.1, last accessed 6/7/2022

are consistently around twice as high in urban areas as rural ones (Chaudry et al., 2018), and there is also some evidence that FTA rates may be higher in urban places (Bornstein et al., 2014). However, rural counties are contributing to an increasingly large share of the jail population (Kang-Brown and Subramanian, 2017), meaning that identifying effective strategies to reduce rural jail populations is a clear next step in criminal justice reform. Second, these evaluations have explicitly focused on people who are housed, rather than the most economically vulnerable in society. Of course, focusing on higher volume courts and easier to reach populations increases power in experimental evaluations. However, given the emerging consensus that text-message based reminders "work," careful exploration of the external validity of these findings to harder-to-reach groups is warranted. Indeed, the potential of behavioral "nudges," as SMS reminders have been described (Fishbane, Ouss and Shah, 2020), to deferentially affect high and low status individuals has become an increasing focus of policy oriented social science (e.g. Mrkva et al., 2021).

Using a randomized controlled trial, we find mixed support for the ability of text messages to reduce FTAs in smaller, more rural, courts with large economically vulnerable populations. Specifically, housed misdemeanor defendants in Shasta County, California were approximately 5 percentage points (10%) more likely to appear in court if they were sent a reminder notification 3 days before their scheduled court date. One major, but actionable, barrier to text messages being as effective in smaller jurisdictions appears to be due to information gaps on the part of the Court. When adjusted for the roughly 47% of phone numbers in the Court's database that were inaccurate or incomplete, our findings imply that successfully sent text messages reduce the probability of rural misdemeanor FTAs by approximately 19%, consistent with findings from the larger jurisdictions.

Our research design also allowed us to evaluate the impact of FTAs among the population of people who were likely to be unhoused, based on their current charged offense. We fail to find evidence that text message based reminders are an effective way to reduce FTAs among this population. While we find that the Court is substantially less likely to have accurate contact information for unhoused people, the difference in information quality does not explain this difference in response to reminders. Administrative records from a large local social service provider, the Good News Rescue Mission (GNRM) also suggest major challenges associated with providing in-person reminders to this popula-

tion - there is only a small overlap between the population of unhoused people charged with misdemeanors and the population who accesses overnight or day services from the GNRM.

2 Background

2.1 The Shasta County Context

Shasta County, California is a rural county in Northern California. In 2020, approximately 180 thousand people lived in Shasta County, half of whom live in the county seat of Redding. Approximately 79% of the population is white, non-Hispanic (36 percentage points higher than California overall), per capita income in 2019 was roughly $30,000 (about $6,000 lower than the state average), and the estimated 2021 poverty rate was about 14% (three percentage points higher than in the state). There are approximately 240 people per square mile in the state of California as a whole, while in Shasta County there are approximately 47. Attitudes towards government and social issues are also generally different in Shasta County relative to California; in the 2020 presidential election, 34% of California residents voted for the Republican party, compared with 65% in Shasta County.[3]

Shasta County is also notably different from one of the most recent text message based FTA experiments evaluated in New York City (Fishbane, Ouss and Shah, 2020). New York City has approximately 27,000 people per square mile, 32% of whom identify as non-Hispanic White, and 12% of whom voted for the Republican candidate in the 2020 presidential elections. Local estimates suggest that in 2020, roughly 1% of the New York City population is unhoused.[4] The current best estimate in Shasta County is that roughly 2% of the population is unhoused, and that slightly over half of the unhoused population of Northern California lives in Shasta County (NorCal Continuum of Care 2020). This relatively high population of people experiencing housing instability is generally attributed

[3]Election results are from the California Secretary of State Statement of Vote https://elections.cdn.sos.ca.gov/sov/2020-general/sov/complete-sov.pdf last accessed 8/8/2022.

[4]These estimates are based on reports from Bowery.org https://www.bowery.org/homelessness/ last accessed 1/31/2022

to Redding being the largest city in Northern California.[5] Spatial features of Redding also make it potentially suitable to large unhoused populations; Redding is located at the intersection of two major north-south and east-west highways, and the downtown area is bisected by both a river and train line.

2.2 Misdemeanor Court Appearances in Shasta County

The Shasta County Superior Court is notified of court dates three days in advance and, once set, this information is also posted on the Shasta County website. Most misdemeanor cases begin and end at arraignment, and misdemeanor arraignments take place on Monday and Friday mornings. In California, the maximum statutory penalty for misdemeanors is a fine of up to $1000, or six months to 364 days in jail. Due to persistent jail overcrowding, as a general rule individuals charged with misdemeanors in Shasta County are not detained during adjudication, and the penalties for misdemeanor convictions generally consist of a fine or community service. However, failing to appear for a required court date will result in an arrest warrant being issued and a ratcheting up of criminal penalties - including increased fines and potential incarceration. Prior to our study period, once court dates were scheduled the Court notified defendants via a phone-based reminder system, where an automated voice message was sent to the phone number in the Court's records. The script of the automated reminder was as follows:

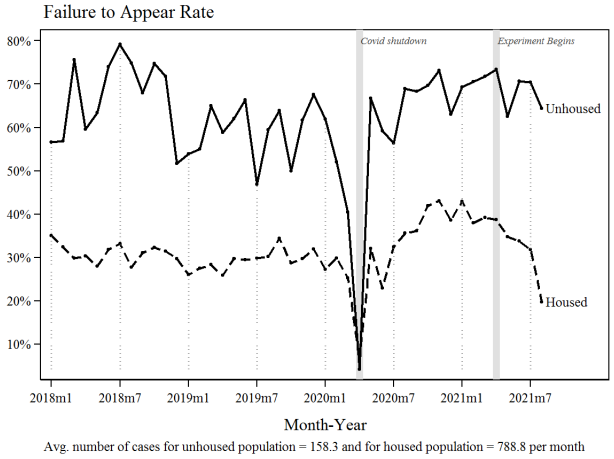
This is the Shasta County Superior Court calling for *name*. This call is to remind you that you have a court appearance scheduled on *date* at the Shasta County Courthouse at *time* in department *department*. Failure to appear in court as required may result in a number of negative consequences, including being charged with an additional crime of failure to appear, or a warrant being issued for your arrest. Your sentence may be increased due to your failure to appear. We strongly encourage you to not miss your court appearance on the date and time indicated. If you have questions regarding this message, you may call 530-245-6789 between the hours of 8:30 a.m. to 12:00

[5] That said, Redding is still not very dense compared to New York City, with 1,569 people per square mile.

p.m. and 1:00 p.m. to 4:00 p.m. Monday through Friday, excluding holidays. If you are represented by counsel, follow your attorney's directions about court appearances. Thank you.

Even with these voicemail reminders, which were discontinued on February 23, 2021, failing to appear was common in Shasta County. As shown in Figure 1, between January of 2018 and March of 2020, housed defendants failed to appear (FTA) for a scheduled court date in 30% of misdemeanor cases in the Shasta County Superior Court.[6] This overall FTA rate is slightly lower than the study populations in New York City (Fishbane, Ouss and Shah, 2020) and the large urban jurisdiction studied in (Emanuel and Ho, 2020).

Figure 1: Failure to Appear Rates Over Time



The Court has identified a set of misdemeanors that are considered to be "flags" for someone being unhoused: offenses involving unlawful camping or campfires, public urination or alcohol consumption, being in a park after hours, or solicitation. FTA rates are almost twice as high for the 17% of people likely experiencing housing instability, based on their alleged offenses. In addition, someone whose address is listed as "Transient" or "General Delivery" will also be flagged as unhoused, for as long as their address information is not updated.

The Court ceased operations during the first two weeks of the COVID-19 pandemic.

[6]Consistent with this, bond dealers frequently require contact information from family members, and notify both defendants and family members of upcoming court dates (Helland and Tabarrok, 2004)

When the Court re-opened, FTA rates were noticeably higher for housed people, potentially due to uncertainty about whether the Court was hearing cases. During our study period, FTA rates for housed individuals overall declined to pre-pandemic levels. For the likely unhoused, FTA rates increased slightly, but were generally constant during the pandemic.

3 Experimental Design

Our intervention is focused on people who are charged with misdemeanors, with a specific emphasis on those likely to be currently experiencing homelessness - some of the most economically vulnerable people in society. Existing RCTs (e.g. Emanuel and Ho, 2020) generally have excluded people without valid cell phone numbers, or those whose address information identifies them as likely to be unhoused (e.g., identified as transient in court records). While survey data suggests that a high fraction of people experiencing homelessness have cell phones, over half either have no phone or multiple phone numbers in the past three months Rhoades et al., 2017. In 2019, 36% of cases involving homelessness-related offenses in Shasta County were associated with a clearly inoperable phone number, compared with 23% of cases overall.

In cooperation with the Shasta County Superior Court, between April 6th and June 29th, 2021, we sent SMS reminders to a stratified random sample of misdemeanor defendants. Once the Court was notified of its upcoming schedule, typically at 3 pm three days before, misdemeanor defendants were divided into treatment and control groups as follows. First, defendants were screened for previous treatment assignment. Individuals who were previously assigned to treatment or control conditions were assigned their previous status. The remaining defendants were flagged as ”housed” or ”unhoused” based on their current offenses. Within housed and unhoused groups, defendants were then randomly sorted, and divided into equally sized treatment and control groups.

The phone numbers associated with individuals assigned to treated status were sent the following text message:

Helpful reminder from Shasta County Superior Court: You have court on *date*, at *time* at 1500 Court Street, department *dept number* in Redding. What time should you leave to get there by *time*? Any other arrangements to make? Missing court can lead to your arrest. If you have questions regarding your court date, you may call (530) 245-6789 between 8:30 a.m.-12:00 p.m. & 1:00 p.m.-4:00 p.m. M- F, excluding holidays.

where ***date***, ***time***, and ***dept number*** were replaced with values that corresponded to the individual's court date. The specific text of this message was based on the most effective message used in Fishbane, Ouss and Shah, 2020, which combined elements of planning and consequences. Deviations from the specific text in Fishbane, Ouss and Shah, 2020, in particular the "Helpful Reminder" introduction, were based on feedback from a number of virtual focus groups of clients and staff of the Good News Rescue Mission, conducted in March of 2021.[7]

Text messages were sent via a third party commercial vendor, Trumpia. This vendor ensured that our texts were sent in a way that complied with FCC regulations, including preventing additional texts from being sent to recipients who replied "STOP." We were able to track whether a text was successfully sent to the phone number in the Court's records, as opposed to a land line or number on a "Do Not Call" registry. The research team was able to receive reply messages, but per our experimental protocol did not respond to any of the 23 reply messages received.

At the end of the experimental period, we received an extract of all misdemeanor court dates set in Shasta County from January 1, 2016 to August 1, 2021, including information on charges filed, court events, and whether the defendant appeared at a court date. Since future court appearances could be influenced by treatment, and because defendants could "opt out" of receiving additional texts, we limited our primary sample to each defendant's first court appearance.

In order to evaluate the impact of text reminders on FTAs, we estimated the following

[7]Focus group participants also reported a high rate of cell phone ownership, consistent with Rhoades et al., 2017.

linear regression model, for both housed and unhoused defendants

$$FTA_i = \alpha + \beta_1 TextMessage_i + \epsilon_i \quad (1)$$

where FTA_i is a binary outcome that equals one if individual i was assigned a text message. The main coefficient of interest, β_1, reflects the difference in FTA rates across treated and control groups. While randomization was done in real time, and every housed and unhoused defendant had a 50% chance of being assigned to treatment in their first court appearance,[8] we can also include a set of potentially relevant control variables to minimize uninformative variation in the outcome. These include fixed effects for the court date itself, the number of previous times the defendant had been charged in Shasta County and the number of previous cases during which the defendant had failed to appear for a court date.

These estimates represent an intent to treat effect, as not every person in the treated group received a text message. We therefore also report LATE estimates where treated status is used as an instrument for receiving an SMS reminder.

4 Evaluation

4.1 Evidence of Successful Randomization

Over our two month period of analysis, a total of 1,459 people were charged with misdemeanors in Shasta County Superior Court. Of those, 1,096 were identified by the Court as likely to be housed, and 363 were identified as likely to be unhoused.[9] During the experiment, there were two anomalies in implementation that lead to defendants on two dates receiving reminder messages less than three days prior to their court dates. We include

[8] Accurate randomization was monitored after each set of scheduled court dates by checking for balance along gender, race, criminal history, and current charges. We did not observe any anomalies leading us to doubt the integrity of the randomization process.

[9] Based on an assumed control FTA rate of approximately 77% and a sample size of about 370 people, ex ante power calculations suggest that we would be able to correctly reject an incorrect null hypothesis with 95% certainty 80% of the time if treated individuals were 16.8 percentage points less likely to FTA. If the control FTA rate is closer to 55%, with a sample size of approximately 1,000 people we have 80% power to reject the null hypothesis with 95% certainty if the effect on FTAs is 9 percentage points or more.

these individuals in our main analysis, and exclude them as a robustness test. Table 1 summarizes some basic characteristics of the individuals, and the charges filed against them, by housing and treatment status.[10]

[10] As shows in appendix table A.1, excluding defendants with court dates during the two miss-timed reminders does not introduce imbalance into our sample.

Table 1: Summary Statistics & Test of Randomization

	Housed Control	Housed Treatment	Unhoused Control	Unhoused Treatment	Total	t-test p-value	t-test p-value
	(1)	(2)	(3)	(4)	(5)		
Variable	Mean/SE	Mean/SE	Mean/SE	Mean/SE	Mean/SE	(1)-(2)	(3)-(4)
Age	39.250	39.362	43.659	42.163	40.207	0.880	0.236
	[0.525]	[0.523]	[0.867]	[0.917]	[0.322]		
Male	0.662	0.678	0.616	0.596	0.654	0.578	0.687
	[0.020]	[0.020]	[0.036]	[0.037]	[0.012]		
Shasta Area Code	0.718	0.760	0.508	0.601	0.693	0.122	0.075*
	[0.019]	[0.018]	[0.037]	[0.037]	[0.012]		
White Defendant	0.746	0.734	0.838	0.820	0.762	0.656	0.657
	[0.019]	[0.019]	[0.027]	[0.029]	[0.011]		
CA Resident	0.984	0.974	0.946	0.972	0.974	0.297	0.215
	[0.005]	[0.007]	[0.017]	[0.012]	[0.004]		
Missing Phone	0.183	0.148	0.395	0.348	0.217	0.116	0.363
	[0.017]	[0.015]	[0.036]	[0.036]	[0.011]		
# Previous Cases	3.433	3.350	8.930	6.697	4.497	0.756	0.044**
	[0.202]	[0.177]	[0.935]	[0.572]	[0.178]		
# Prior FTAs	2.316	2.288	6.432	5.056	3.162	0.888	0.070*
	[0.149]	[0.138]	[0.615]	[0.431]	[0.127]		
Prior Case	0.835	0.821	0.914	0.848	0.842	0.540	0.055
	[0.016]	[0.016]	[0.021]	[0.027]	[0.010]		
Prior FTA	0.631	0.619	0.859	0.815	0.678	0.697	0.248
	[0.021]	[0.021]	[0.026]	[0.029]	[0.012]		
N	547	549	185	178	1,459		
F-test joint significance (p-value)						0.774	0.131

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Most defendants are close to 40 years old, and 2/3rds are males. Approximately 75% are white, which is only a few percentage points lower than the general population. Most, over 80%, have appeared in Shasta County Court before - on average two times since 2015. In addition, FTAs are common, with over 60% having at least one FTA since 2016 on their record. SMS-messages appear to be a reasonable, but not perfect, way to contact housed defendants, as 82-85% have some phone number entered in the Court's data. Based on those phone numbers and drivers license records, 98% of housed defendants live in California, and over 70% have a phone number with a Shasta County area code. Across the 547 control and 549 treated defendants who are housed, we do not observe any statistically significant differences in these observed characteristics, and the p-value associated with an F-test of the joint significance of the observed characteristics is 0.77

Unhoused defendants are slightly older than housed defendants, more likely to be white, and less likely to be male. The demographics of the unhoused population charged with misdemeanors generally aligns with the 2021 point in time estimates, which suggest that 58% of the unhoused in Shasta County are male, 82 % are white, and the median age is roughly 50 years old. Unhoused people charged with misdemeanors have more than twice as many previous contacts with the Court than housed defendants, and appear to be a much harder to reach population; over 80% have failed to appear in court previously, only 60% have a valid phone number on file. Most do have some form of identification- 97% appear to be CA residents, but only 40-50% have a record of a phone number with a Shasta County area code. Unhoused individuals in the treated group have had fewer charges, and FTAs, against them in the past than unhoused people in the control group. Both of these differences are marginally significant at conventional levels (p=0.044 and 0.07, respectively), but jointly the treated and untreated unhoused population appears relatively balanced (p=0.131). In addition, note that this slight realized difference in court contact would tend to bias us towards incorrectly concluding that SMS messages reduce FTAs among the unhoused population, as the treated group may be somewhat positively selected.

5 Results

5.1 Can Text Messages reduce FTAs in Vulnerable and Rural Populations?

We show the average FTA rates, along with robust 95% confidence intervals, for control and treatment groups in Figure 2. Within defendants with the same housing status, the effect of text messages is the difference in FTA rates across treated and control populations. Defendants that were not identified as being unhoused do appear to be less likely to FTA when assigned the treatment status. In contrast, while we may have had some bias in favor of identifying a positive treatment effect for unhoused individuals, as treated individuals appeared to have less previous contact and fewer FTAs than the untreated group, there was no obvious difference in the FTA rate of unhoused individuals assigned to treatment or control groups, with the treated individuals actually accumulating FTAs at marginally higher rate.

Figure 2: FTA rates for Housed and Unhoused Defendants

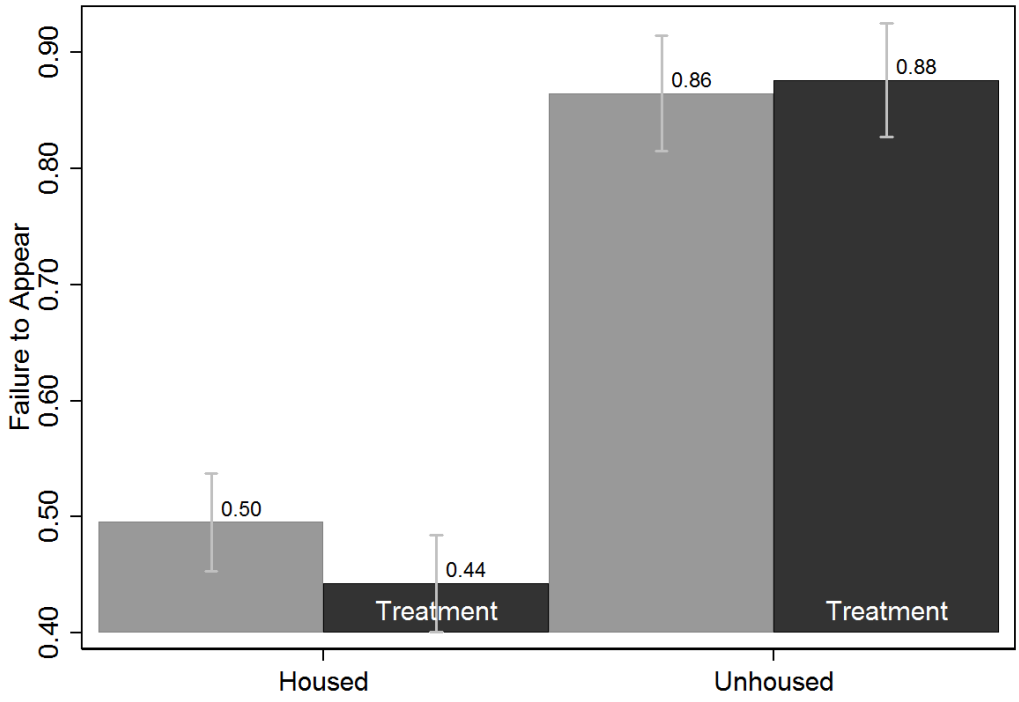


Table 2: The Effect of Sending a Text Message on Failure to Appear - ITT

	Housed			Unhoused		
	(1)	(2)	(3)	(4)	(5)	(6)
Exp vs Control	-0.053*	-0.051*	-0.053*	0.012	-0.005	0.001
	(0.03)	(0.03)	(0.029)	(0.035)	(0.035)	(0.035)
Date FE	.	Y	Y	.	Y	Y
Crim History Controls	.	.	Y	.	.	Y
Adjusted R2	0.002	0.0310	0.098	-0.0025	0.0145	0.0310
Control Mean	0.495	0.495	0.495	0.865	0.865	0.865
N	1,096	1,096	1,096	363	363	363

Notes: Criminal history controls include the number of previous cases filed in court, and number of previous cases where the defendant failed to appear. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Regression results are shown in Table 2. Housed defendants randomly assigned to the treatment group were 10.7% (0.053/0.495) less likely to miss their first scheduled court date than defendants in the control group. We illustrate in columns 2 and 3 that, consistent with our successful random assignment, our results are robust to the inclusion of date fixed effects, and accounting for differences in previous court contact. We also fail to find evidence that, even with control variables, there is a meaningful difference in FTA rates for unhoused individuals who receive reminder messages, although pooling the two samples and testing for a difference in the treatment effects across populations, with controls, implies a 12% probability that the effects are identical.[11] Our results do not change when we exclude treated and control individuals whose court dates corresponded with the delayed text messages.

Finally, we also consider the possibility that our charge-based definition of homelessness conflates housing status and criminal behavior. If housed and unhoused people were charged with totally different types of offenses, e.g. someone accused of misdemeanor assault would never also be charged with illegal camping, then the differences in estimated effects across these groups could reflect something else about individuals accused of serious versus quality-of-life crimes. To explore this possibility, we identified all charges

[11]More precisely, a linear probability model that expresses the likelihood of an FTA on a dummy for being unhoused, treated, and an interaction between being treated and unhoused, along with the full set of controls, yields a estimated coefficient on being treated an unhoused of 0.072, and a clustered standard error of 0.046 percentage points.

filed against people flagged as unhoused, and compared this set of charges to those filed against the housed people in our sample. Out of the 1,096 housed misdemeanor offenders in our sample, 1,017 were charged, at some point, with at least one offense that a unhoused person was also charged with. Re-estimating our model in this set of housed defendants with similar "criminal profiles" as unhoused defendants, shown in appendix table A.3, does not affect our conclusions, although our results are less precise in the absence of criminal history controls.

In Figure 3, we report the difference in FTA rates across treated and control groups over time. While FTA rates were declining overall, particularly for the housed population, we consistently observed fewer FTAs by housed people assigned to treatment status, with a particularly large difference at the end of the sample period, and consistently little difference for the unhoused population; FTA rates at the end of the sample period are close to 100% in the treated group, which consisted of fewer than 5 individuals per month.[12]

5.2 Why are Text Messages Less Effective in Shasta County?

Why did text message reminders have a smaller impact in Shasta County than in urban places? Recent Pew survey results suggest that only 9% of Republican and Republican-leaning adults report trusting government institutions, compared with 36% of Democrat and Democrat-leaning adults. (Pew Research Center, May 2021). In fact, during our focus groups with GNRM clients, many reported they might not immediately trust a text message from the Court. It is possible that Shasta County residents, and unhoused residents in particular, are more suspicious of proactive government outreach than previous study populations and thus were less responsive to the SMS, even after incorporating focus group suggestions to increase receptivity. The larger impacts of treatment for the last cohort is consistent with this being an important mechanism, if public knowledge of the experimental intervention grew over time.

Another candidate explanation for the difference between these and past findings is

[12]Shasta County Department of Public Health records suggest that COVID incidence in Shasta County were declining over our sample period, but were very low, with an average of roughly 10 new cases a day, making this an unlikely cause of the changing effects over time.

Figure 3: Average FTA Rates Over Time

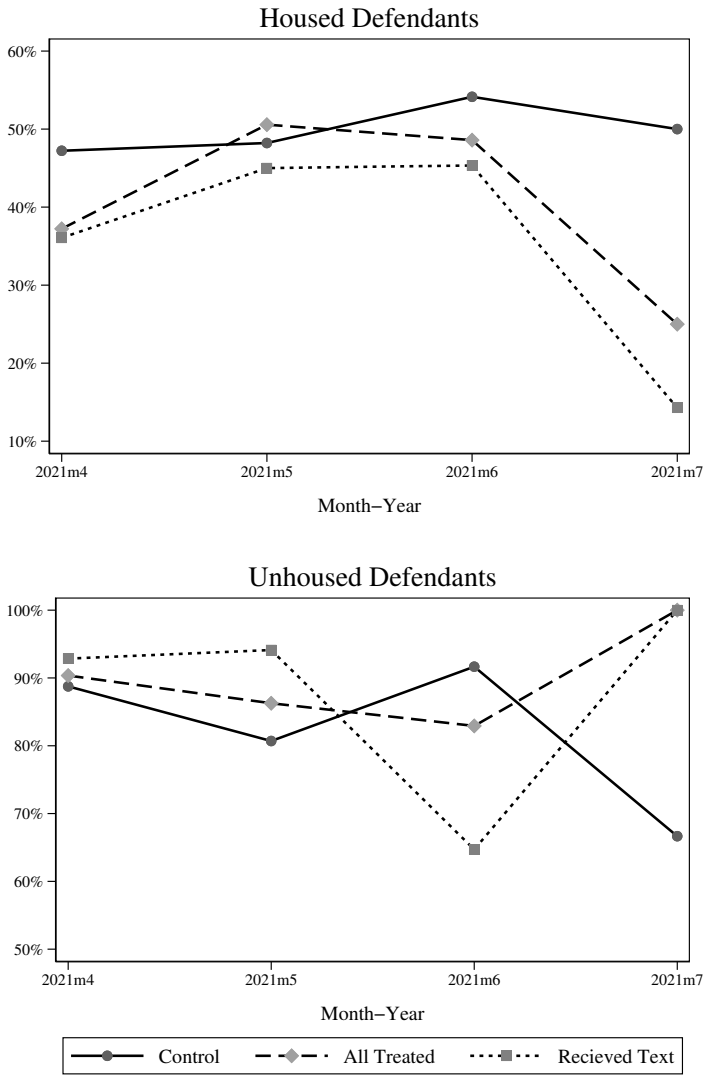
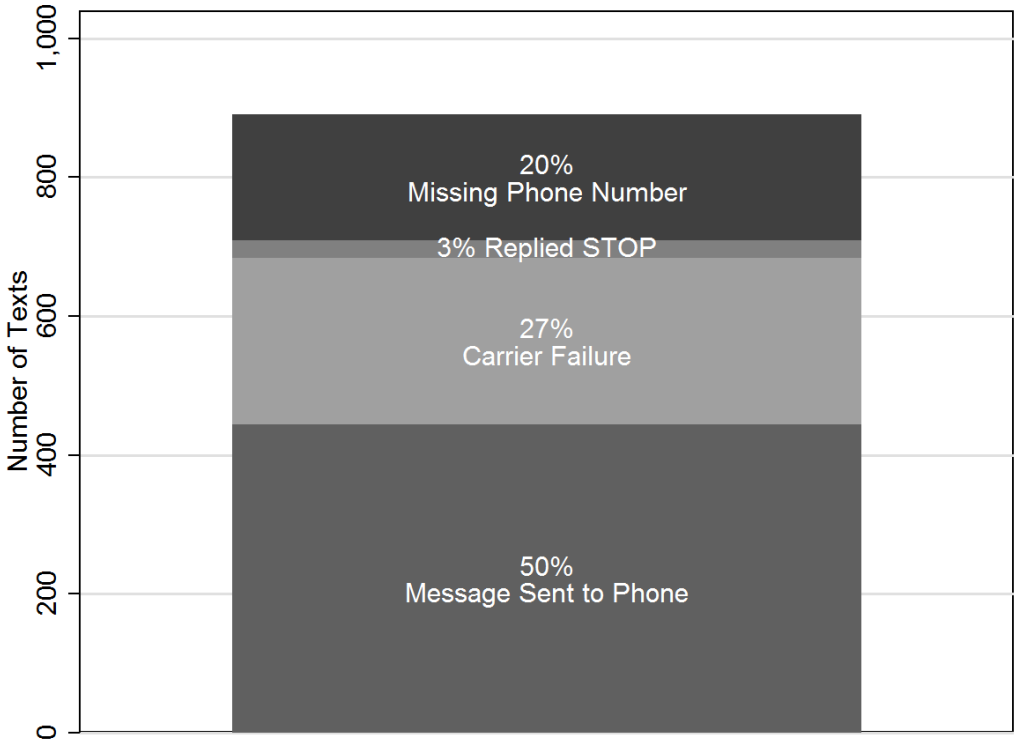


Figure 4: Text Message Dispositions



that more of the defendants in Shasta County have faulty phone numbers. Only 55% of texts sent to phone numbers provided by housed defendants and 35% of texts sent to numbers provided by unhoused defendants were successfully delivered; in contrast, previous research had fail rates of 3 to 15%.[13] This implies that, while previous research has plausibly generated close-to average treatment effects, the estimates in Table 2 may be better characterized as intent to treat effects. As shown in Figure 4, 20% of text messages failed because of missing phone numbers, and 27% failed because the provided number could not receive texts. Declining to provide an accurate phone number may also be due to lack of trust in police officers or the government; further research on how police may partner with the Court in eliciting accurate contact information would shed light on this issue.

Once we account for the fact that about half of the texts were successfully sent (see LATE estimate in Table 2), we estimate that sending text messages to cell phone numbers associated with housed misdemeanor defendants will reduce their FTA rates by 19% (0.095/0.495), which is more comparable to (Fishbane, Ouss and Shah, 2020), and just at the limit of what we are able, in expectation, to statistically identify. Further, these estimates are likely smaller in magnitude than the impact of the charged person actually getting a reminder text. Based on replies to our text messages, as well as comments from court officials, recipients of our reminder messages were not always the people with upcoming court dates.[14]

Phone numbers associated with the unhoused population were substantially more difficult to send messages to; the first stage coefficient in Table 3 suggests only a 35% "take up" of reminders. However, even accounting for this low take up rate in a IV framework does not suggest that unhoused people are more likely to appear in court if contacted via SMS; our largest point estimates, column 5 in Table 3, only suggest a 4% reduction in FTA rates for unhoused people who receive text reminders. Of course, the smaller sample size means that our analysis of unhoused defendants is under-powered relative to the analysis of housed individuals.

[13]These failed text rates are estimates relayed in personal communication with Dr. Helen Ho and Dr. Aurélie Ouss.

[14]Per our research protocol, we did not link the texts with any identity-confirming information. In practice, this may be something the Court might consider in order to improve accuracy.

Table 3: The Effect of Receiving a Text Message on Failure to Appear

	Housed			Unhoused		
	(1)	(2)	(3)	(4)	(5)	(6)
Exp vs Control	-0.095*	-0.093*	-0.096*	0.033	-0.013	0.001
(se)	(0.054)	(0.054)	(0.054)	(0.100)	(0.098)	(0.095)
First Stage Coeff.	0.554 ***	0.551***	0.544***	0.354***	0.348***	0.350***
(se)	(0.0212)	(0.0214)	(0.0209)	(0.0359)	(0.0359)	(0.03)
Date FE	.	Y	Y	.	Y	Y
Crim History Controls	.	.	Y	.	.	Y
First Stage F Statistics	680	664.7	677.2	96.98	93.76	93.70
Adjusted R2	0.005	0.0317	0.153	.	0.0144	0.0598
Control Mean	0.495	0.495	0.495	0.865	0.865	0.865
N	1,096	1,096	1,096	363	363	363

Notes: Criminal history controls include the number of previous cases filed in court, and number of previous cases where the defendant failed to appear. Robust standard errors are reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

6 Can Third Party Partners Reach Unhoused People Charged with Misdemeanors?

If phone numbers for unhoused people, even when they exist in court records, are less likely to be accurate than for housed people, then this would limit the ability of the Court to reduce FTAs via text. Further, it also could be the case that the impersonal, unresponsive, nature of the intervention is less effective for vulnerable populations. In addition, in rural areas in particular, people who are unhoused may be unable to access the types of social services that would facilitate appearing in court even with reminders (e.g. lacking transportation, or the ability to secure their belongings while in court). Would working with local service providers increase the likelihood that unhoused people appeared in court?

After discussions with GNRM staff, we concluded that people with upcoming court dates could receive reminders in the following way: Individuals checking into overnight shelters are logged in electronically by staff using tablet computers. If the GNRM was aware of an upcoming court date for someone with the same name and birth date as the person being logged in, a notification would appear on the tablet, instructing the staff

member to direct the person to the main service desk.[15] This service desk is staffed by a senior employee, who would give the GNRM client an index card with the upcoming court date information.

The GNRM also provides a variety of non-overnight services, including showers, vouchers for transportation, clothing and haircuts, as well as both food and food vouchers. Individuals who receive these services are also electronically recorded. However, sometimes the logging is done manually and entered into the GNRM system after the fact, rather than in real time. Manual logging is more common when a junior volunteer is conducting the intake. In these instances, client reminders would be less likely to occur, as the electronic logging is what would trigger the notification.

With that caveat in mind, we compared our lists of defendants to internal GNRM records of overnight stays and voucher recipients. We then constructed a hypothetical experiment where every treated individual who used GNRM services within 7 days of their court date received a reminder, and appeared in court. This longer time period was used to generate the most generous estimate of how many people GNRM could contact in the future. We identified a total of 2 individuals in the housed sample, and 16 in the unhoused sample, in GNRM records. A total of 50% (1) of the housed, and 44% (7) of the unhoused, had been assigned to the treatment condition.

We then conducted a hypothetical experiment, where we assigned each treated individual in the GNRM records a ”0” value for FTA, regardless of their actual behavior, thus assuming that personal contacts are 100% effective in encouraging court appearances. Results are shown in Table 4. As shown in column 6, even in this best case scenario, sharing court date information with the GNRM would reduce FTA rates by at most 12%, half the effect of a successfully sent, cheaper, text message to an accurate phone number.

[15]This reminder system is currently used by the GNRM in other circumstances, for example, if a family member has contacted the GNRM looking for the individual. When a notification is activated for a client, the tablet interface is locked until the GNRM staff confirms they have notified the client.

Table 4: **Upper-Bound Estimates** The Effect of Reminders on Failure to Appear

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Housed						
	ITT	LATE	ITT	LATE	ITT	LATE
Exp vs Control	-0.055*	-0.099*	-0.053*	-0.096*	-0.055*	-0.099*
	(0.030)	(0.054)	(0.030)	(0.054)	(0.029)	(0.052)
Date FE	.	.	Y	Y	Y	Y
Crim History Controls	.	.	.	.	Y	Y
Adjusted R2	0.00209	0.00400	0.0307	0.0313	0.0986	0.0985
Control Mean	0.495	0.495	0.495	0.495	0.495	0.495
N	1,096	1,096	1,096	1,096	1,096	1,096
Panel B: Unhoused						
	(1)	(2)	(3)	(4)	(5)	(6)
	ITT	LATE	ITT	LATE	ITT	LATE
Exp vs Control	-0.028	-0.079	-0.040	-0.116	-0.036	-0.104
	(0.037)	(0.106)	(0.037)	(0.105)	(0.037)	(0.103)
Date FE	.	.	Y	Y	Y	Y
Crim History Controls	.	.	.	.	Y	Y
Adjusted R2	-0.00124	-0.00100	-0.00577	-0.0142	0.00492	-0.000965
Control Mean	0.865	0.865	0.865	0.865	0.865	0.865
N	363	363	363	363	363	363

Notes: This table replicates Tables 2 and 3, but all treated individuals who visited the GNRM within 7 days of their court date are recorded as having appeared for all court dates (FTA=0). Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

7 Cost Benefit Analysis

Reducing failure to appear has two major benefits. First, it reduces the number of warrants issued, and second, it potentially reduces the number of arrests.

During our two-month analysis period, 1,459 people were charged with misdemeanors in Shasta County Superior Court. This translated to about 9,000 misdemeanors cases throughout the year, 6,750 for the housed population. In Shasta County, if a defendant fails to appear, a warrant is issued not only for that case, but also all other open cases filed against the defendant. Between 2016 and 2021, on average each misdemeanor case with a failure to appear is association with 4 other open cases, ranging from infractions to felonies, meaning that an average of 5 warrants are issued for each misdemeanor FTA. Assuming a 30% failure to appear rate (pre-intervention rate for housed population), this would result in 10,125 (2025*5) warrants.[16] Assuming text messages reduced failure to appear by 10.7%, the intervention would prevent 1,083 warrants. Emanuel and Ho, 2020 find that issuing warrants costs $21 in judge and staff time. Therefore, one year of text message intervention would save approximately $22,743 a year. If the Court were to improve phone numbers in their system this number could grow to $36,141 (1,721*21).

To estimate the costs of arrests, we follow Fishbane, Ouss and Shah, 2020 and Fain and Turner, 2017, we assume that an arrest actively takes 8 hours of police time, 1 hour of a district attorney's time, and 2 hours of a pretrial officer's time. Next, we obtain estimates of salaries for police officers and assistant district attorneys, from Transparent California. The average wage for police officers was $75/hour; for district attorneys, $54/hour; for pretrial officers, $23/hour.[17] These estimates mean that each arrest would cost $700. In Shasta County 35% of failure to appear warrants are cleared by arrest, implying a cost savings of $265,335 a year. If the Court were to improve phone numbers in their system, this number could grow to $421,645.

[16] The average number of open cases for someone failing to appear for a misdemeanor has been increasing over time; in 2021, there were an average of 6 additional open cases against someone with a misdemeanor FTA.

[17] We take median salary for each position and divide by 2,080 hours worked per year.https://transparentcalifornia.com/salaries/search/?a=shasta-countyq=district+attorneyy=2020 https://transparentcalifornia.com/salaries/search/?q=police+a=reddingy=2020s=page=2 https://www.ziprecruiter.com/jobs-search?search=Pretrial-Services-Officerlocation=California

In short, absent any price discrimination on the part of the text message service, our text message intervention would cost Shasta County $67.5 per year to implement (9,000 misdemeanor cases*$.0075 a text) and could save the Court $265,335 per year, or $421,645 if the Court improves phone numbers. This indicates a net benefit of at least $265,267.5 per year ($421,577.5 with improved phone numbers).

In practice, a fraction of the total benefit was captured by a third party- the company providing Shasta County's new case management system. To send the reminder text message in all misdemeanor cases, Shasta County was quoted a cost of $15,000 a year with a one time setup fee of $8,000. This is a non-trivial transfer of benefits, but substantially smaller than the amount of private savings due to the installation of anti-car theft devices captured by insurance companies (Ayres and Levitt, 1998). With these additional costs, and assuming, conservatively, that no phone numbers are improved, the cost savings would be $247,335 to the Court.

8 Conclusion

The results of our experiment show that text message reminders work for housed individuals in our rural setting. While the implied average treatment effect is at the lower end of existing research, the costs associated with FTAs are particularly high. Not only are defendants faced with additional criminal justice penalties, the Court must devote a non-trivial amount of employee time documenting the FTA, contacting the Sheriff about the new warrant, and frequently allocating extremely limited jail space to defendants who are subsequently arrested for this new violation. The Court is currently adopting a new case management system that has the capability of sending SMS reminders. Based on the results of this experiment, these reminders will be incorporated into standard practice.

However, our results also show that text message interventions or reminders from local service providers for the unhoused population may be unlikely to lead to meaningful changes in FTA rates. The overlap between the population of people charged with misdemeanors and population using GNRM services does not appear to be large enough to have a meaningful impact. That said, it is possible that outreach services, which are

currently being adopted by the GNRM, may be more effective at reaching this hard-to-reach population. These outreach services involve senior staff members visiting areas populated by large numbers of unhoused individuals, and both offering direct service provision without visiting a GNRM facility and learning how GNRM could better serve that particular population. These outreach staff do carry the same tablet devices that are linked to the notification system, meaning electronic reminders could be used in this context.

The results of this experiment do reveal another path for reducing FTAs: improving the information on defendant phone numbers. On top of text message reminders, improving the quality of the Court's phone information, either based on more updated internal record keeping or requesting that police officers encourage arrestees to provide cell phone numbers, could further reduce the FTA rate by an additional 8%. Particular attention should be paid to collecting accurate contact information from people likely to be unhoused. There are many reasons why Court contact information may be inaccurate, and addressing mistrust in government likely requires a different policy response than disconnected numbers due to the continual life disruptions associated with housing instability.

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Table A.1: Excluding Miss-Timed Texts

	(1) Housed Control	(2) Housed Treatment	(3) Unhoused Control	(4) Unhoused Treatment	(5) Total	t-test p-value	t-test p-value	t-test p-value	t-test p-value	t-test p-value	t-test p-value
Variable	Mean/SE	Mean/SE	Mean/SE	Mean/SE	Mean/SE	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
Age	39.122	39.494	43.825	42.076	40.217	0.624	0.000***	0.006**	0.000***	0.018*	0.176
	[0.534]	[0.537]	[0.889]	[0.935]	[0.329]						
Male	0.663	0.682	0.605	0.600	0.655	0.527	0.156	0.133	0.060	0.050*	0.932
	[0.021]	[0.020]	[0.037]	[0.038]	[0.013]						
Shasta Area Code	0.719	0.761	0.503	0.588	0.692	0.117	0.000***	0.001**	0.000***	0.000***	0.111
	[0.020]	[0.019]	[0.038]	[0.038]	[0.012]						
White Defendant	0.750	0.741	0.836	0.818	0.765	0.738	0.018*	0.068	0.009**	0.041*	0.650
	[0.019]	[0.019]	[0.028]	[0.030]	[0.011]						
CA Resident	0.985	0.975	0.949	0.971	0.975	0.281	0.008**	0.239	0.083	0.732	0.312
	[0.005]	[0.007]	[0.017]	[0.013]	[0.004]						
Missing Phone Number	0.185	0.146	0.401	0.359	0.219	0.084	0.000***	0.000***	0.000***	0.000***	0.419
	[0.017]	[0.015]	[0.037]	[0.037]	[0.011]						
# Previous Cases	3.459	3.366	9.102	6.594	4.519	0.735	0.000***	0.000***	0.000***	0.000***	0.029*
	[0.207]	[0.182]	[0.968]	[0.585]	[0.183]						
# Previous FTAs	2.314	2.282	6.610	5.047	3.178	0.879	0.000***	0.000***	0.000***	0.000***	0.047*
	[0.151]	[0.141]	[0.638]	[0.445]	[0.131]						
Prior Case	0.845	0.828	0.915	0.847	0.848	0.444	0.019*	0.952	0.005**	0.556	0.049*
	[0.016]	[0.016]	[0.021]	[0.028]	[0.010]						
Prior FTA	0.637	0.619	0.859	0.812	0.680	0.560	0.000***	0.000***	0.000***	0.000***	0.239
	[0.021]	[0.021]	[0.026]	[0.030]	[0.012]						
N	523	528	177	170	1,398						
F-test joint significance (p-value)						0.681	0.000***	0.000***	0.000***	0.000***	0.145

Notes: This table replicates Table 1, but excludes treated and control observations from court dates with late reminder texts. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2: **Excluding Miss-Timed Texts** The Effect of Text Messages on Failure to Appear

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Housed						
	ITT	LATE	ITT	LATE	ITT	ATE
Exp vs Control	-0.054*	-0.097*	-0.053*	-0.095*	-0.054*	-0.098*
	(0.031)	(0.055)	(0.030)	(0.054)	(0.030)	(0.054)
First Stage Coeff.		0.555		0.552		0.552
(se)		(0.0216)		(0.0218)		(0.0213)
First Stage F Statistics		657.1		643.2		642.6
Date FE	.	.	Y	Y	Y	Y
Crim History Controls	.	.	.	.	Y	Y
Adjusted R2	0.00197	0.00500	0.0318	0.0325	0.105	0.104
Control Mean	0.493	0.493	0.493	0.493	0.493	0.493
N	1,051	1,051	1,051	1,051	1,051	1,051
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Unhoused						
	ITT	LATE	ITT	LATE	ITT	LATE
Exp vs Control	0.012	0.032	-0.005	-0.013	0.001	0.0003
	(0.037)	(0.101)	(0.037)	(0.099)	(0.036)	(0.097)
First Stage Coeff.		0.365		0.359		0.361
(se)		(0.0370)		(0.0372)		(0.0374)
First Stage F Statistics		97.03		93.33		93.26
Date FE	.	.	Y	Y	Y	Y
Crim History Controls	.	.	.	.	Y	Y
Adjusted R2	-0.00260	.	0.00751	0.00740	0.0241	0.0241
Control Mean	0.859	0.859	0.859	0.859	0.859	0.859
N	347	347	347	347	347	347

Notes: This table replicates Tables 2 and 3, but excludes treated and control observations from court dates with late reminder texts. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A.3: **Common Support Across Criminal Profiles** The Effect of Text Messages on Failure to Appear

	(1) ITT	(2) LATE	(3) ITT	(4) LATE	(5) ITT	(6) LATE
Exp vs Control	-0.048	-0.086	-0.045	-0.082	-0.050*	-0.090*
	(0.031)	(0.056)	(0.031)	(0.055)	(0.030)	(0.054)
First Stage Coeff.		0.558		0.552		0.553
(se)		0.0221		0.0223		0.0223
First Stage F Statistics		633.8		612.6		611.8
Date FE	.	.	Y	Y	Y	Y
Crim History Controls	.	.	.	.	Y	Y
Adjusted R2	0.00133	0.00600	0.0287	0.0315	0.0858	0.0879
Control Mean	0.528	0.528	0.528	0.528	0.528	0.528
N	1017	1017	1017	1017	1017	1017

Notes: This table replicates Tables 2 and 3, but excludes housed defendants who are not charged with any offenses that any unhoused defendants are charged with. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.