# Fatalities and Government Transfers

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**Abstract**

We estimate the effect of Supplemental Nutrition Assistance Program (SNAP) benefit disbursement on drug-related fatal automobile collisions. Distributing SNAP benefits on days other than the first of the month, adding an additional income shock to the monthly calendar, increases the number of drug-related fatal automobile collisions by 1.21 percent. A one-percentage point increase in the share of SNAP benefits distributed on a day leads to a .2 percent increase in the number of drug-related fatal automobile collisions. Our estimation utilizes a novel dataset of variation in SNAP distribution dates across states, and switches in distribution date regimes within states over time to identify a causal relationship. We plan to extend our analysis in two ways. (1) Using our current identification strategy, we will estimate the effect of SNAP disbursement on drug-related mortality at large between 1990 and 2017 using National Vital Statistics System data. (2) We will employ an alternate identification strategy, the initial roll-out of SNAP, to verify our results.

**Keywords:** Welfare; Liquidity constraints; Mortality; Drug use
(JEL I38; I12; H53)

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# 1 Introduction

How does drug use respond to in-kind government transfers? The Supplemental Nutrition Assistance Program (SNAP) provides low-income families with additional income explicitly earmarked for food expenditures (USDA FNS, 2018a). This program is intended to increase household consumption of food (Food Research & Action Center, 2018), however, economic theory suggests that SNAP income is equivalent to a cash transfer for families that spend more on food than their SNAP income. We explore a potential outlet for this cash transfer equivalent - drugs and alcohol.

This paper exploits the variation in SNAP receipt timing within the calendar month to identify the public health effects of government transfers. Although the federal government funds SNAP, each state is in charge of administering the program to its eligible residents. We use the variation in the calendar day(s) of benefit distribution between states, and variation in distribution regime across time within states, to identify the effect of SNAP transfers on drug and alcohol related fatal car accidents. Drug related fatal car accidents proxy for drug and alcohol use within the population. We propose to extend our analysis using National Vital Statistics System drug and alcohol related mortality data.

A state may choose to distribute benefits to all recipients on one day of the month, or spread distribution out over multiple days. When distribution is spread over multiple days, each individual within the state receives all her benefits on one day, but that day is one of a subset of days that the state distributes benefits on. Considerable research documents that individuals near their budget constraint do not smooth income shocks (Hastings & Washington (2010); Shapiro (2005); Todd (2015); Wilde & Ranney (2000)). Instead, an individual rapidly expends income on immediate consumption (Shapiro (2005); Smith et al. (2016); Wilde & Ranney (2000)). This spike in consumption allows us to identify the effect of the transfer. The variation in SNAP distribution date allows us to construct a control group.

The interaction between government transfers and drug use is of considerable interest

to policymakers (US HHS, 2011). Fifteen states spent 1.3 million to screen Temporary Assistance for Needy Families (TANF) applicants for drug use in 2016 alone (Covert & Israel, 2017). Screened applicants tested positive at rates between 0 and 2.14, depending on the state (Covert & Israel, 2017), which is lower than the national rate of 9.4 percent (National Institute on Drug Abuse, 2016). The positive rate of drug testing among TANF applications should not be misconstrued as the drug use rate, however, as applicants are aware that testing could be required, and have time to adjust their behavior accordingly. A benefit of our data is that individuals do not alter their behavior in response to the data collection. States are not currently allowed to test SNAP recipients for drug use, but the federal government is considering allowing them to (CBS, 2018).

**Related literature.** Our paper is related to a large literature in public, labor, and behavioral economics studying the effects of government transfer receipt and timing on household and individual behavior. For a thorough review, see Bitler (2015) and Hoynes et al. (2016). Our work contributes to three strains: (1) evaluations of the fungibility of in-kind transfers, (2) exploration of intertemporal smoothing, and (3) documentation of SNAP externalities.

Nearly all empirical research shows the average SNAP household increases food expenditures more from SNAP receipt than if it received a cash transfer, but does not spend the entirety of the additional income on food. Various studies have estimated the marginal propensity to consume food (MPCF) out of SNAP income. Administrative records of SNAP transactions show a MPCF of .5 to .6 (Hastings & Shapiro, 2018). An evaluation of SNAP roll-out using survey data finds the SNAP MPCF is .16 to .32 with a confidence interval from .17 to .27 (Hoynes & Schanzenbach, 2009). Additional analysis of survey data, using a SNAP expansion as variation, finds a MPCF of .53 to .64 (Beatty & Tuttle, 2014). Retail scanner data, augmented with method of payment data to identify SNAP consumers, finds a MPCF of .3 (Bruich, 2014). Notably, the SNAP MPCF are all strictly less than one - which suggests consumers are using the in-kind transfer to consume non-food goods. We explore a

potential outlet for these remaining funds - drugs and alcohol.

We leverage the cyclicality of spending following income receipt for our identification strategy. Many studies document the decrease in food expenditures throughout the month (Goldin et al. (2016); Hamrick & Andrews (2016); Hastings & Washington (2010); Kuhn (2018)), where the beginning of the month is associated with income receipt. For SNAP specifically, food spending peaks in the first three days after benefit receipt (Wilde & Ranney, 2000). Of course, food expenditure is not the same as consumption, and it possible that consumers purchase storable goods at the beginning of the month while still smoothing consumption through the month. However, recent work has shown a decrease in food consumption over the course of the month as well (Shapiro (2005); Smith et al. (2016); Wilde & Ranney (2000)).

The cyclicality of consumption is connected to a number of externalities. Test scores for children in SNAP households decrease near the end of the benefit cycle (Cotti et al., 2017). Crime increases at grocery stores at the end of the month (Carr & Packam, 2018) and over the course of the welfare benefit cycle (Foley, 2011). There appear to be significant public health consequences as well. Hospital admissions for hypoglycemia increase at the end of the month for low-income individuals, but not high-income (Seligman et al., 2014). Hypoglycemia is associated with a lack of nutrition (Mayo Clinic, 2018). On the other side, the initial receipt of income increases intimate partner violence (Hsu, 2017), which the author suggests may be due to an increase alcohol consumption.

Our work most closely relates to Dobkin & Puller (2007), which documents the correlation between government transfer payments and hospitalizations for drug-related illness. Drug-related admissions increase by 23% in the first five days of the month, with a large component of this driven by Supplemental Security Income recipients. Our work differs in that we estimate a causal relationship by using exogenous changes in SNAP distribution dates over time. Additionally, our introduction of expenditure data allows us to identify the relationship between dollar amount and the resulting drug and alcohol related mortality.

Our second identification strategy, the utilization of the roll-out of SNAP, does not allow for the connection between expenditure and mortality, but offers identification that does not rest on the hand to mouth consumption of drugs and alcohol upon receipt of benefits.

**Structure of paper.** In Sections 2 and 3 we provide an overview of the SNAP program, its implementation in each state, and describe our SNAP and car crash data. Section 6 outlines our research design, including a detailed explanation of our identifying variation and econometric model. We provide our preliminary results in Section 7. We conclude in Section 8. An outline of the next steps in our research is presented in two parts: in the data section, specifically, Section 4 and Section 5 we describe the data components of our extensions. In Section 6.1, we describe the research designs.

# 2 Supplemental Nutrition Assistance Program

The Supplemental Nutrition Assistance Program (SNAP) provides low-income residents of the United States with food-purchasing assistance. Participants in the program receive a transfer of funds each month that can only be spent on food. Although the funds are not cash, they are redeemable for cash by supermarkets, convenience stores, and food retailers. The monthly amount varies for each household participating in the program, and is based on the number of individuals in the household, total income, and total expenses. The Federal Government pays for the program, and the Department of Agriculture Food and Nutrition Service Division oversees it. Each state is in charge of administering the distribution of SNAP benefits to its residents.

SNAP is the second largest government transfer program in the United States - only Medicaid is larger (Congressional Budget Office, 2013). 42 million individuals were enrolled in SNAP in 2017 (USDA FNS, 2018b), which was around 13% of the population at the time (U.S. Census Bureau, 2016). The average participant receives 125.51 per month in SNAP

funds (USDA FNS, 2018b), and the total cost of the program was 68 billion in 2017 USDA FNS (2018b).

Federal food assistance has existed in some form in the United States since the Great Depression (USDA FNS, 2018a). A pilot program, which eventually became the Food Stamp Program, was trialed between 1961 and 1964. The Food Stamp Act of 1964 made the pilot program permanent and extended it to every state (USDA FNS, 2018a). The 2008 Farm Bill renamed the program the Supplemental Nutrition Assistance Program (USDA FNS, 2008).

**Distribution Schedules.** Each state administers SNAP benefit distribution for its residents, although the benefit amount is set and paid for by the federal government. Seven states distribute benefits to every resident on the same day. The remaining states disburse benefits over multiple days. Although a state may distribute over multiple days, each individual within the state receives the entirety of her monthly benefits on one day. States that distribute over multiple days have a system of assigning participants to a distribution day. As such, states have chosen to assign the distribution date by SSN, birthday, last name, and case number. The last name, birthday, and SSN numbers allow for an additional layer of identification, which we discuss in Section 6.1. See Table 1 for a detailed listing of the date assignment scheme and distribution dates for each state in 2018.

**Schedule Transitions.** As mentioned above, each state selects the number of days to distribute SNAP benefits over. Within a state, this choice can vary over time. Sixteen states switch between distribution regimes, with three of those states switching more than once. When switching between distribution regimes, states have chosen to transition in one of three ways: a *simple transition*, a *50-50* transition, and a *smoothed transition*.

Consider some new distribution schedule, $Dist_{new}$, and an old distribution schedule, $Dist_{old}$.

1. If a state uses a *simple* transition at some month $t$:

$$Dist_{t-1} = Dist_{old}$$
$$Dist_t = Dist_{new}$$

2. If a state uses a *50-50* transition at some month $t$:

$$Dist_{t-2} = Dist_{old}$$
$$Dist_{t-1} = .5Dist_{old} + .5Dist_{new}$$
$$Dist_t = Dist_{new}$$

3. If a state uses a *smoothed* transition at some month $t$:

   This state will smooth the transition over some period of months, $k$

$$Dist_{t-k} = Dist_{old}$$
$$Dist_{t-k+1} = Dist_{int}^{k+1}$$
$$\vdots$$
$$Dist_{t-2} = Dist_{int}^{2}$$
$$Dist_{t-1} = Dist_{int}^{1}$$
$$Dist_t = Dist_{new}$$

   where $Dist_{int}$ is some distribution schedule with dates between $Dist_{old}$ and $Dist_{new}$, and each $Dist_{int}$ may or may not be the same. These switches provide additional identifying variation. Table 3 lists each switch we observe from 1998-2017.

**Data Collection.** We construct a novel dataset that details the distribution dates and date assignment scheme for each state and month for years 1998 - 2017. We construct our

data using a time-series panel of distribution date ranges for the years 1998 - 2012 from the Economic Research Service of the United States Department of Agriculture (USDA). We augment this dataset with the specific days within in the range, see Table 2, the distribution scheme, and the transition method for distribution switches. We also carry the dataset forward to 2017.

These additions are added using the current schedules posted on the USDA Food and Nutrition Service "When Are Benefits Available?" webpage, `https://www.fns.usda.gov/snap/snap-monthly-benefit-issuance-schedule`, and historical versions of this webpage available at the Internet Archive, `https://archive.org`.

**Program Cost and Scope.** We use state-month SNAP expenditures and the count of individuals served for 1998-2017, as detailed in the SNAP National Data Bank Monthly State Participation and Benefit Surveys.[1]

# 3 Automobile Collisions

The first part of our analysis focuses on the effect of SNAP distribution on the number of drug and alcohol related fatal car crashes. Ideally, we would measure drug and alcohol consumption for each individual who is treated and not treated with SNAP benefits. We could monitor alcohol and tobacco expenditures, but this ignores (1) the difference between expenditure and consumption, and (2) the vast black market for non-legal drugs. Drug and alcohol related car crashes are a consistent measure of the level of alcohol and drug consumption in a given community at a specific time.

We use Fatality Analysis Reporting System (FARS) data to measure the number of fatal crashes. FARS is a publicly available dataset maintained by the National Highway Traffic Safety Administration of the United States Department of Transportation. FARS records person, vehicle, and crash information for all fatal car crashes from 1975 to the present. This

[1] https://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap

information includes if the driver of any vehicle involved in the car is under the influence of drugs or alcohol.

# 4 Medical Data

We have a proposal under review at the Center for Disease Control's National Health Statistics Division (`https://www.cdc.gov/nchs/nvss/index.htm`) to extend our study to mortality at large using National Vital Statistics System (NVSS) data. NVSS micro-data and compressed vital statistics files contain the cause of death codes, exact date of death, and state of death. Using this data, we could extend our analysis to every death in the United States related to drug and alcohol use, and strengthen our identification by utilizing the variation in disbursement by last name and social security number (SSN).

# 5 SNAP Roll-Out

At the time of program introduction, SNAP was known as the Food Stamp Program (FSP). FSP began as a pilot program in 8 counties and eventually expanded to 43 counties during this pilot program period. The Food Stamp Act of 1964 opened the program to all counties in the United States, but, crucially for our identification strategy, allowed counties to choose whether to participate (Hoynes & Schanzenbach, 2009). In 1973, the Food Stamp Act was amended to mandate that all counties participate in FSP by 1975. We use a dataset of county-month FSP participation as provided in Hoynes et al. (2016).

During this time-period, the NVSS micro-data is publicly available in pdf files. We are transcribing the pdf files into datasets that track the cause of death codes, exact date of death, and county of death for all fatalities in the United States during the FSP rollout period and the years preceding it.

# 6 Research Design

**Identifying Variation.** We use the variation in SNAP disbursement schedules between states and within states over time to identify the causal effect of SNAP income on fatal car crashes involving drugs or alcohol. We are able to use the exogenous variation in SNAP disbursement time, random across individuals, to approximate random assignment of SNAP treatment. For each state, we know the percent of SNAP disbursement that occurs on each day of the calendar month and the average SNAP income per person.

We use this information to estimate three effects: (1) the effect of distributing SNAP benefits on a day other than the 1st of the month, (2) the daily effect of SNAP disbursement on drug related fatal accidents, and (3) the effect of benefit generosity.

The majority of social services distribute benefit checks on the first of the month, and most paychecks are distributed near the first of the month as well. Following in the work of Carr & Packam (2018), we examine the impact of adding an additional income shock to the monthly calendar. This occurs when a state chooses to move SNAP disbursement from the first of the month, where it would be grouped with other income, to its own day in the month.

We then consider the impact of SNAP disbursement on the daily amount of drug and alcohol related traffic fatalities. We construct construct a "weighted" treatment variable for each day-state combination over time, that describes the percent of SNAP distributed each day in every state. We compare the number of fatal accidents involving drugs and alcohol between states, for each day of the month, as a function of the SNAP distribution that day for the state. The identifying assumption is that in the absence of SNAP disbursement, the trend in the number of drug and alcohol related fatal car accidents would be parallel in all states. We relax this assumption by including fixed effects, which are detailed in the following section.

Our last analysis examines the impact of benefit generosity on the number of these fatalities.

**Econometric Models.**

Our first estimation considers the difference between total monthly traffic fatalities related to drug and alcohol use in states that distribute SNAP on the first of the month, and states that distribute SNAP away from the first of the month. This classification can vary within states across time. Consider the following estimating equation,

$$crash_{smy} = \beta_1 multiple_{sdmy} + \alpha_{sy} + \epsilon_{sdmy}$$

where $crash$ is the number of drug and alcohol related car crashes in a state $s$ in month $m$ during year $y$. $Multiple$ is an indicator variable for distribution away from the first of the month, in reference to the multiple income shocks faced by the individuals. We include state-year fixed effects.

Our following two estimations utilize a generalized differences-in-differences estimation strategy. The first estimation is described by the following,

$$crash_{sdmy} = \beta_1 percent_{sdmy} + \alpha_{smy} + \lambda_d + \epsilon_{sdmy}$$

where $crash_{sdmy}$ is the number of drug and alcohol related car crashes in a state $s$ on day $d$ in month $m$ during year $y$. Our explanatory variable of interest is $percent_{sdmy}$, which is the percent of SNAP benefits distributed on that day. We include state-month-year fixed effects, $\alpha_{smy}$ and day of week fixed effects $\lambda_d$.

The second estimation is described by the following,

$$crash_{sdmy} = \beta_1 benefit_{sdmy} + \alpha_{smy} + \lambda_d + \epsilon_{sdmy}$$

where $benefit$ is the average dollar amount distributed to a SNAP participant.

Our dependent variable, the number of fatal accidents involving drugs and alcohol, is a non-negative count variable and therefore we use a Poisson regression model and assume

$E(Y|X) = exp(X'\beta)$. We thus reform our estimating equations into the following log-likelihood function,

$$\ln L(\beta) = \sum_{sdmy=1}^{N} \{crash_{sdmy}\mathbf{x}_i'\beta - exp(\mathbf{x}_i'\beta) - \ln crash_{sdmy}!\}$$

For all estimations, we allow the standard errors to cluster at the state level, which has the additional effect of relaxing the Poisson model assumption of equality between the mean and variance.[2] The coefficients in the Poisson regression can be interpreted as semi-elasticities, or how a 1 one unit change in our independent variables predict a percentage change in the count of fatal car crashes involving drugs and alcohol.

## 6.1 Planned Extensions

**National Vital Statistics System.** We will use the same variation to identify the effect of SNAP disbursement on drug and alcohol related mortality at large. NVSS includes patient level data that will allow us to add an additional layer of identification. A subset of states distribute SNAP benefits based on the last name, the birth date, or social security number (SSN) of the recipient. This allows us to identify a more narrow group of potentially treated individuals for our analysis.

Consider the following equation,

$$death_{sdmyi} = \beta_1 treat_{sdmyi} + \alpha_{smy} + \lambda_d + \epsilon_{sdmyi}$$

where $death_{sdmyi}$ is the count of drug and alcohol fatalities in state $s$ on day $d$ in month $m$ for year $y$ , for individuals that have identifier $i$. The identifier can be the first letter of the last name, the last digit of the SSN, or some aspect of the birth date of the recipient - whichever method the state uses to select the day of disbursement for residents. Table 4 and

[2]We consider two-way clustering for state and year, but find similar results. Our panel extends from 1998 to 2017, which provides fewer year clusters than ideal and so we select year clustering in our preferred regression

5 detail how states chose to distribute SNAP across last names and SSN numbers on 2017. The estimating equation is the same as the car crash analysis except our key explanatory variable is now $treat_{sdmyi}$ instead of $SNAP_{sdmy}$, where $treat$ is an indicator variable for individuals who would receive all of their benefits on that day if eligible for SNAP.

As before, we will be working with count data, and will thus evaluate a maximum likelihood function for a Poisson estimation,

$$\ln L(\beta) = \sum_{sdmyi=1}^{N} \{death_{sdmyi}\mathbf{x}_i'\beta - exp(\mathbf{x}_i'\beta) - \ln death_{sdmyi}!\}$$

**Introduction of SNAP.** Using the county level rollout of SNAP, we will examine the total number of drug and alcohol related fatalities per month in SNAP-participating counties compared to non-SNAP-participating counties.

Consider the following equation,

$$death_{cmy} = \beta_1 treat_{cmy} + \alpha_c + \lambda_y + \epsilon_{cmy}$$

where $death_{cmy}$ is the number of deaths in county $c$ in month $m$ and year $y$. Our coefficient of interest is attached to $treat_{cmy}$ which indicates if a county is participating in SNAP or not. We control for county and year fixed effects.

# 7 Preliminary Results

Distribution of SNAP on a day other than the first of the month leads to a 1.21 percent increase in the number of drug and alcohol related automobile fatalities per month. This point estimate is included in Table 6. Our preferred specification, Column(1), includes state-year fixed effects. The additional specifications include different fixed effects.

We find a one percentage point increase in the share of SNAP benefits distributed in a state on a day leads to a .11 percent increase in the number of car crashes involving

drugs and alcohol in a state on the distribution day. Table 7 shows this point estimate and its confidence interval and the point estimates and confidence intervals for three alternate specifications. These additional specifications include different fixed effects. In our preferred specification, Column (1), we include state-year-month fixed effects. These fixed effects relax our identifying assumption of parallel trends in drug and alcohol related fatal car accidents across states across time, to parallel trends within a a specific year-month combination. Column (2) includes day of week and state-year fixed effects. In Column (3), we consider year fixed effects and state fixed effects. In Column (4), we only include day of week effects. The point estimate is steady throughout the alternate specifications, with the exception of Column (4), which does not control for time-invariant differences in unobservables across states.

Table 8 holds the same information for our estimation of the effect of benefit generosity. We find a one hundred dollar increase in benefit generosity leads to a .06 percent increase in drug and alcohol related automobile fatalities.

# 8 Conclusions

How does drug use respond to government transfers? This paper uses SNAP and the variation in SNAP benefit disbursement across states and time to identify the causal effect of government transfers on drug and alcohol related car crashes. istributing SNAP benefits on days other than the first of the month, adding an additional income shock to the monthly calendar, increases the number of drug-related fatal automobile collisions by 1.21 percent. A one-percentage point increase in the share of SNAP benefits distributed on a day leads to a .2 percent increase in the number of drug-related fatal automobile collisions. A one hundred dollar increase in benefit generosity leads to a .06 percent increase in drug and alcohol related automobile fatalities.

These results suggest government transfers have public health consequences which should

be considered. We plan to extend our analysis to drug and alcohol mortality at large by working with the NVSS micro level mortality data. Micro data will allow us to add further layers of identification through the alphabetical, SSN, and birthday disbursement schemes of states. Analysis of the rollout of the SNAP program will allow us to examine this effect away from the potential spillover effects of previous SNAP income receipt.

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# 9 Figures and Tables

Table 1: **SNAP Distribution Schedules and Schemes, 2017**

| State | Date Range | Scheme |
|---|---|---|
| Alabama | 4 - 23 | case number |
| Alaska | 1 | - |
| Arizona | 1 - 13 | last name |
| Arkansas | 4 - 13 | SSN |
| California | 1 - 10 | case number |
| Colorado | 1 - 10 | SSN |
| Connecticut | 1 - 3 | last name |
| Delaware | 2 - 23 | last name |
| District of Columbia | 1 - 10 | last name |
| Florida | 1 - 28 | case number |
| Georgia | 5 - 23 | case number |
| Hawaii | 3 - 5 | last name |
| Idaho | 1 - 10 | birthday |
| Indiana | 1 - 10 | last name |
| Iowa | 1 - 10 | last name |
| Kansas | 1 - 10 | lastname |
| Kentucky | 1 - 19 | case number |
| Louisiana | 5 - 14 | SSN |
| Maine | 10 - 14 | birthday |
| Maryland | 3 - 21 | last name |
| Massachusetts | 1 - 14 | SSN |
| Michigan | 3 - 21 | case number |
| Minnesota | 4 - 13 | case number |
| Mississippi | 4 - 21 | case number |
| Missouri | 1 - 22 | last name - birthday |
| Montana | 2 - 6 | case number |
| Nebraska | 1 - 5 | SSN |
| Nevada | 1 | - |
| New Hampshire | 5 | - |
| New Jersey | 1 - 5 | case number |
| New Mexico | 1 - 20 | SSN |
| North Carolina | 3 - 21 | SSN |
| North Dakota | 1 | - |
| Ohio | 2 - 20 | case number |
| Oklahoma | 1 - 10 | case number |
| Oregon | 2 - 20 | SSN |
| Rhode Island | 1 | - |
| South Carolina | 1 - 19 | case number |
| South Dakota | 10 | - |
| Tennessee | 1 - 20 | SSN |
| Texas | 1 - 15 | case number |
| Utah | 5 - 15 | last name |
| Vermont | 1 | - |
| Virginia | 1 - 9 | case number |
| Washington | 1 - 10 | case number |
| West Virginia | 1 - 9 | last name |
| Wisconsin | 2 - 15 | SSN |
| Wyoming | 1 - 4 | last name |

The above table is a list of the distribution schedules for each state in the United States. We have omitted Illinois, New York, Ohio, and Pennsylvania. These states await data confirmation. The *Date Range* refers to the first date of SNAP distribution and the last day. The *Scheme* is the method of assigning dates to SNAP recipients. "Case number" means that recipients are assigned a monthly SNAP receipt date based on their SNAP case number. "Last name" means the receipt date is based on the first letter (or first three letters) of the recipient's last name. "SSN" means the last digit of the recipient's Social Security Number is used and "birthday" means some aspect of the birthday (year, day, etc.) is used.

Table 2: **Specific SNAP Distribution Days, 2017**

| State | Day of Month | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| Alabama | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| Alaska | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arizona | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | |
| Arkansas | | | | X | X | | | X | X | X | X | X | X | | | | | | | | | | | | | | | |
| California | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| Colorado | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| Connecticut | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | |
| Delaware | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| District of Columbia | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| Florida | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Georgia | | | | | X | | X | | X | | X | | X | | X | | X | | X | | X | | X | | | | | |
| Hawaii | | | X | | X | | | | | | | | | | | | | | | | | | | | | | | |
| Idaho | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| Indiana | | | | | X | | X | | X | | X | | X | | X | | X | | X | | X | | X | | | | | |
| Iowa | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| Kansas | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| Kentucky | X | | X | | X | | X | | X | | X | | X | | X | | X | | X | | | | | | | | | |
| Louisiana | | | | | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| Maine | | | | | | | | | | X | X | X | X | X | | | | | | | | | | | | | | |
| Maryland | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| Massachusetts | X | X | | X | X | | X | X | | X | X | | X | X | | | | | | | | | | | | | | |
| Michigan | | | X | | X | | X | | X | | X | | X | | X | | X | | X | | X | | | | | | | |
| Minnesota | | | | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | |
| Mississippi | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | | |
| Missouri | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | |
| Montana | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | |
| Nebraska | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | |
| Nevada | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| New Hampshire | | | | | X | | | | | | | | | | | | | | | | | | | | | | | |
| New Jersey | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | |
| New Mexico | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | |
| North Carolina | | | X | | X | | X | | X | | X | | X | | X | | X | | X | | X | | | | | | | |
| North Dakota | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Oklahoma | X | | | | X | | | | | X | | | | | | | | | | | | | | | | | | |
| Oregon | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| Rhode Island | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| South Carolina | | X | | X | | X | | X | | X | | X | X | | X | | X | | X | | X | | | | | | | |
| South Dakota | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tennessee | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | |
| Texas | X | | X | | X | X | X | | X | | X | X | X | | X | | | | | | | | | | | | | |
| Utah | | | | | X | | | | | | X | | | | X | | | | | | | | | | | | | |
| Vermont | X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Virginia | X | | | X | | | X | | X | | | | | | | | | | | | | | | | | | | |
| Washington | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| West Virginia | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| Wisconsin | | X | X | | X | X | | X | X | | X | X | | X | X | | | | | | | | | | | | | |
| Wyoming | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | |

In the above table, an "X" mark indicates a state distributes SNAP benefits on this day of the month. The vertical axis lists each state in the United States, with the exception of Illinois, New York, Ohio, and Pennsylvania, which we have omitted until data confirmation. The horizontal axis lists each day of the month that states distribute SNAP benefits on. It should be noted that no state distributes benefits later than the 28th of the month.

Table 3: **Changes in Distribution Schedule, 1998-2017**

| **State** | **1998 Dates** | **2017 Dates** | **Transition** |
|---|---|---|---|
| Alabama | 4 - 18 | 4 - 23 | 50-50 |
| Delaware* | 5 - 11 | 2 - 23 | simple |
| Florida | 1 - 15 | 1 - 28 | 50-50 |
| Georgia | 5 - 14 | 5 - 23 | 50-50 |
| Idaho* | 1 - 5 | 1 - 10 | simple |
| Indiana | 1 - 10 | 1 - 23 | 50-50 |
| Kentucky | 1-10 | 1-19 | smoothed |
| Maryland* | 6 - 10 | 3 - 23 | simple |
| Michigan | 1 - 9 | 3 - 21 | smoothed |
| Mississippi | 5 - 19 | 4 - 21 | simple |
| Montana | 1 | 2 - 6 | simple |
| North Carolina | 3 - 12 | 3 - 21 | simple |
| Oklahoma | 1 | 1 - 10 | smoothed |
| South Carolina | 1 - 10 | 1 - 19 | simple |
| Tennessee | 1 - 10 | 1-20 | simple |
| Virginia | 1 | 1-9 | smoothed |

*State experienced more than one switch.

This table describes the transition between distribution schedules for each state that transitioned. It also lists the old date range and the new date range. The "range" lists the first date that SNAP benefits are distributed as well as the last date. A few states have multiple transitions. These states are denoted with a *. To date, each state with multiple transitions has chosen to transition in the same way, and so we choose to only list the state and its transition style once.

Table 4: **SNAP Distribution Date Based on Last Name First Letter, 2017**

| State | Day of Month | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Arizona | A, B | C,D | E,F | G,H | I,J | K,L | M,N | O,P | Q,R | S,T | U,V | W,X | Y,Z |
| Connecticut | A-F | G-N | O-Z | | | | | | | | | | |
| Delaware | | A | B | C | D | E | F | G | H | I | J | K | L |
| District of Columbia | A,B | C | D,E,F | G,H | I,J,K | L,M | N,O,P,Q | R,S | T,U,V | W,X,Y,Z | | | |
| Hawaii | | | A-I | | J-Z | | | | | | | | |
| Indiana | | | | | A,B | | C,D | | E,F,G | | H,I | | J,K,L |
| Iowa | A,B | C,D | E,F,G | H,I | J,K,L | M,N,O | P,Q,R | S | T,U,V | W,X,Y,Z | | | |
| Kansas | A,B | C,D | E,F,G | H,I,J | K,L | M | N,O,P,Q,R | S | T,U,V | W,X,Y,Z | | | |
| Maryland | | | | AAA-BAO | BAP-BQZ | BRA-CAQ | CAR-COQ | COR-DIZ | DJA-FIS | FIT-GON | GOO-HAX | HAY-JAB | JAC-KIM |
| Missouri | Jan., A-K | Jan., L-Z | Feb., A-K | Feb., L-Z | Mar., A-K | Mar., L-Z | Apr., A-Z | May, A-K | May, L-Z | Jun., A-K | Jun., L-Z | Jul., A-K | Jul., L-Z |
| Utah | | | | | A-G | | | | | | H-O | | |
| West Virginia | B,X,Y,Z | C,F | H,N,V | I,M,O,U | Q,S | A,W | J,K,P | D,E,R | G,L,T | | | | |
| Wyoming | A-D | E-K | L-R | S-Z | | | | | | | | | |

| | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|
| Arizona | | | | | | | | | | |
| Connecticut | | | | | | | | | | |
| Delaware | M | N | O | P | Q,R | S | T | U,V | W | X,Y,Z |
| District of Columbia | | | | | | | | | | |
| Hawaii | | | | | | | | | | |
| Indiana | | M,N | | O,P,Q,R | | S | | T,U,V | | W,X,Y,Z |
| Iowa | | | | | | | | | | |
| Kansas | | | | | | | | | | |
| Maryland | KIN-LOX | LOY-MCO | MCP-NEF | NEG-PGZ | PHA-RIC | RID-SDZ | SEZ-STC | STD-TRA | TRB-WES | WET-ZZZ |
| Missouri | Aug., A-K | Aug., L-Z | Sep., A-K | Sep., L-Z | Oct., A-K | Oct., L-Z | Nov., A-K | Nov., L-Z | Dec., A-Z | |
| Utah | | P-Z | | | | | | | | |
| West Virginia | | | | | | | | | | |
| Wyoming | | | | | | | | | | |

Some states choose to assign SNAP distribution day based on the first letter of the recipient's last name. We have listed these states as well as the letter distribution scheme they use. The horizontal axis is each day of the month that states from this group distribute SNAP benefits. The letters listed below the day are the SNAP recipients who receive their benefits on that day for that state. Missouri uses a combination of the recipient's birth month and the last name first letter.

Table 5: **SNAP Distribution Date Based on SSN, 2017**

| State | Day of Month | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Arkansas | | | | 0,1 | 2,3 | | | 4 | 5 | 6 | 7 |
| Colorado | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | |
| Louisiana | | | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Massachusetts | 0 | 1 | | 2 | 3 | | 4 | 5 | | 6 | 7 |
| Nebraska | 1,2 | 3,4 | 5,6 | 7,8 | 9,0 | | | | | | |
| New Mexico | 11,31,51,71,91 | 01,21,41,61,81 | 12,32,52,72,92 | 02,22,42,62,82 | 13,33,53,73,93 | 03,23,43,63,83 | 14,34,54,74,94 | 04,24,64,84 | 15,35,55,75,95 | 05,25,45,65,85 | 16,36,56,76,96 |
| North Carolina | | | 1 | | 2 | | 3 | | 4 | | 5 |
| Oregon | 0,1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| Tennessee | 00-04 | 05-09 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | |
| Wisconsin | | 0 | 1 | | 2 | 3 | | 4 | 5 | | 6 |

| | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|
| Arkansas | 8 | 9 | | | | | | | | |
| Colorado | | | | | | | | | | |
| Louisiana | 7 | 8 | 9 | | | | | | | |
| Massachusetts | 8 | 9 | | | | | | | | |
| Nebraska | | | | | | | | | | |
| New Mexico | 06,26,46,66,86 | 17,37,57,77,97 | 07,27,47,67,87 | 18,38,58,78,98 | 08,28,48,68,88 | 19,39,59,79,99 | 09,29,49,69,89 | 10,30,50,70,90 | 00,20,40,60,80 | |
| North Carolina | | 6 | | 7 | | 8 | | 9 | | 0 |
| Oregon | | | | | | | | | | |
| Tennessee | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85-89 | 90-94 | 95-99 |
| Wisconsin | 7 | 8 | 9 | | | | | | | |

Some states choose to assign SNAP distribution day based on the recipient's Social Security Number. We have listed these states as well as the distribution scheme they use. The horizontal axis is each day of the month that states from this group distribute SNAP benefits. The numbers listed below the day are the SNAP recipients who receive their benefits on that day for that state. States with one number assign based on the last digit. States with two numbers assign based on the last two digits.

Table 6: **Drug and Alcohol Related Fatal Car Crashes and Multiple Day SNAP Disbursement**

| | (1) | (2) | (3) |
|---|---|---|---|
| Multiple | 1.26*** | .155*** | |
| | (.474) | (.059) | |
| Observations | 10,902 | 10,902 | |
| *Fixed Effects* | | | |
| State | | X | |
| Year | | X | |
| State-Year | X | | |

These are the results of our estimation of the effect of SNAP benefit disbursement on multiple days on drug and alcohol related fatal car accidents. *Multiple* is an indicator variable for distributions that occur on more than one days of the month. We estimate the effect using a Poisson distribution. The coefficients in the Poisson regression can be interpreted as semi-elasticities, or how distributing SNAP on more than one day predicts a percentage change in the count of fatal car crashes involving drugs and alcohol. We include combinations of fixed effects. An "X" indicates this set of fixed effects was included. Our preferred specification is Column (1).

Table 7: **Drug and Alcohol Related Fatal Car Crashes and SNAP Disbursement**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Percent | .112*** | .112*** | .113 *** | .070** |
| | (.037) | (.038) | (.038) | (.035) |
| Observations | 331,798 | 331,798 | 331,798 | 331,798 |
| *Fixed Effects* | | | | |
| Day of Week | X | X | X | X |
| State | | | X | |
| Year | | | X | |
| State-Year | | X | | |
| State-Year-Month | X | | | |

These are the results of our estimation of the effect of SNAP benefit disbursement on drug and alcohol related fatal car accidents. *Percent* is the percent of SNAP benefits distributed on a day. We estimate the effect using a Poisson distribution. The coefficients in the Poisson regression can be interpreted as semi-elasticities, or how a 1 percentage point change in the amount of SNAP distributed in a day predicts a percentage change in the count of fatal car crashes involving drugs and alcohol. We include combinations of fixed effects. An "X" indicates this set of fixed effects was included. Our preferred specification in Column (1).

Table 8: **Drug and Alcohol Related Fatal Car Crashes and SNAP Disbursement Amount**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Benefit | .00055* | .00058 | .00089 *** | -.0041 *** |
| | (.000) | (.000) | (.000) | (.000) |
| Observations | 331,767 | 331,767 | 331,767 | 331,767 |
| *Fixed Effects* | | | | |
| Day of Week | X | X | X | X |
| State | | | X | |
| Year | | | X | |
| State-Year | | X | | |
| State-Year-Month | X | | | |

These are the results of our estimation of the effect of SNAP benefit amount on drug and alcohol related fatal car accidents. *Benefit* is the per person benefit amount distributed on a given day. We estimate the effect using a Poisson distribution. The coefficients in the Poisson regression can be interpreted as semi-elasticities, or how a 1 dollar increase in the amount of SNAP benefits distributed on a day predicts a percentage change in the count of fatal car crashes involving drugs and alcohol. We include combinations of fixed effects. An "X" indicates this set of fixed effects was included. Our preferred specification is Column (1).