# Benefit Redemption Patterns in the Supplemental Nutrition Assistance Program: Fiscal Year 2022

## Appendix F: Detailed Description of the Methodology

**May 2025**

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# Benefit Redemption Patterns in the Supplemental Nutrition Assistance Program in Fiscal Year 2022

## Appendix F

**May 2025**

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To conduct the analyses, Mathematica cleaned and merged raw data from several sources to produce four sets of analysis files. This appendix describes our cleaning and merging procedures, which were based on methods developed for previous studies. Because this study's time frame is the first to include Emergency allotments (EA) and Pandemic Electronic Benefit Transfer (P-EBT) issuances, this appendix emphasizes the changes made to the procedures to account for these issuance types. Each section also discusses the issues we faced, our solutions, and the resulting limitations in interpreting the analysis.

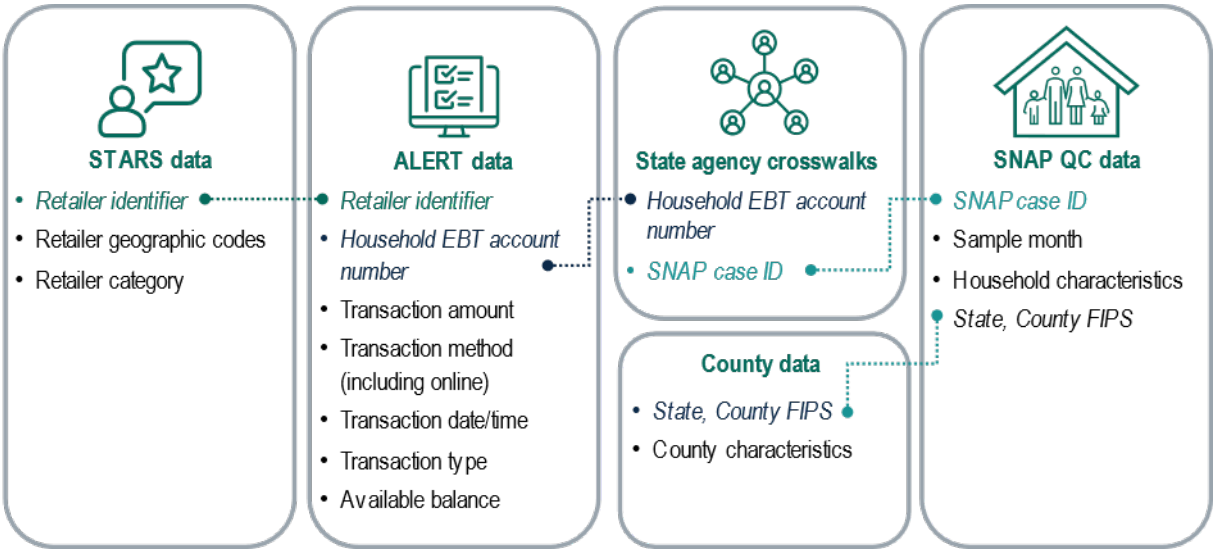
## A. Cleaning the raw data

To create the analysis files, we cleaned and linked three primary data sets:

1. Anti-Fraud Locator using EBT Retailer Transactions (ALERT)
2. Store Tracking and Redemption System (STARS)
3. SNAP Quality Control (SNAP QC)

We combined these primary data sets with additional data including county characteristics and State issuance schedules. Figure F.1 summarizes the types of information available in each file, as well as the variable used for linking.

**Figure F.1.** Contents and linkages among transaction, retailer, administrative, and secondary data




### 1. Anti-Fraud Locator using EBT Retailer Transactions (ALERT)

The primary data used in the analyses were the ALERT data, which contain every transaction conducted by a SNAP household at an authorized retailer using their SNAP EBT card. The EBT transaction data are compiled by each State's EBT vendor and maintained by FNS. FNS provided Mathematica with monthly ALERT files covering EBT transactions from September 2021 through May 2023. The final analysis includes

data from October 2021 through October 2022,[1] with the other months used to identify patterns in benefit issuances.

Each record in the data includes the retailer identifier and State; the household account number (HHACCT) and State; the EBT card number; the time and date of the transaction; the beginning EBT balance; the transaction amount; the transaction method (for example, electronic swipe, manual/key entry, paper voucher, or tap to pay); the transaction type (used to determine whether the transaction was a purchase, void, or refund); and an indicator for whether the transaction was approved or denied. The files do not include a record of the amount or date of a household's benefit issuance. Instead, an issuance is inferred between a household's sequential transactions as an observed increase in the available balance not resulting from a void or refund.

The first processing step we took was to parse the data into separate monthly files for each State using the household's State information—that is, the State that issued its EBT card—available on each transaction record. We excluded records for denied transactions and balance inquiries. Next, we assessed the quality of the data by reviewing the number of records per State and month, the distribution of transactions by day, the types of transaction codes, and the distribution of households by months of participation. In addition, we reviewed the prevalence by State of multiple household accounts associated with a single card number, and multiple card numbers associated with a single household account. For analysis, we grouped records using the HHACCT because households could have multiple or different EBT card numbers throughout the year.

Below, we summarize the main findings from this assessment of data quality.

- **Transaction codes.** During FY 2022, EBT vendors for States could submit transaction data using one of two data formats designated as version 1 or version 2. For the 14 States operating under the version 1 specification, their ALERT files contained only four transaction type codes: purchase (10), refund (20), void (30), or balance inquiry (40). For the remaining States operating under the version 2 specification, the data additionally included transaction codes for voucher authorization (51), voucher clear (52), voucher expire/release (53), and adjustment (60). Due to State-specific idiosyncrasies, we developed an approach to appropriately treat these transaction codes that included some State-specific exceptions.[2]
- **Multiple household account numbers per EBT card**. In Massachusetts, 40 percent of EBT card numbers were associated with two household account numbers; in Alabama and Texas, more than 3 percent of EBT card numbers were associated with multiple household account numbers. We reviewed the patterns in Massachusetts and observed that the State likely re-issued HHACCT numbers mid-year. In Alabama and Texas, we also observed households that appeared to switch HHACCT numbers over

[1] The focus for the analysis is FY 2022. However, most households receive a benefit after the first day of the month; their final "benefit month" in the exhaustion analysis begins in September 2022 and ends in October 2022.

[2] For code 52 (voucher clear), we dropped the associated transactions except in Alabama, Maine, and Mississippi; in these three States, voucher clear transactions affected available balances. Code 51 (voucher authorization) was often paired with a code 53 (voucher release), in which the code 53 appeared to reverse the transaction amount in code 51. If we were able to identify the voucher release associated with a given voucher authorization, we dropped both records. Otherwise, we treated code 53 as a void (code 30 under the old format) and code 51 as a transaction (code 10 under the old format). For code 60, we verified in the data that the balance decrement associated with that record was consistent with the observed transaction amount. For negative transaction amounts with code 60, we treated them as equivalent to a refund (code 20).

time. In these cases, we overwrote new HHACCTs with the old ones using the EBT card number to identify households.

- **Multiple EBT card numbers per household.** We expect that in all States, some households will have more than one EBT card number. However, we observed an atypically large number of EBT cards per household in California, with 50 percent of households associated with at least two EBT card numbers. This was due to the implementation of Card Verification Values (CVV) in California that occurred in Spring 2022, resulting in newly issued EBT cards for many SNAP households in the State.

The team also identified the following data quality issues that primarily affected the construction of the exhaustion analysis files. We further describe these files and the process of constructing them in Section B.

- **Zero-balance households.** As described in a bullet above, some records in States using the version 2 ALERT data formats had transaction codes of 51, 52, and 53 (voucher authorization, clear, and expire/release, respectively), and 60 (adjustment). Records with these transaction codes often had an observed EBT card balance of zero associated with them, which we could identify as incorrect given the balance on the previous record and the transaction amount. Our end-of-period balance analyses used the balances on transaction records, so we corrected the balance on the records with transaction codes of 51, 52, 53, and 60 by calculating it as the previous transaction balance minus the current transaction amount. We identified some households that only had records with these transaction codes and, as a result, were never observed with a non-zero balance. Because there is no way to determine these households' balances at the time of their transactions, we removed these households from the pool of households eligible for inclusion in the exhaustion analysis file. These households represent a negligible share of all households in the ALERT data.
- **Large balance households**. All States had households with unexpectedly large balances. The top-censoring for balance amounts differed based on the ALERT data specification; the maximum balance observed in States using ALERT version 1 was $9,999.99; the limit was higher for States operating with version 2. However, in all States, the proportion of households with a balance of $9,999.99 or higher was negligible (less than 0.2 percent in all States). We removed households with a balance of $9,999.99 in version 1 because we could not accurately calculate the balance after each transaction. We removed households with a balance of $9999.99 or more in version 2 to maintain consistency with States operating under version 1.

### 2. Store Tracking and Redemption System (STARS)

The STARS data contain a record of each retailer authorized to accept SNAP benefits. FNS provided the STARS data for each retailer authorized to accept SNAP benefits from September 2021 through October 2022. Each record contained a retailer identification number, store name, location (city, State, ZIP Code, county Federal Information Processing Standard [FIPS] code, and geographic coordinates), retailer category, and authorization date.

We used the retailer identification number to match the STARS data to each purchase transaction in the ALERT data. We used the retailer type variable to group retailers into the following store type categories:

- Supermarkets/super stores
- Large/medium grocery stores
- Small grocery stores

- Convenience stores
- Specialty food stores, which included stores classified with a specialty in the following items: bakery/bread, fruits/vegetables, meat/poultry, or seafood
- Internet retailers[3]
- Other stores, which includes stores classified as combination grocery/other, communal dining facility, delivery route, direct marketing farmer, drug and/or alcohol treatment program, farmers market, food buying cooperative, group living arrangement, homeless meal provider, meal delivery service, military commissary, private for-profit restaurant, private for-profit senior citizen's center residential building, and shelter for battered women and children

### 3. SNAP Quality Control (SNAP QC) data

The FY 2022 SNAP Quality Control (QC) database contains detailed demographic, economic, and SNAP eligibility information for a nationally representative sample of 41,391 SNAP households. The raw datafile is generated from monthly reviews of SNAP cases conducted by State SNAP agencies as part of quality control reviews. We primarily used the edited version of the file produced by Mathematica for FNS, which includes monthly and fiscal year weights and a variety of constructed economic and demographic variables.

To match SNAP QC households with their ALERT records, we used the raw, nonpublic SNAP QC file to obtain each household's SNAP case number. For 25 States, the SNAP case number was the same as the ALERT household account number, and SNAP QC households were matched directly with ALERT records. We asked the remaining States to provide a crosswalk file allowing a link of the SNAP QC household with ALERT records. We received crosswalks for all 28 States.

Table F.1 provides the number of households in the SNAP QC data by State, the percentage matched with ALERT data, and the percentage having transactions in the study period defined as the three months centered on the SNAP QC sample month.

**Table F.1.** Number of matched households in SNAP QC data, by State, and percentage with ALERT records in study period

| State | Method of match | Number of QC cases | SNAP QC cases matched with ALERT | | SNAP QC cases with ALERT records in study period | |
|---|---|---|---|---|---|---|
| | | | Number | Percent | Number | Percent |
| Alabama | Direct | 1,030 | 1,028 | 99.8 | 1,020 | 99.0 |
| Alaska | Direct | 227 | 227 | 100.0 | 222 | 97.8 |
| Arizona | Direct | 885 | 885 | 100.0 | 879 | 99.3 |
| Arkansas | Crosswalk | 803 | 797 | 99.3 | 790 | 98.4 |
| California | Crosswalk | 809 | 809 | 100.0 | 807 | 99.8 |

[3] Although the version 2 ALERT data specification includes a unique transaction method code to capture internet transactions, this is not available for States operating under the version 1 specification. Because all online retailers must have a unique, distinct Internet retailer number to accept online SNAP purchases, we use the internet retailer indicator available in the STARS data to identify online transactions for analysis.

| State | Method of match | Number of QC cases | SNAP QC cases matched with ALERT | | SNAP QC cases with ALERT records in study period | |
|---|---|---|---|---|---|---|
| | | | Number | Percent | Number | Percent |
| Colorado | Crosswalk | 1,022 | 1,012 | 99.0 | 1,008 | 98.6 |
| Connecticut | Crosswalk | 999 | 992 | 99.3 | 989 | 99.0 |
| Delaware | Crosswalk | 135 | 134 | 99.3 | 130 | 96.3 |
| District of Columbia | Crosswalk | 329 | 307 | 93.3 | 301 | 91.5 |
| Florida | Direct | 947 | 947 | 100.0 | 936 | 98.8 |
| Georgia | Crosswalk | 1,031 | 1,030 | 99.9 | 1,026 | 99.5 |
| Guam | Direct | 182 | 177 | 97.3 | 177 | 97.3 |
| Hawaii | Direct | 546 | 546 | 100.0 | 542 | 99.3 |
| Idaho | Crosswalk | 942 | 940 | 99.8 | 938 | 99.6 |
| Illinois | Crosswalk | 839 | 838 | 99.9 | 833 | 99.3 |
| Indiana | Crosswalk | 809 | 794 | 98.1 | 791 | 97.8 |
| Iowa | Direct | 968 | 963 | 99.5 | 961 | 99.3 |
| Kansas | Crosswalk | 909 | 901 | 99.1 | 898 | 98.8 |
| Kentucky | Crosswalk | 1,012 | 1,005 | 99.3 | 1,003 | 99.1 |
| Louisiana | Crosswalk | 880 | 876 | 99.5 | 872 | 99.1 |
| Maine | Direct | 897 | 895 | 99.8 | 889 | 99.1 |
| Maryland | Direct | 441 | 433 | 98.2 | 433 | 98.2 |
| Massachusetts | Crosswalk | 922 | 884 | 95.9 | 853 | 92.5 |
| Michigan | Crosswalk | 863 | 851 | 98.6 | 848 | 98.3 |
| Minnesota | Direct | 1,025 | 973 | 94.9 | 935 | 91.2 |
| Mississippi | Direct | 1,067 | 1,057 | 99.1 | 1,052 | 98.6 |
| Missouri | Direct | 715 | 714 | 99.9 | 710 | 99.3 |
| Montana | Direct | 597 | 590 | 98.8 | 583 | 97.7 |
| Nebraska | Crosswalk | 958 | 945 | 98.6 | 935 | 97.6 |
| Nevada | Crosswalk | 1,056 | 1,053 | 99.7 | 1,050 | 99.4 |
| New Hampshire | Crosswalk | 555 | 549 | 98.9 | 546 | 98.4 |
| New Jersey | Direct | 613 | 600 | 97.9 | 595 | 97.1 |
| New Mexico | Crosswalk | 967 | 958 | 99.1 | 955 | 98.8 |
| New York | Crosswalk | 896 | 891 | 99.4 | 880 | 98.2 |
| North Carolina | Crosswalk | 893 | 893 | 100.0 | 889 | 99.6 |
| North Dakota | Direct | 455 | 453 | 99.6 | 446 | 98.0 |
| Ohio | Crosswalk | 920 | 901 | 97.9 | 896 | 97.4 |
| Oklahoma | Direct | 971 | 971 | 100.0 | 968 | 99.7 |
| Oregon | Crosswalk | 756 | 675 | 89.3 | 663 | 87.7 |
| Pennsylvania | Crosswalk | 817 | 816 | 99.9 | 812 | 99.4 |
| Rhode Island | Crosswalk | 671 | 648 | 96.6 | 647 | 96.4 |
| South Carolina | Direct | 941 | 941 | 100.0 | 936 | 99.5 |
| South Dakota | Direct | 605 | 605 | 100.0 | 602 | 99.5 |

| State | Method of match | Number of QC cases | SNAP QC cases matched with ALERT | | SNAP QC cases with ALERT records in study period | |
|---|---|---|---|---|---|---|
| | | | Number | Percent | Number | Percent |
| Tennessee | Crosswalk | 937 | 937 | 100.0 | 934 | 99.7 |
| Texas | Direct | 866 | 801 | 92.5 | 792 | 91.5 |
| Utah | Direct | 1,007 | 989 | 98.2 | 981 | 97.4 |
| Vermont | Crosswalk | 721 | 439 | 60.9 | 416 | 57.7 |
| Virgin Islands | Direct | 219 | 215 | 98.2 | 213 | 97.3 |
| Virginia | Direct | 786 | 786 | 100.0 | 785 | 99.9 |
| Washington | Crosswalk | 786 | 786 | 100.0 | 785 | 99.9 |
| West Virginia | Direct | 888 | 888 | 100.0 | 886 | 99.8 |
| Wisconsin | Direct | 986 | 986 | 100.0 | 981 | 99.5 |
| Wyoming | Crosswalk | 290 | 288 | 99.3 | 285 | 98.3 |
| **Total** | | **41,391** | **40,627** | **98.1** | **40,304** | **97.4** |

Note: Study period is defined as the three months centered on the SNAP QC sample month.

In nearly every State, we were able to match at least 96 percent of households in the SNAP QC data with households making transactions in the ALERT data. Typically, when there was no match for a household it was because the SNAP QC household identifier was incorrectly entered into the QC data. (When possible, States provided corrected identifiers for matching purposes.)

Instances of lower-than-average match rates with the QC data were a result of households participating in SNAP cash-out programs. These households were not observed in the EBT data. For example, in FY 2021, Vermont reported about 30 percent of SNAP households participated in SNAP cash out (FNS 2024c).[4] Other cash-out States were Minnesota, Ohio, and Oregon.[5]

### 4. Other data

We gathered additional data for use in analysis from the following sources:

- **Poverty data by county.** We collected data on county-level poverty rates and population density based on U.S. Census Bureau estimates and compiled by the USDA's Economic Research Service.
- **State issuance schedules**. FNS provides details of State SNAP benefit issuance schedules online, as well as State plans for the additional issuances applicable for FY 2022: EA and P-EBT. We compiled State issuance schedules for all three issuance types using publicly available information. For each State, Table F.2 presents the standard issuance dates, determinants of a household's standard issuance date, and a description of the EA issuance distribution for the State. In Table F.3, we summarize State P-EBT issuance schedules.

[4] https://fns-prod.azureedge.us/sites/default/files/resource-files/snap-state-activity-report-fy21.pdf

[5] Oregon operates cash-out in four counties; Minnesota operates cash-out in only Hennepin County.

**Table F.2.** Standard and EA benefit issuance schedules for States, territories, and the District of Columbia

| | Standard issuance | | | | Emergency allotment | | |
|---|---|---|---|---|---|---|---|
| State | Determinant | Date(s) of issuance | Assigned or imputed distribution date in ALERT files | Assigned or imputed distribution date in ALERT-QC files | Months in FY 2022 | Distribution description | Assign or impute distribution date |
| Alabama | Last 2 digits of case number | 4–23 | Assigned | Assigned | All | Not staggered[a] | Assigned |
| Alaska | Distribution not staggered | 1 | Assigned | Assigned | Through August 2022 | Over several weeks | Imputed |
| Arizona | First letter of last name | 1–13 | Imputed | Imputed | Through April 2022 | With standard issuance (with exceptions[b]) | Assigned to align with standard distribution |
| Arkansas | Last digit of Social Security number | 4, 5, 8, 9, 10, 11, 12, 13 | Imputed | Imputed | None | N/A | N/A |
| California | Last digit of case number | 1–10 | Imputed | Assigned | All | One or two days per month[c] | Assigned |
| Colorado | Last digit of case number | 1–10 | Assigned | Assigned | All | Over 5 consecutive days | Imputed |
| Connecticut | First letter of last name | 1–3 | Imputed | Imputed | All | Multiple Fridays | Imputed |
| Delaware | First letter of last name | 2–23 | Imputed | Imputed | All | Not staggered | Assigned |
| District of Columbia | First letter of last name | 1–10 | Imputed | Imputed | All | With standard issuance | Assigned to align with standard distribution |
| Florida | 8th and 9th digit of 10-digit case number, read backwards | 1–28 | Assigned | Assigned | None | N/A | N/A |
| Georgia | Last digit of case number | 5–23 odd days | Assigned | Assigned | Through May 2022 | Over 4 days | Assigned |
| Guam | Last digit of Social Security number | 1–10 | Imputed | Imputed | All | Not staggered | Assigned |
| Hawaii | First letter of last name | 3, 5 | Imputed | Imputed | All | Not staggered[a] | Assigned |
| Idaho | Last digit of birth year | 1–10 | Imputed | Imputed | None | N/A | N/A |

| | Standard issuance | | | | Emergency allotment | | |
|---|---|---|---|---|---|---|---|
| State | Determinant | Date(s) of issuance | Assigned or imputed distribution date in ALERT files | Assigned or imputed distribution date in ALERT-QC files | Months in FY 2022 | Distribution description | Assign or impute distribution date |
| Illinois | Case type and number | 1,2,3,4,5,6,7,8,9,10,13,17,20 | Imputed | Imputed | All | Same order as standard distribution | Assigned |
| Indiana | First letter of last name | 5,7,9,11,13,15,17,19,21,23 | Imputed | Imputed | Through May 2022 | With standard issuance | Assigned to align with standard distribution |
| Iowa | First letter of last name | 1–10 | Imputed | Imputed | Through March 2022 | With standard issuance | Assigned to align with standard distribution |
| Kansas | First letter of last name | 1–10 | Imputed | Imputed | All | Same order as standard distribution | Imputed |
| Kentucky | Last digit of case number | 1,3,5,7,9,11,13,15,17,19 | Imputed | Imputed | Through April 2022 | With standard issuance | Assigned to align with standard distribution |
| Louisiana | Last digit of Social Security number | 5,7,9,11,13,15,17,19,21,23 [d] | Imputed | Imputed | All | Not staggered (with exceptions[f]) | Assigned |
| Maine | Last digit of recipient's birth date | 10–14 | Imputed | Imputed | All | Not staggered | Assigned |
| Maryland | First three letters of last name | 4–23 | Imputed | Imputed | All | With standard issuance | Assigned to align with standard distribution |
| Massachusetts | Last digit of Social Security number | 1, 2, 4, 5, 7, 8, 10, 11, 13, 14 | Imputed | Imputed | All | Not staggered[a] | Assigned |
| Michigan | Last digit of case number | 3,5,7,9,11,13,15,17,19,21 | Imputed | Imputed | All | Same order as standard distribution[c] | Imputed |
| Minnesota | Last digit of case number | 4–13 | Assigned | Assigned | All | Over 15 days | Imputed |

| | Standard issuance | | | | Emergency allotment | | |
|---|---|---|---|---|---|---|---|
| State | Determinant | Date(s) of issuance | Assigned or imputed distribution date in ALERT files | Assigned or imputed distribution date in ALERT-QC files | Months in FY 2022 | Distribution description | Assign or impute distribution date |
| Mississippi | Last 2 digits of case number | 4–21 | Assigned | Assigned | Through December 2021 | Not staggered | Assigned |
| Missouri | Client's birth month and last name | Impute | Imputed | Imputed | None | N/A | N/A |
| Montana | Last digit of case number | 2–6 | Assigned | Assigned | None | N/A | N/A |
| Nebraska | Last digit of Social Security number | 1–5 | Imputed | Imputed | None | N/A | N/A |
| Nevada | Last digit of birth year | 1–10 | Imputed | Imputed | All | Not staggered[c] | Assigned |
| New Hampshire | Not staggered | 5 | Assigned | Assigned | All | Over three to four days[a] | Imputed |
| New Jersey | 7th digit of case number | 1–5 (Warren County assigns all benefits on the 1st) | Assigned | Assigned | All | With standard issuance | Assigned to align with standard distribution |
| New Mexico | Last 2 digits of Social Security number | 1–20 | Imputed | Imputed | All | Over the month | Imputed |
| New York | Last digit of case number | 1–9 (upstate); dates vary monthly (NYC) | Imputed[e] | Imputed[e] | All | Over 10 days | Imputed |
| North Carolina | Last digit of Social Security number | 3,5,7,9,11,13,15, 17,19,21 | Imputed | Imputed | All | Over 10 days | Imputed |
| North Dakota | Distribution not staggered | 1 | Assigned | Assigned | None | N/A | N/A |
| Ohio | Last digit of case number | 2,4,6,8,10,12,14, 16,18,20 | Imputed | Imputed | All | Not staggered | Assigned |
| Oklahoma | Last digit of case number | 1,5,10 | Imputed | Assigned | All | Over 6 days (with exceptions[g]) | Imputed |

| | Standard issuance | | | | Emergency allotment | | |
|---|---|---|---|---|---|---|---|
| State | Determinant | Date(s) of issuance | Assigned or imputed distribution date in ALERT files | Assigned or imputed distribution date in ALERT-QC files | Months in FY 2022 | Distribution description | Assign or impute distribution date |
| Oregon | Last digit of Social Security number | 1–9 | Imputed | Imputed | All | Over 3 days | Imputed |
| Pennsylvania | Last digit of case number | First 10 business days of the month; dates vary by month and county | Imputed | Imputed | All | Over 10 days | Imputed |
| Rhode Island | Distribution not staggered | 1 | Assigned | Assigned | All | Not staggered | Assigned |
| South Carolina | Last digit of case number; certification date | 1–10 (if approved before September 2012); 11,2,13,4,15,6,17,8,19,10 (if approved after September 2012) | Imputed | Assigned | All | With standard issuance | Assigned to align with standard distribution |
| South Dakota | Distribution not staggered | 10 | Assigned | Assigned | None | N/A | N/A |
| Tennessee | Last 2 digits of Social Security number | 1–20 | Imputed | Imputed | Through December 21 | With standard issuance | Assigned to align with standard distribution |
| Texas | Last digit of case number; certification date | 1, 3, 5, 6, 7, 9, 11, 12, 13, 15 or 16–28 | Imputed | Imputed | All | Staggered randomly | Imputed |
| Utah | First letter of last name | 5, 11, 15 | Imputed | Imputed | All | Not staggered | Assigned |
| Vermont | Distribution not staggered | 1 | Assigned | Assigned | All | Not staggered[a] | Assigned |
| Virgin Islands | Distribution not staggered | 1 | Assigned | Assigned | All | Not staggered | Assigned |
| Virginia | Last digit of case number | 1,4,7 | Imputed | Assigned | All | Not staggered | Assigned |

| | Standard issuance | | | | Emergency allotment | | |
|---|---|---|---|---|---|---|---|
| State | Determinant | Date(s) of issuance | Assigned or imputed distribution date in ALERT files | Assigned or imputed distribution date in ALERT-QC files | Months in FY 2022 | Distribution description | Assign or impute distribution date |
| Washington | Date of application | 1–20 | Imputed | Imputed | All | With standard issuance (with exceptions[h]) | Assigned to align with standard distribution |
| West Virginia | First letter of last name | 1–9 | Imputed | Imputed | All | Not staggered | Assigned |
| Wisconsin | 8th digit of Social Security number | 2, 3, 5, 6, 8, 9, 11, 12, 14, 15 | Imputed | Imputed | All | Not staggered | Assigned |
| Wyoming | First letter of last name | 1–4 | Imputed | Imputed | Through April 2022 | Day after standard issuance | Assigned to align with standard distribution |

Sources: Food and Nutrition Service. "SNAP COVID-19 Emergency Allotments Guidance." 2023. https://www.fns.usda.gov/snap/covid-19-emergency-allotments-guidance; "SNAP Monthly Issuance Schedule for All States and Territories." 2022. https://www.fns.usda.gov/snap/monthly-issuance-schedule-all-states-and-territories .

Notes: "Not staggered" indicates that benefits are issued to all SNAP households in a State on the same date. As discussed in Sections B and C, for a subset of States listed as having "imputed" EA dates, EA distribution schedules are inconsistent enough that imputation does not work reliably. We will discuss alternative approaches with FNS as described in Section C.

[a]Distribution could occur in next month.

[b]SNAP households with a last name beginning between A and H had an EA issuance date that varied by month and did not necessarily align with their standard issuance date in that month

[c]Distribution was in the month following eligibility.

[d]For households with a member who is age 60 or older or has a disability, benefits are issued between the 1st and the 4th of the month.

[e]To determine which schedule applied to each household, we identified the county of residence as the county where most transactions occurred in a month. For counties outside of New York City, we imputed issuance dates between the first and ninth day of the month; for the remaining New York counties, we assigned issuance months according to the city's monthly rotating schedule.

[f]Ongoing participants received EA on the same day each month; new participants received EA on a rolling basis staggered across three days.

[g]Supplements to bring each household to the $95 minimum were disbursed from the 15th to the last day of each month.

[h]Beginning in November 2021, households with a standard issuance date of the 1st of the month received EA on the 2nd.

**Table F.3.** State P-EBT schedule summary

| State | Card issuance for SNAP participants (SNAP EBT card, separate P-EBT card, combination) | State uses standard issuance amounts or own calculation |
|---|---|---|
| Alabama | SNAP | Standard and own calculations |
| Alaska | Separate | Standard |
| Arizona | SNAP | Standard for summer; own calculations for school year |
| Arkansas | Combination | Standard |
| California | Separate | Standard and own calculations |
| Colorado | Combination | Standard for summer; own calculations for school year |
| Connecticut | SNAP | Standard and own calculations |
| Delaware | SNAP | Standard for summer; own calculations for school year |
| District of Columbia | SNAP | Standard for summer; own calculations for school year |
| Florida | SNAP | Standard |
| Georgia | SNAP | Standard and own calculations |
| Guam | SNAP | Standard |
| Hawaii | Separate | Standard |
| Idaho | Separate | Standard |
| Illinois | SNAP | Standard for summer; own calculations for school year |
| Indiana | SNAP | Standard |
| Iowa | SNAP | Standard for summer; own calculations for school year |
| Kansas | SNAP | Standard |
| Kentucky | SNAP | Standard and own calculations |
| Louisiana | Combination | Standard and own calculations |
| Maine | SNAP | Standard and own calculations |
| Maryland | Separate | Standard and own calculations |
| Massachusetts | SNAP | Standard for summer; own calculations for school year |
| Michigan | SNAP | Standard for summer; own calculations for school year |
| Minnesota | SNAP | Standard and own calculations |
| Mississippi | Separate | Standard and own calculations |
| Missouri | Combination | Standard for summer; own calculations for school year |
| Montana | SNAP | Standard for summer; own calculations for school year |
| Nebraska | Combination | Standard for summer; own calculations for school year |
| Nevada | SNAP | Standard |
| New Hampshire | SNAP | Standard for summer; own calculations for school year |
| New Jersey | SNAP | Standard and own calculations |
| New Mexico | Separate | Standard |
| New York | SNAP | Standard for summer; own calculations for school year |
| North Carolina | SNAP | Standard |
| North Dakota | SNAP | Standard; own calculations for additional summer supplement |

| State | Card issuance for SNAP participants (SNAP EBT card, separate P-EBT card, combination) | State uses standard issuance amounts or own calculation |
|---|---|---|
| Ohio | SNAP | Standard and own calculations |
| Oklahoma | SNAP | Standard |
| Oregon | SNAP | Standard for summer; own calculations for school year |
| Pennsylvania | SNAP | Standard and own calculations |
| Rhode Island | SNAP | Standard for summer; own calculations for school year |
| South Carolina | Separate | Standard for summer; own calculations for school year |
| South Dakota | SNAP | Standard for summer; own calculations for school year |
| Tennessee | SNAP | Standard for summer; own calculations for school year |
| Texas | SNAP | Standard |
| Utah | SNAP | Standard |
| Vermont | SNAP | Standard for summer; own calculations for school year |
| Virgin Islands | SNAP | Standard |
| Virginia | SNAP | Standard for summer; own calculations for school year |
| Washington | Separate | Standard for summer; own calculations for school year |
| West Virginia | Separate | Standard for summer; own calculations for school year |
| Wisconsin | SNAP | Standard for summer; own calculations for school year |
| Wyoming | SNAP | Standard for summer; own calculations for school year |

Sources: Food and Nutrition Service. "State Guidance on Pandemic EBT." 2023. https://www.fns.usda.gov/snap/state-guidance-coronavirus-pandemic-ebt-pebt. Additional information was collected from State websites.

## B. Constructing the analysis files

Using this merged data, we created four sets of analysis files. We used the ALERT calendar month file to produce monthly statistics averaged across calendar months. We selected a random sample of 20,000 ALERT households from each calendar month and State to create the benefit exhaustion file, which we used to produce summary statistics about the exhaustion of benefits after issuance. We created two sets of analogous analysis files using matched ALERT-QC data files. As noted in the box below, the calendar month and benefit exhaustion files differ in the types of issuances included. The use of a random sample for the benefit exhaustion file (reducing the computational intensity required to identify issuances) allowed us to identify the types of issuances and remove P-EBT issuances and subsequent transactions from the analysis.

### 1. ALERT calendar month file for Appendix B, Tables B.1 to B.15, B.22a, B.22b, B.25 to B.30

We constructed a calendar month file, using information from the ALERT and STARS data to produce descriptive statistics of monthly transactions by State and retailer type over the study period. The ALERT file received minimal processing to drop rejected transactions and balance inquiries and to add store information. We constructed analytic variables, which were summarized by State and month (for State statistics) and by State, household, and month (for household-level statistics), and then averaged over months.

To obtain an accurate calculation of the number of transactions and the value of expenditures, we adjusted for voids and refunds. To calculate the number of transactions, the team counted voids as "-1" because they negated an entire transaction that we already counted

and refunds as "0" because they resulted in a return of some benefits to the EBT card but did not necessarily remove an entire purchase. To calculate the value of transaction amounts, we subtracted the voided and refunded amounts from the total benefits redeemed for the month. This approach was sufficient because the tabulations from this file were monthly averages and did not depend on the order of transactions or the exact household balance after each transaction.[6]

### Calendar month file versus benefit exhaustion file

- The calendar month file includes all households receiving benefits on an EBT card and all redemption transactions
- The benefit exhaustion file excludes transactions made on cards that only have P-EBT issuances. These are households that are not SNAP participants and participating households that receive P-EBT on a separate P-EBT-only card. We refer to these as P-EBT-only households.
- In addition, unless noted otherwise, the benefit exhaustion file excludes issuance periods in which a household received a P-EBT issuance or an issuance that the study team could not classify as a standard or EA issuance.

Although in most States the calendar month did not exactly align with the issuance month (because most States did not issue benefits to all participants on the first day of the calendar month), the calendar month remained a reasonable time unit for identifying the average number of transactions in a month and the average amount spent per month and per transaction. The tabulations in the analysis were calendar month averages for SNAP participating households, calculated at the State and national level.[7]

The calendar month file includes redemption in all months the household is present in the data. The redemption includes months with standard, EA, and P-EBT issuances and any other adjustments that might have been made to the household's account. It also includes redemptions by households that only receive P-EBT.

**2. ALERT benefit exhaustion file for Appendix B, Tables B.16 to B.22, B.23 to B.24, B.31 to B.32**

To answer questions about how quickly participants redeem their benefits after issuance, we constructed a benefit exhaustion file that includes all transactions for each household beginning with their first issuance in a month until the day before their next issuance. EA and P-EBT could add additional issuances for a household within the benefit month. Because the ALERT data do not record when a benefit was issued, we assigned issuance dates when possible based on information collected from State issuance schedules. If assigning issuance dates was not possible, we imputed them using a procedure described in further detail below.

[6] Because these data include all transactions for every household participating in SNAP (reaching near one terabyte of data), identifying the purchase transaction associated with each void and refund in the full set of data was infeasible.

[7] In some months, Alabama issued EA benefits more than once, coinciding with the start and the end of that calendar month. For example, they issued EA benefits on July 1, 2022 and again on July 30, 2022. For months with this pattern, we adjusted calendar months slightly for analysis to avoid having two EA issuances in the same month. For example, we redefined July to include redemptions made between July 1 and July 29.

Because we performed computationally intensive algorithms to identify issuance dates for some States, we created the benefit exhaustion file using random samples of SNAP households per month for each State. We sampled up to 20,000 households per month per State (or up to 240,000 households per State), resulting in 6,624,196 households.[8] We used the full year of data for all sampled households and reweighted the average nationwide statistics based on the random samples to reflect the actual distribution of households, transactions, and benefits across States.

### *a. Pre-processing*

Prior to assigning or imputing issuance dates, we cleaned the ALERT data file to remove voids and their corresponding voided purchase or refund, and, when necessary, reordered transactions to identify decrements in the available balance that were consistent with the observed transaction amount in each record.

- To remove **voids** and their corresponding voided purchase or refund, we matched voids to the nearest preceding purchase or refund of the same amount. We then deleted the voids and matched purchase or refund from the data.
- To **reorder** the data, we first identified transactions that were "out of order." When a household's transactions were ordered by the date and time of the transaction, we expected that the balance from the previous record minus the amount of that transaction would equal the balance on the current record. If this was not the case, it should be due to an issuance. When transactions appeared out of order, we typically found that the difference calculated matched a transaction amount in a future record. We identified potential out of order transactions and then searched all transactions for that household and month to find a transaction with a remaining balance equal to the available balance on the identified "out of order" transaction. We then adjusted record numbers to reorder the transactions.

### *b. Determining issuance day for standard, EA, and P-EBT issuances*

Given the existence of multiple issuances per month for many households in FY 2022, we took a State-by-State approach to identifying issuance dates for each household. The process was as follows:

1. *Create a file of observed balance increases.* For each household, we stored the observed balance increase amounts and their dates across each of the 21 months of ALERT transaction data.
2. *Flag P-EBT issuances for each household*. Relying on the information collected from FNS waiver approvals and State websites (summarized in Table F.3), we searched the observed balance increases for amounts and dates that aligned with the household's State's P-EBT issuance plan. We flagged balance increases as being P-EBT if they were multiples of the expected P-EBT issuance amounts for each State (to allow for multiple days of receipt and/or multiple children), in the months that aligned with the known P-EBT distribution months.[9] In States with no EA in FY 2022, we additionally flagged any P-EBT issuances that were

[8] Prior to sampling, we excluded households that always had a zero-balance and those with a balance of $9,999.99 or higher (as described in Section A). In addition, we did not sample any household with a transaction that was missing STARS data (a negligible share of all ALERT households).

[9] To reduce the likelihood of misidentifying standard issuances as P-EBT issuances, we verified that the household did not also receive the P-EBT amount in months that would not have been P-EBT months.

combined with a standard issuance (identified by determining whether the observed balance increase, after removing the expected P-EBT issuance amount, matched a preceding or subsequent issuance).[10]

After reviewing issuances in each State, we often identified and flagged additional P-EBT amounts and/or distribution dates that were not captured in the original State plans available on FNS's website. We verified these additional distributions by reviewing online communications from States and local organizations to SNAP participants and parents. In some States, we identified a relatively large share of unknown issuances that did not appear to be P-EBT based on available documentation and patterns in households with only P-EBT issuances. In these cases, we did not flag the issuance as P-EBT. This resulted in some States for which we were not confident in our ability to identify most P-EBT issuances. We excluded these States from the analysis of benefit redemption patterns in P-EBT months compared to non-P-EBT months (Chapter V, Section C and Appendix D, Tables D.9 through D.12).

If all observed balance increases for the household appeared to be P-EBT issuances, or if the State household identifier indicated it was a P-EBT household (available in a few States), we flagged the household as a P-EBT-only household. We excluded all P-EBT-only households from the exhaustion analyses as they are not SNAP participants or could not be connected to a SNAP household.

### Identifying P-EBT issuances

- Most States issued summer P-EBT benefits using FNS's standardized benefit amounts of $375 for summer 2021 and $391 for summer 2022 (and similar standardized amounts for Alaska, Hawaii, Guam, and the Virgin Islands). Multiples of these amounts were typically easily identified as issuances separate from the standard and EA benefit issuances in the fall and early winter months.
- Many States issued school-year benefits to both school-age children and children in childcare using FNS's standardized benefit amounts of $6.82 per day for school year 2020-2021 and $7.10 per day for school year 2021-2022 (and similar standardized amounts for Alaska, Hawaii, Guam, and the Virgin Islands). Because standard and EA benefits are typically integer amounts, these non-integer values were also usually easily identified as P-EBT issuances.
- We had difficulty identifying P-EBT when States issued many different amounts based on each student's school situation (such as in-person or in a hybrid situation; school-age or in childcare; and number of days out of school), especially when the potential amounts were integers. Some States also chose to round the non-integer amounts, making them more difficult to distinguish from other benefit types. A household with multiple children in different school and childcare settings could have many combinations of P-EBT amounts. We chose not to look for every possible combination of these amounts, as that would have likely led us to identify too many issuances as P-EBT.◢

We also excluded from most analyses in the exhaustion analysis the periods in which a household receives a P-EBT issuance. These months are returned to the analysis in Chapter V, Section C and Appendix D, Tables D.9 through D.12 in States where we have confidence in our ability to identify P-EBT, specifically to examine differences in spending in these months.

[10] Because months with P-EBT issuances were removed from the main analysis, we did not flag combined P-EBT, EA, and standard issuances in States that issued EA, given the large range of possible issuance amounts in those States.

3. *Flag standard and EA issuances for each household.* After identifying P-EBT issuances in the data, we then used data on the remaining non-P-EBT observed balance increases to identify standard and EA issuances. We grouped States based on expected patterns in the number and type of issuances received by households in the State each month (summarized in Table F.4):

**States with no EA in FY 2022.** For the 8 States without EA, we expected only one balance increase in each calendar month after accounting for P-EBT. In these States, we identified standard issuances using a similar approach as taken in prior year studies. We flagged a balance increase as a standard issuance if it was an integer increase, it was the only balance increase in the calendar month after accounting for P-EBT, and it matched a surrounding month's issuance.[11] Any issuance that did not meet these criteria and was not flagged a P-EBT issuance was treated as an "unknown" issuance, including instances in which a household had more than one non-P-EBT balance increase in the month. Benefit months with unknown issuances were dropped from the analysis, which aligns with the approach taken in previous studies in which months with multiple observed integer issuances or any non-integer increase were excluded.

**States that issued EA and standard benefits in one combined issuance**. State plans submitted to FNS for 11 States indicated EA and standard benefits were issued to households in one combined benefit. In practice, ALERT data transactions showed that some households received the standard and EA issuance on separate days in some months. However, these issuances were usually within a few days of each other. In all other cases, households received one combined issuance.

We identified the combined issuances by looking for balance increases that were equal to a possible benefit maximum, or up to $95 more, for a given household size in that State. We additionally identified separate standard and EA issuances by looking for pairs of balance increases that added up to a possible benefit maximum or up to $95 more. Any issuances that were not identified as P-EBT issuances or a standard, EA, or combined issuance, were marked as unknown. Months with unknown issuances were dropped from the analysis.

**States that issued EA and standard benefits separately**. In the remaining 34 States, EA and standard benefits were issued on separate days within each calendar month. In these States, we expected to observe two issuances per household and calendar month after accounting for P-EBT. To identify these issuances, factoring in standard and EA benefit schedules, we looked for increases after the earliest issuance date in a household and month that paired with another increase to sum to a possible SNAP benefit maximum for a household size in that State, or up to $95 more.[12] We verified the planned EA distribution schedules provided by States to FNS by examining the patterns in $95 issuances within the State, and made adjustments to the schedules when necessary.[13]

[11] Because P-EBT can be difficult to identify in some households in some months, such as when school-age children and those in childcare receive different amounts that we observe as one issuance, we chose to mark as unknown a single monthly issuance that both differed from and was higher than both the previous and next month's issuances. A higher benefit in one month would lead to a different spending pattern for the household.

[12] In Minnesota, we included the maximum food allotments available through the Minnesota Family Investment Program.

[13] While households can receive $95 as a standard issuance, most $95 benefits were EA issuances, given to each household that was within $95 of the maximum benefit amount.

In some States, EA benefits were issued in the calendar month following the one in which they received the matching standard benefit issuance. In other States, EA benefits were issued late in the calendar month. As a result, we often observed the corresponding EA issuance in the following month. To account for these cases, we created a flag to identify which calendar month a given EA benefit was associated with, as it did not always align with the month in which we observed the balance increase. In other instances, we observed standard and EA issuances that were combined.

In States in which the pattern of standard and EA issuances was challenging to identify using balance increase patterns alone, and for which we could assign the standard issuance date using the household account number, we first identified their expected standard issuance date, then their EA issuance date. This approach improved our ability to identify standard and EA issuances in those States.

In each State, we marked any observed balance increases that were not identified as P-EBT, standard, or EA benefit issuances as unknown issuances. Benefit months with unknown issuances were dropped from the analysis.

**Table F.4.** States grouped by observed standard and EA issuance patterns

| Category | Type | States |
|---|---|---|
| A | No EA issuance in FY 2022 (8 States) | Arkansas, Florida, Idaho, Missouri, Montana, Nebraska, North Dakota, South Dakota |
| B | State issued EA and standard benefit in a combined issuance[a] (11 States) | Arizona, District of Columbia, Indiana, Iowa, Kentucky, Maryland, New Jersey, South Carolina, Tennessee, Washington, Wyoming |
| C | State issued EA on the same day each month for all households (16 States) | Alabama, California, Delaware, Guam, Hawaii, Maine, Massachusetts, Mississippi, Nevada, Ohio, Rhode Island, Utah, Vermont, Virgin Islands, Virginia, Wisconsin |
| D | State issued EA on a schedule that varied by household (18 States) | Alaska, Colorado, Connecticut, Georgia, Illinois, Kansas, Louisiana, Michigan, Minnesota, New Hampshire, New Mexico, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, West Virginia |

[a] In the data, some households in these States received a split issuance, with each part issued on different days, typically within one to three days of each other.

*Assign or impute standard and EA issuance dates for each month.* After tagging each observed balance increase for a household as either a standard, P-EBT, EA, or unknown issuance, we then identified the standard and EA issuance dates for each household and month. For each State, we either assigned or imputed the standard and EA issuance date.

**Standard issuance dates**. For households in 15 States, the standard issuance date was straightforward to identify, either because all households received their benefit on the same day, or because the issuance date was determined by the household's SNAP case number, which was equivalent to the ALERT HHACCT in that State (Table F.2).[14]

[14] The standard issuance date could be assigned for households in an additional four States for the matched ALERT-QC exhaustion analysis file because the SNAP household case number was included in the QC identifier crosswalk.

For the remaining States, we inferred the standard issuance date using an imputation algorithm that followed the same general approach as taken in previous benefit redemption pattern studies. We tested the accuracy of the imputation by including all States in the imputation process; we compared imputed and assigned standard issuance dates in the 15 States for which we were able to assign dates.

To impute the standard issuance date, we first dropped any calendar months for a household in which the household was observed to receive two standard issuances, or in which the household received any unknown issuance.[15] We then imputed the issuance date using the "observed issuance day" associated with the flagged standard issuance in each month, defined as the day corresponding to the increase in the household's available balance relative to the prior transaction. For example, a household with a balance of $30 prior to making a $10 transaction would typically be observed with a $20 balance at the time of their next transaction. If, instead, the balance on the subsequent transaction record was more than $20 (say, $55), we would flag the date of that subsequent transaction as the "observed issuance day" with an issuance amount equal to the actual balance minus the expected balance ($35 in this example).

The observed issuance date is not necessarily the day that the household's standard benefit was deposited into their account. For example, if a household received its benefit on the first of the month but did not make a purchase until the sixth of the month, the observed issuance date would be the sixth of the month. Therefore, to ensure the greatest accuracy in determining a household's issuance date, we used 13 months of data to impute the issuance date as the earliest "observed issuance day" across all months of data for a household. This imputation considered only issuances that we flagged as standard issuances.

**EA issuance dates**. For households in 18 States, we were able to assign the EA issuance date for each household because the State issued EA on the same day for all households, though it could vary by month (16 States from Category C in Table F.4), or because the State published an EA issuance schedule covering the relevant months and those dates were determined based on the household's SNAP case number (2 States in Category D: Georgia and Illinois).

For the 11 States that issued standard and EA benefits as a combined issuance, we assigned the EA issuance date based on the assigned or imputed standard issuance date for a household (Category B in Table F.4). For the subset of household-month records in these States for which we observed EA and standard benefits issued on different days, we set the issuance date to be the assigned date of the first issuance type observed in that month and combined the benefit amounts across the EA and standard

[15] As done in prior studies, we did not include in the imputation process the first month in which we observed a household participating in SNAP. For these months, we cannot distinguish between an observed balance increase due to a true issuance and an observed balance increase due to the fact that we did not observe prior balances. In addition, households that enter SNAP partway through the month do not receive their full monthly benefit for that month, which would bias the imputation algorithm.

benefit issuance.[16] We included as day 1 redemption any transactions that were observed between the assigned standard issuance date and the observed EA issuance. [17]

For the remaining 16 States (from Category D in Table F.4), we developed algorithms to attempt to identify the EA issuance date for each household and month. We verified the accuracy of the algorithms by closely examining the transactions around the assigned issuance days. If we consistently saw that households redeemed benefits between the EA dates we assigned and the dates we observed the issuance, we first tried to slightly modify the algorithm, as described below. If that was not successful, we presumed the State did not issue benefits using a consistent schedule that we could use to assign an issuance date.

- *States with two to five possible issuance dates that are separated by several days.* Louisiana, Oregon, and West Virginia issued EA benefits over a few days each month, usually about a week apart (the patterns and dates documented in the State plans to FNS were confirmed or modified based on patterns of observed $95 issuances). In these States, we assigned the EA issuance date to be the latest date from each month's distribution list that preceded the observed EA issuance.
- *States issuing EA continuously over a range of dates.* In 6 States (Connecticut, Kansas, Michigan, Minnesota, New Hampshire, and North Carolina), EA was distributed each day over a range of dates, typically over a week or more. In these States, we developed an algorithm like the one used for imputing standard issuance dates. We identified the "observed issuance day" for each flagged EA issuance, then identified the number of days between the State's first EA issuance date and the household's observed EA issuance day for that month (the "observed distance"). We set the household's EA issuance date as the first date of the State's EA issuance in that month, plus the minimum of the observed distance across months. This approach presumes that States issued benefits to households in about the same order each month.
- *States issuing EA over a discrete list of dates with little separation between dates.* In New York and Pennsylvania, EA was distributed over a week or more, though the dates were not continuous, typically to avoid weekend or holiday distributions. For example, February benefits were distributed from the 15th to 19th and 23rd to 26th. Using an algorithm similar to those with a continuous range of dates, this algorithm identified the number of days in the list between the first issuance day and the observed issuance day (the "observed list location"). We set the EA issuance date at the minimum observed list location from each month's list (for example, the 3rd date in the list each month).

[16] In some months for some households, the EA issuance that we believe was issued within a few days of the standard issuance, was not observed until more than seven days after the standard issuance date because the household made no transactions in the first few days after the EA issuance. With no information to use to set the actual EA distribution date, and no verification that EA for this month was issued within a few days of the standard issuance, we assigned the observed EA issuance date as the household's EA date and treated the benefit period as if the benefits were issued separately, as discussed in the next section. This was true for households in AZ (14 percent), KY (42 percent), SC (13 percent), WA (27 percent), and WY (21 percent).

[17] Using the observed EA issuance date adds a bias to our findings, guaranteeing we see the household redeeming benefits on the first day after issuance. We did not find a consistent number of days between these issuances, and State documentation does not provide additional information to help us assign a date. We also did not find these split issuances occurring more often in some months than in others. We chose to accept the small bias by using the observed date rather than guess or otherwise assign the EA distribution date.

- *States with no identifiable pattern in their monthly EA distribution.* For Alaska, Colorado, New Mexico, Oklahoma, and Texas, our attempts to identify a pattern in the EA distributions were not successful. In these States, we set day 1 for the EA issuance each month to be the date it was observed. See the box below for more discussion.

After using these algorithms to identify the EA issuance date, we still found some households in some months with redemptions between our identified EA date and the observed EA issuance, which implies that the EA was issued later than our assigned date. When these cases were limited to under 10 percent of months for a State, we accepted the algorithm as working in general, but adjusted the EA issuance dates in those households and months to be the day after the last observed transaction that occurred before the observed EA issuance, correcting the error. (If the State had more than 10 percent of months with this error, they were included in the last category where the issuance was assigned to be the observed date.)

### Redefining day 1 and the resulting bias

As will be seen throughout this discussion, our definition of day 1 redemption varied based on the EA distribution schedules for the whole State (or for households within some States). Some States described their EA issuances as occurring with their standard benefit, but the EA benefits were, at times, issued a few days later. We chose to capture all issuances and redemption over those days as day 1. In addition, some households in other States had distributions that were so close together that we treated them as one issuance. In other cases, States had enough variation in their EA distribution schedules that we could not accurately identify an EA date for each month for each household, and we assigned day 1 to be the day we observed the issuance. In each case, the approach created a bias in the measures of day 1 redemption, by either extending the definition of day 1 to be multiple days or defining day 1 to be their first redemption of the month (rather than the day they received the issuance). Instead of trying to draw conclusions from apparent differences across States for day 1 redemption, which was possible in previous studies, we removed the day 1 column from these tables (see Appendix A, Tables A.16 and B.16, for example) and focused instead on redemption by day 7, day 14, day 21, and the end of the month.◢

### *c. Additional State-specific processing*

We identified patterns of issuances in five States that did not always align with typical patterns, as described below.

- *Supplements*. Three States (Maine, New Hampshire, and Oregon) issued additional benefit supplements to households that meet certain work requirements in the benefit month. These supplements varied in size across States: New Hampshire and Oregon issued $10 supplements, while Maine issued $100 supplements. It is likely households anticipate these supplements because they are either identified as eligible for them (subject to meeting the work requirement) at their certification or recertification appointment, or the supplement is automatically processed and distributed based on the household's reported work hours. Because households expect this benefit supplement, it likely affects their spending patterns. For this reason, we retained household-month observations that included these supplements.
- *Lump-sum EA issuances in Alaska*. In Alaska, standard benefits are issued on the 1st of the month for each household. For EA, we observed a large share of households that did not receive their EA benefit monthly as expected. Instead, we observed multiple months of standard issuances, followed by a large, lump-sum EA issuance covering the prior months. For the households that did not have the expected pattern of standard and EA issuances (either as two separate issuances or one combined issuance) in most months, accurately imputing the EA issuance date was not feasible.

Keeping in mind that the purpose of this report is to identify *patterns* of benefit redemption, we focused our analysis on each household's months for which we might expect there to be a pattern to their redemption. We retained for the analysis the months that met one of the following sets of conditions:

  - When a household received the expected standard and EA issuance (either separate or combined) for at least 75 percent of the months they were present in the data, we retained the months with both issuances. In these cases, we set the EA issuance date to be the observed EA issuance. Remaining months were dropped.
  - When households received apparent lump sum payments (payments of at least $190, representing the minimum amount for multiple months of EA benefits) as either a second issuance in a month or in combination with a standard issuance, we dropped the month of the lump sum payment and the two following months. This presumes that the household will redeem benefits differently for a month or two after receiving an additional benefit in one month.

- *Early issuance in Florida and Maryland*. We removed October 2021 from the analysis in Maryland and September 2022 from the analysis in Florida, both due to atypical issuance patterns in that month. FNS issued a waiver to Maryland to issue EA early for many households in October 2021, resulting in an EA distribution pattern that did not align with other months in the fiscal year.[18] FNS also issued a waiver to allow Florida to issue September 2022 SNAP benefits early due to Hurricane Idalia;[19] households therefore received multiple issuances in September on a schedule that did not align with the typical issuance schedule.

### *d. Defining the issuance period for each household*

In contrast to years in which SNAP participants received only their standard benefit each month, our approach to the exhaustion analysis in FY 2022 needed to be adjusted to account for the fact that many households received multiple issuances each month. For this reason, rather than focusing the exhaustion analysis on a benefit month (defined in prior studies as the month starting with the assigned or imputed standard issuance day), we instead analyzed the exhaustion of benefits over an issuance *period*.

The issuance period was defined for each household as the period of time between two issuances. For example, for a household that received their standard benefit on the first of the month and their EA benefit on the 15th of the month, the exhaustion analysis focused on redemption over the issuance period between the 1st and the 15th. Their next issuance period would be defined as the period between the 15th of the month and the 1st of the following month. For households in States with no EA, or in States in which EA and standard benefits are issued in one combined benefit, the issuance period is still one month long.

This approach means that some households were included in the exhaustion analysis multiple times per calendar month, and that the issuance periods varied both across and within households over time. Appendix B, Table B.31 presents the distribution of households by the average number of days between benefit issuances. Focusing on an issuance period as the unit of analysis introduces new considerations for the benefit exhaustion analysis, as described below.

[18] https://news.dhs.maryland.gov/reports/that/maryland-secures-federal-approval-issue-snap-emergency-allotments-october/

[19] https://www.fns.usda.gov/disaster/florida-disaster-nutrition-assistance

**Combining short issuance periods**. Given the possible variation in standard and EA issuance amounts and schedules, some households, in at least some months, received their larger issuance just a few days before their smaller issuance, and other households received their smaller issuance a few days before their larger issuance. For example, a one-person household could receive its $20 minimum standard benefit on the first day of the calendar month and its $230 EA benefit on the third day of the calendar month, and another one-person household in the same State could receive their $230 EA benefit on the third day of the calendar month and their $20 minimum standard benefit on the fifth day of the calendar month. Because the households knew approximately when these benefits would be available to redeem, they may have decided to wait until both issuances were available to redeem benefits. Instead of observing the redemption of the first benefit (whether large or small) for just two days before beginning a new issuance period, we chose to capture both situations (and other similar variations) with one issuance period. We combined these short periods (three days or fewer) into one issuance period, combining the issuance amounts into one total benefit and counting all redemption that occurred in the days between the two issuances as occurring on day 1. Redemption on the day after the latter issuance was defined based on the number of days combined: if the issuances were one day apart, day 1 consisted of the day of issuance and the day after, and redemption on the next day would be defined as occurring on Day 3; if the issuances were two days apart, redemption on the day after the second issuance would be on Day 4, and so on. The issuance period in this case would typically be about one month, ending the day before the next issuance.

**Possibility of three issuance periods.** In Maine, with the $100 supplement issued on a day separate from both the standard and EA benefit, we often saw three separate issuance periods. In some months the $100 supplement was issued within three days of the EA issuance. In those months, for all households, we combined these two issuance periods into one, and the standard issuance date was the beginning of a second issuance period. In other months, for some, but not all, households, the supplement was issued within three days of their standard issuance, and in those months and for those households, we combined the supplement and standard issuance into one issuance period, with the EA issuance date starting its own issuance period. For all other months and/or households, we developed three issuance periods.[20]

For some households, Oklahoma issued the $95 minimum EA amounts on separate dates: the first was the portion of the $95 that the household received to reach the maximum benefit for its household size, and the second was the additional amount needed for the household to reach the $95 EA minimum. If these issuances were within 3 days of each other, they were combined into one issuance period; otherwise, they were treated as separate periods and could lead the household to have three issuance periods.

**Exhaustion tables with spending by day.** Because some households have issuance periods as short as four to six days in length, we opted to retain these short issuance periods in the day 7 column, leading to the following period lengths in the universe of each of the exhaustion analysis columns:

- Day 7 redemption: Redemption periods of all lengths
- Day 14 redemptions: Periods that are at least 14 days

[20] We did not make similar adjustments to periods in Oregon and New Hampshire because the benefit issuances were $10 each and were not as likely to lead to a substantial change in redemption patterns.

- Day 21 redemptions: Periods that are at least 21 days
- End of month: Periods that are at least 28 days

**Exhaustion of monthly issuances versus EBT balances.** Analyses of benefit exhaustion in previous studies have focused on the percentage of the household's monthly benefit that was redeemed each month. In all tables, we adjusted that measure for this study to focus on issuance periods instead of months, examining how quickly the most recent issuance was exhausted. However, with the addition of P-EBT and EA issuances, most households received more in benefits than they would have prior to the pandemic. They also may have received those benefits in uneven amounts with varying lengths of time before their next issuance. For example, a two-person household qualifying for the $20 minimum benefit might receive their $439 EA benefit on Day 2 and their $20 standard benefit on Day 7. Our analysis of the percentage redeemed of the previous benefit amount issued will analyze how quickly they redeemed $439 over 5 days and $20 over 25 days. Most likely they will be coded as redeeming less than 100 percent of the $439 and more than 100 percent of the $20. As an alternative measure, we included a new set of exhaustion analysis tables (Appendix C) that analyzed how quickly the household exhausted their available balance, which includes the accumulated unspent benefit from previous months.

*e. Inactive households*

We use the exhaustion analysis file to identify inactive households. These are households that had no purchase transactions in a month in which they received an issuance, as opposed to a household that stops receiving a benefit for several months and then returns to the program. The analysis includes only households that are in the data with an issuance long enough to be observed as having a gap in participation, so for at least three months. We identified as being inactive households that had (1) a month or more of no transactions reported in the data and (2) an issuance in the month they returned that was at least 60 percent more than either the last observed issuance or the issuance in the subsequent month. The latter indicates the observed benefit in the returning month is big enough to have been the current month's issuance plus the missing month's issuance. We identified households as being inactive for multiple consecutive months if the first observed issuance following the months with no transactions is an exact multiple of the number of missing months times the observed benefit before or after the absence. For example, if we observed a household in January with a $100 issuance, observed no transactions in February and March, then observed a $300 issuance in April, we would identify this as a household that received $100 in February, March, and April but was inactive in February and March.

**3. Matched ALERT-QC data analysis files for Appendix A, Tables A.1 to A.27**

To study benefit redemption patterns by household characteristics, we linked the ALERT analysis files to the edited SNAP QC data. We used the matched ALERT-QC analysis file to analyze redemption activity over the three-month period centered on the SNAP QC sample month (the month in which the QC data measured the characteristics for a given household). Therefore, the transaction data in these files were at most one month removed from the SNAP QC review. The matched file included 37,178 households.

We used these files to calculate descriptive statistics of monthly transactions by household characteristics, including household composition, race, employment status, Temporary Assistance for Needy Families receipt, and SNAP benefit amounts. These files also enabled us to describe the characteristics of households with varying online benefit redemption patterns.

We used the same methods to clean the ALERT-QC matched files as we did for the ALERT calendar month and benefit exhaustion files, with one exception. For the ALERT-QC benefit exhaustion file, we were able to assign the standard issuance date to households in an additional four States and New York City because the case number included in the QC data aligned with the SNAP case number used for issuance date assignment.

We augmented the geographic information on the ALERT-QC matched files using the U.S. Department of Agriculture Economic Research Service definitions of metropolitan, micropolitan, and noncore statistical areas. A metropolitan statistical area has at least one urbanized area with a population of 50,000 or more and includes adjacent territory with a high degree of social and economic integration with the core, as measured by commuting ties. A micropolitan statistical area has at least 1 urban cluster of at least 10,000 but less than 50,000 in population and includes adjacent territory with a high degree of social and economic integration with the core, as measured by commuting ties. All other areas are noncore statistical areas.

Again, using information from the Economic Research Service, the team added identifiers of persistent poverty. A county was classified as experiencing persistent poverty if 20 percent or more of its residents had a household income at or below the federal poverty threshold over four 10-year measurement periods using the 1980, 1990, and 2000 decennial censuses and the American Community Survey 5-year estimates for 2007–2011, 2015-19, and 2017-21.

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