



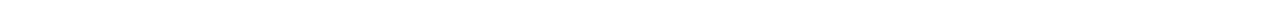
United States Department of Agriculture

The Extent of Trafficking in the Supplemental Nutrition Assistance Program: 2015–2017

Nutrition Assistance Program Report
Food and Nutrition Service
Office of Policy Support

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September 2021

The Extent of Trafficking in the Supplemental Nutrition Assistance Program: 2015–2017

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Table of Contents

EXECUTIVE SUMMARY	iii
Approach.....	iii
Trafficking in 2015–2017	iv
Trends Over Time	iv
1. INTRODUCTION.....	1
1.1. Background and Purpose	1
1.2. Approach.....	2
1.3. Report Overview	3
2. METHODS	4
2.1. General Approach	4
2.2. Limitations	5
2.3. Consistent Methods With Improved Data.....	6
2.4. Estimates	6
3. SNAP TRAFFICKING IN 2015–2017	8
3.1. National Estimates	8
3.2. Trafficking by Store Type.....	8
3.3. Trafficking by Store Ownership	11
3.4. Trafficking and Poverty Level of Store Location	12
3.5. Trafficking and Population Density of Store Location.....	14
4. TRAFFICKING TRENDS.....	17
4.1. Trends in Benefits Trafficked	17
4.2. Store Violations	19
4.3. Explaining the Change in Trafficking.....	19
4.3.1. Effects of Store Composition.....	20
4.3.2. Other Factors.....	22

APPENDICES

- A. Estimation Error
- B. Approaches for Detecting Trafficking, Data Sources, and Creation of Analysis Files
- C. Post-Stratification Estimation Methodology
- D. Variables Employed in the Raking Model
- E. Estimate Definition
- F. Statistics on Investigations and Administrative Actions
- G. Statistics on Comparisons between Retailers in the Investigative Sample and in the Population of Retailers
- H. Estimate Intervals
- I. Sensitivity of Estimates to Violation Definitions

EXECUTIVE SUMMARY

This is the eighth in a series of periodic analyses to estimate the extent of trafficking in the Supplemental Nutrition Assistance Program (SNAP). The most common type of trafficking occurs when SNAP recipients sell their benefits for cash at a discount to food retailers. Although trafficking does not represent a cost to the Federal Government, it is a diversion of program benefits from their intended use. Benefits are intended to help low-income households access a nutritious diet, and trafficking impedes the program's mission and undermines its integrity. This trafficking update provides an important overview of SNAP integrity from 2015 through 2017.

APPROACH

As with previous analyses, current trafficking estimates are based on two types of FNS investigations: those occurring covertly in stores and those based on SNAP Electronic Benefit Transfer (EBT) administrative (i.e., SNAP transaction) records. Both types of investigations focus on retailers that exhibit suspicious behavior; and thus are not representative of the retailer population. National estimates of trafficking calculated simply by using these sources, therefore, would be higher than in the retailer population as a whole. In order to correct for at least some of this bias, this and prior reports utilize methods that adjust the trafficking outcomes from investigation activity to more accurately reflect the population of SNAP authorized retailers and their level of redemptions.

For this report a second set of estimates, the updated current estimates, was developed using a new definition of trafficking more consistent with how FNS defines trafficking, for example in its Fiscal Year End Summaries. The current definition of trafficking is more liberal than the updated current definition. As an example, the current estimates definition marks a retailer as a trafficker if they were permanently disqualified from the program for any reason. Under the updated current definition, the permanently disqualified retailer must have been disqualified for the explicit reason of trafficking. Additionally, the current definition of trafficking flags retailers who may have been exonerated after December 31, 2017, the end of the study period. The updated current definition retrospectively removes such retailers from the set of identified traffickers, thus correcting for false positives.

The report contains trafficking estimates generated from data on investigations conducted by FNS and by the U.S. Department of Agriculture's Office of the Inspector General, and State law enforcement agencies. These estimates also incorporate a broader population of stores with suspect redemption patterns that have been identified through the Agency's fraud detection system, the Anti-fraud Locator using EBT Retailer Transactions (ALERT) system.

The following indicators were estimated under both the current and updated current definitions of trafficking:

- Total value of SNAP redemptions that were trafficked;
- Trafficking rate, or the proportion of SNAP redemptions that were trafficked; and
- Store violation rate, or the proportion of authorized stores that engaged in trafficking.¹

TRAFFICKING IN 2015–2017

Based on the best data available for 2015–2017, estimates indicate the following :

- Under the current definition, trafficking diverted an estimated \$1.3 billion annually from SNAP benefits. Under the updated current definition, an estimated \$1.0 billion was diverted annually.
- Overall, approximately 2.0 percent of total SNAP benefits were trafficked using the current definition, and 1.6 percent under the updated current definition.
- Approximately 14.3 percent of all authorized SNAP stores engaged in trafficking under the current definition and 12.7 percent using the updated current definition.

There is statistical uncertainty around these estimates. For more information, please refer to the tables in the report and a further discussion of Simulated Limited of Estimation in Appendix H and Sensitivity Analyses in Appendix I.

A variety of store characteristics and settings were associated with the level of trafficking. Small stores—largely composed of smaller and medium sized groceries, and convenience stores—accounted for about 15 percent of all redemptions but were estimated to account for just over 95 percent of all trafficking redemptions (99 percent under the updated current definition).² Only about a tenth of a percent of SNAP redemptions at publicly owned stores were trafficked using the current definition of trafficking. Using the updated current definition, no SNAP redemptions were trafficked at publicly owned stores. Trafficking was much more likely among retailers located in higher poverty neighborhoods than those in areas with less poverty. Trafficking rates are also highest in the most urbanized areas.

TRENDS OVER TIME

Exhibits E-1 through E-3 provide the most up-to-date estimates for each study period. Since the first trafficking estimate was generated in 1993, the amount trafficked declined from \$811 million annually to a low of \$241 million annually in the 2002-2005 period (Exhibit E-1). Since then, however, the amount has risen—mostly due to the overall rate of growth in SNAP redemptions.³

¹ The study focuses only on active stores, i.e., stores that redeemed SNAP benefits at some point between 2015 and 2017. It should be noted that because the estimates restrict themselves to calendar years 2015 through 2017, it is possible that under the current estimates a retailer determined to be a trafficker for the purposes of this report could later be exonerated. This is not the case under the revised current estimates.

² It should also be noted that the trafficking estimate for supermarkets is highly volatile, reflecting their low presence among retailers who are investigated or sent charge letters, issues with detecting trafficking in these large, complexly organized stores, and the large share of redemptions accounted for by these stores. It is feasible that the amount of trafficking accounted for, given the methodology, can change dramatically from one study period to the next.

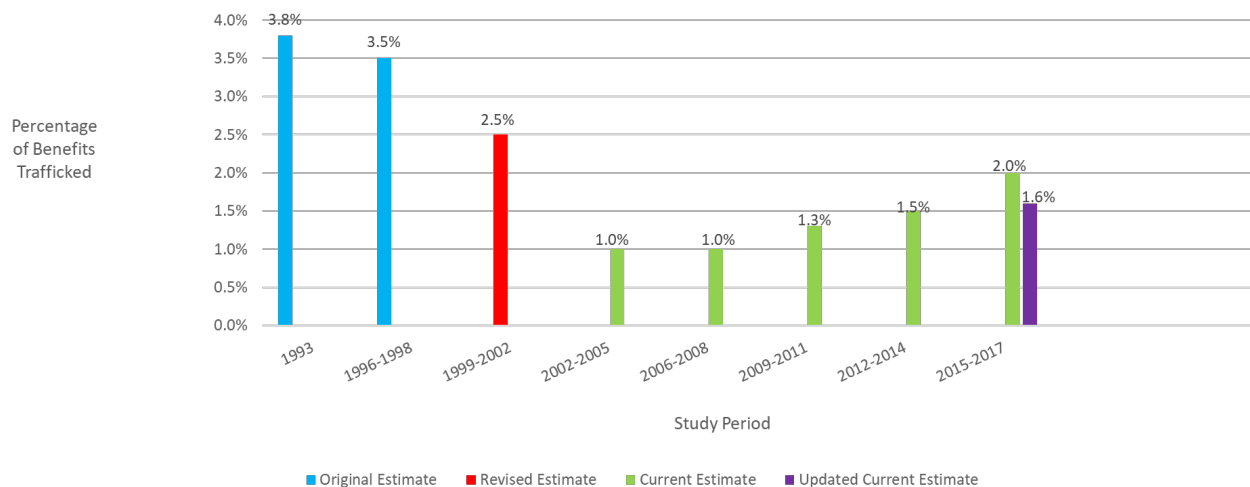
³ Estimates reported for the periods since and including 2002-2005 are based on what is known as the “current estimate.” Estimates earlier than those reported for 2002–2005 are based on similar but less comprehensive definitions of the investigative sample and trafficking. In previous studies in 1993 and 1996–1998, the estimates were referred

Although the value of benefits trafficked has increased substantially over time, the rate of trafficking has remained low (see Exhibit E-2). The rate of store violations has somewhat increased over time, from 11.8 percent in the last study period to 14.3 percent in the current study period (12.7 percent under the updated current definition. See Exhibit E-3).

Exhibit E-1: Annualized Dollar Amount of Trafficking, by Study Period

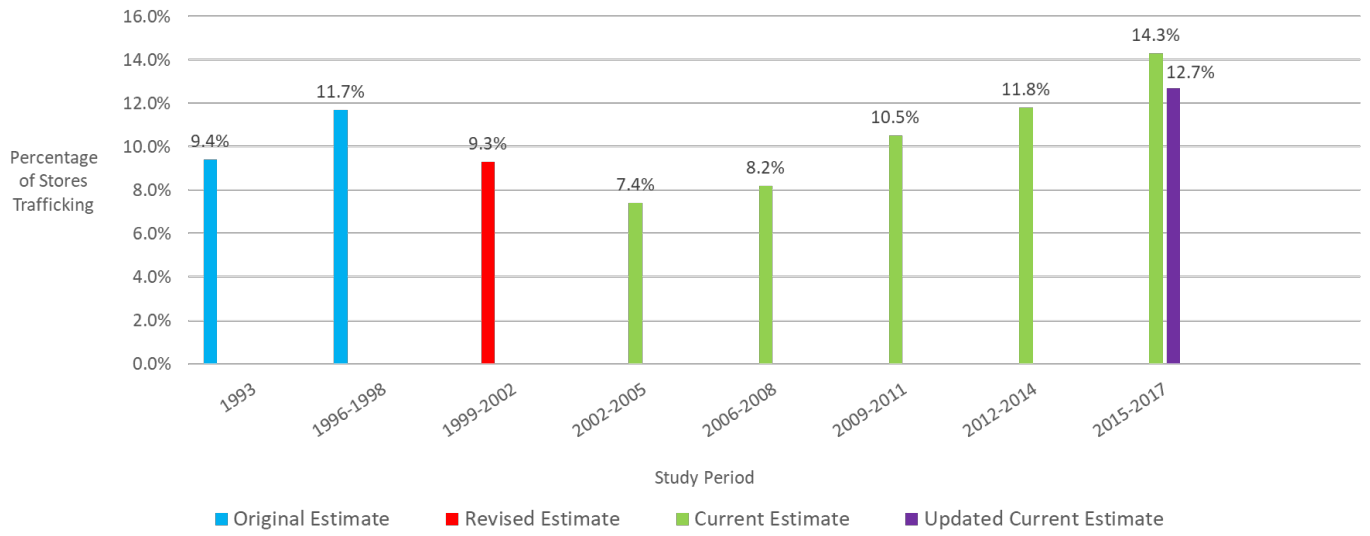


Exhibit E-2: Rate of Trafficking, by Study Period



to as the “original” estimates, and the estimates in the 1999–2002 study were referred to as the “revised” estimates. We now include “updated current estimates based on a definition of trafficking more consistent with how FNS operationalizes it. Details on estimate definitions are provided in Appendix E.

Exhibit E-3: Rate of Store Violations, by Study Period



1. INTRODUCTION

1.1. BACKGROUND AND PURPOSE

The United States Department of Agriculture (USDA) Food and Nutrition Service (FNS) administers the Supplemental Nutrition Assistance Program (SNAP), which in fiscal year 2018 issued slightly more than \$60 billion in benefits to almost 40.3 million low-income participants to help them obtain a nutritious diet.¹

SNAP benefits can be redeemed for the purchase of eligible food items from authorized food retailers. The sale or exchange of SNAP benefits for anything other than food sold by an authorized SNAP retailer is illegal. Trafficking is defined in the regulations (CFR Title 7, Subtitle B, Chapter II, Subchapter C, Part 271, §271.2)² by six categories of activities, most of which involve retailer participation (and, hence, retailer trafficking):

- (1) The buying, selling, stealing, or otherwise effecting an exchange of SNAP benefits issued and accessed via Electronic Benefit Transfer (EBT) cards, card numbers and personal identification numbers (PINs), or by manual voucher and signature³, for cash or consideration other than eligible food, either directly, indirectly, in complicity or collusion with others, or acting alone;
- (2) The exchange of firearms, ammunition, explosives, or controlled substances, as defined in section 802 of title 21, United States Code, for SNAP benefits;
- (3) Purchasing a product with SNAP benefits that has a container requiring a return deposit with the intent of obtaining cash by discarding the product and returning the container for the deposit amount, intentionally discarding the product, and intentionally returning the container for the deposit amount;
- (4) Purchasing a product with SNAP benefits with the intent of obtaining cash or consideration other than eligible food by reselling the product, and subsequently intentionally reselling the product purchased with SNAP benefits in exchange for cash or consideration other than eligible food; or
- (5) Intentionally purchasing products originally purchased with SNAP benefits in exchange for cash or consideration other than eligible food.
- (6) Attempting to buy, sell, steal, or otherwise affect an exchange of SNAP benefits issued and accessed via Electronic Benefit Transfer (EBT) cards, card numbers and personal identification numbers (PINs), or by manual voucher and signatures, for cash or consideration other than eligible food, either directly, indirectly, in complicity or collusion with others, or acting alone.

¹ Source: <https://www.fns.usda.gov/pd/overview>.

² Source: <http://www.ecfr.gov/cgi-bin/text-idx?SID=68173889b0a9e4a8d281c8b0f9797f68&mc=true&node=pt7.4.271>

³ Under the terms of the Agricultural Act of 2014, manual vouchers will be phased out.

Food retailers authorized by FNS are the primary agents that can redeem SNAP benefits with the Federal Government (meal service programs, authorized by FNS, that serve specific disadvantaged populations can also redeem SNAP benefits), and therefore are the primary loci of trafficking. FNS is responsible for authorizing and managing retailer participation. As part of this responsibility, FNS employs monitoring and investigations staff to identify and curb benefit trafficking. These efforts include covert investigations as well as ongoing review of SNAP benefit redemption or transaction data. Investigations are also initiated by the U.S. Department of Agriculture's Office of the Inspector General (OIG), and a limited number of State law enforcement bureaus authorized to assist FNS with store investigations. Although these activities can provide a general sense of trafficking patterns, they do not provide an accurate estimate of benefits diverted through trafficking since they focus on retailers identified as potential traffickers. To remedy this, FNS has funded studies to statistically adjust the information provided by these administrative actions to provide more accurate estimates.

This report is the eighth in a series of periodic reports⁴ that provide updated estimates of the following:

- Total value of SNAP redemptions that were trafficked;
- Trafficking rate, or the proportion of SNAP redemptions that were trafficked; and
- Store violation rate, or the proportion of authorized stores that engaged in trafficking.

The estimates reflect redemption activity beginning on January 1, 2015 and ending on December 31, 2017.

1.2. APPROACH

Since the initial study was completed in 1993, FNS trafficking estimates have been generated from a systematic analysis of the best available data on redemption monitoring (EBT redemption pattern analysis) and investigations of authorized retailers. This systematic analysis recognized that a somewhat biased perspective on SNAP trafficking would result from using investigative and administrative EBT data sources without adjustment. Because this bias is based on stores that have exhibited suspicious behavior, it likely overestimates the extent of trafficking. In contrast, even with statistical adjustment, investigations and monitoring activities cannot catch all instances of trafficking, thereby introducing some downward bias in the estimates. On

⁴ Previous estimates are reported in Macaluso, T. 1995. *The Extent of Trafficking in the Food Stamp Program*; Macaluso, T. 2000. *The Extent of Trafficking in the Food Stamp Program: An Update*; Macaluso, T. 2003. *The Extent of Trafficking in the Food Stamp Program: 1999–2002*; Mantovani, R. E., and C. Olander. 2006. *The Extent of Trafficking in the Food Stamp Program: 2002–2005*; and Mantovani, R. E., and H. Wilson. 2011. *The Extent of Trafficking in the Supplemental Nutrition Assistance Program: 2006–2008*; Mantovani, Richard, Eric Sean Williams, and Jacqueline Pflieger. *The Extent of Trafficking in the Supplemental Nutrition Assistance Program: 2009–2011*; Willey, Joseph, Nicole Fettig, and Malcolm Hale. *The Extent of Trafficking in the Supplemental Nutrition Assistance Program: 2012–2014*. These reports are available from the FNS research and analysis page: <https://www.fns.usda.gov/research-analysis>.

balance, the analysis and approach adopted err on the side of overestimation. (See Appendix A for a discussion of sources of underestimation and overestimation.)

1.3. REPORT OVERVIEW

The remainder of this report is organized with three substantive chapters. Chapter 2 provides an overview of the procedures used to estimate trafficking, along with descriptions of their key limitations and strengths. Chapter 3 provides best estimates of trafficking indicators for calendar years 2015–2017. With the nationwide implementation of Electronic Benefit Transfer (EBT), the sources of information used to identify and record trafficking expanded, and trafficking estimates, beginning with the 2002–2005 estimates, made use of these additional sources of data. This chapter also presents the results of some subgroup analyses comparing types of stores and store locations. Finally, Chapter 4 examines trafficking trends over time.

2. METHODS

2.1. GENERAL APPROACH

The estimates presented in this report were generated using the same strategy as in the previous seven studies and applied the strategy to generate an estimation measure (current estimate) used in the last three studies. This report presents a second set of estimates, “updated current estimates”, developed using a new definition of trafficking that is consistent with how FNS defines trafficking. Both the current and the updated current estimates are presented for reporting purposes. Both are based on identifying trafficking retailers from among those retailers that were investigated and from among those retailers subject to additional monitoring. This investigative sample and the trafficking outcomes were then translated into the number of violating stores and the dollar amount of trafficked redemptions in the retailer population as a whole. Under the updated current estimates the definition of a trafficking outcome is somewhat more restrictive. A permanently disqualified retailer is not considered a trafficker unless the reason given for their disqualification is explicitly described as trafficking.

The investigative sample was generated from two sources:

- **Investigations**—These cases are based on covert activities pursued by FNS, the USDA OIG, the States, and other entities. Investigations target stores with suspicious behavior and identify stores in this group that manifest trafficking behavior.
- **EBT data-based cases**—These cases include stores considered to be suspicious as a result of screening EBT transaction records. Such cases are resolved through an administrative process in which specific transactions are identified as being in violation (indicative of trafficking).

This information was used to define a trafficking rate. (See Appendix B for more details on these sources and Appendix F for statistics on the investigations and EBT data-based cases.) The denominator of the rate consists of all stores that were investigated or were identified as potential traffickers through administrative review of EBT redemption patterns, and the numerator includes stores that trafficked with an investigator or had been permanently disqualified based on an administrative (EBT) case.⁵ As mentioned earlier, this rate overestimates trafficking in that it is based on stores that have exhibited suspicious behavior. To partially correct for this bias, we used a post-stratification raking approach to adjust the sample estimates to better represent the retailer population as a whole. The raking approach provides weights based on store characteristics that project the sample value to a population value. For example, if proportionately fewer supermarkets are in the sample than in the population, the supermarkets in the sample have larger weights than other stores. Because supermarkets have traditionally demonstrated a proportionately lower rate of trafficking in the sample, this lower rate would be translated to the population.

⁵ Trafficking is defined as buying or selling benefits for cash or consideration other than eligible food, and the penalty is permanent disqualification. Permanent disqualification occurs when a retailer’s authorization to redeem SNAP benefits is revoked. Some stores (those that can prove that they had a robust, documented compliance training program in place prior to the violations and that the store owners did not benefit from the violations) may pay compensation in lieu of permanent disqualification. These stores are treated as permanently disqualified for the purposes of this study.

The post-stratification raking procedure weights sample stores to the population based on strata formed by variables that distinguish among stores that are under investigation or that have had an administrative (EBT) case opened. (See Appendix C for a description of the raking process.)

For this and previous analyses, the following variables were used (see Appendix D for information on how these dimensions were defined):

- Store size and type (e.g., supermarket, grocery, convenience store),
- Ownership (private or public),
- Poverty level of the store's neighborhood,
- Urbanization level of the store's neighborhood, and
- SNAP redemption level.

The calculated weights were applied to information for each retailer in the sample to estimate the overall number of stores that trafficked and the total amount of trafficked redemptions in the population. Redemptions were further adjusted to account for legitimate SNAP sales that occur in trafficking stores.⁶ The store violation rate and trafficking rate estimates were calculated as the percentage of all SNAP stores that trafficked and the proportion of all benefits that were trafficked, respectively. Estimates were calculated for various subgroups of stores (i.e., type of ownership, poverty level, and degree of urbanization).

2.2. LIMITATIONS

There are three key limitations associated with our approach. First, although post-stratification may reduce potential bias, it cannot eliminate it. Estimates of trafficking are based on the activities of *suspicious* retailers, and these estimates are extrapolated to the population. Estimates based on a sample of suspected retailers are likely to overstate the population value of trafficking. However, the post-stratification process works only as well as the variables used in the process. The variables used for determining strata were identified as related to trafficking in the 1993 study (based on FNS investigations) and have been carried forth in subsequent studies for consistency.

A second, related limitation concerns the definition of the strata within each of the variables that are used in the raking process. In particular, the variables are defined by simple or ordered categories. These categories are critical to creating the strata used to calculate adjusted weights. For example, four levels of poverty were used to define the location of a store. The estimates might be different if poverty levels were characterized differently.⁷

⁶ Among stores that trafficked, 60 percent of all redemptions in large stores and 10 percent of all redemptions in small stores were assumed to have been legitimate sales. This is a potential source of overestimation if a larger portion of the redemptions represents legitimate transactions. However, it is consistent with the aim of creating estimates that are unlikely to underestimate trafficking.

⁷ The variables and cut points were determined by an analysis performed as part of the 1993 estimates. As part of the sensitivity analyses for the 2002–2005 report, the effect of varying the cut points was examined. The cut points are

Third, the adjustment to account for legitimate redemptions in trafficking stores was set purposefully low to minimize the risk of underestimating the prevalence of trafficking. There is no empirical evidence that retailers that were caught trafficking or were permanently disqualified from the program trafficked at the rate that the adjustment would suggest.⁸

2.3. CONSISTENT METHODS WITH IMPROVED DATA

In order to remain consistent with previous analyses, this study is based on data sources that allow us to represent a broader range of FNS trafficking-related activities. In addition to FNS investigations and EBT data-based cases, this study includes investigations conducted by OIG, the States, and other entities.

2.4. ESTIMATES

This report presents a measure of trafficking consistent with the last three reports and which represents the most comprehensive measure in terms of utilizing all relevant data sources. In previous reports, this measure of trafficking was referred to as the current estimate.⁹ Additionally, this report presents an updated current estimate of trafficking which uses a definition of trafficking that is used by FNS in reports like the Fiscal End of Year Summaries.

In addition to in-field investigations conducted by FNS and charge letters to retailers issued by FNS based on EBT analysis, the estimate includes closed cases on the Watch List (a prioritized list of suspicious stores identified by the Anti-fraud Locator using EBT Retailer Transactions (ALERT) system)¹⁰ and retailers investigated by OIG, the States, and other entities. Under the current definition of trafficking, the numerator includes investigated retailers with a trafficking flag,¹¹ retailers permanently disqualified from the program or that paid a civil money penalty in lieu of permanent disqualification, and retailers found to be trafficking through investigations by OIG and the States. Retailers that were permanently disqualified or paid a civil money penalty in lieu of permanent disqualification are designated by FNS after official review as being indicative of those most often found to be trafficking and thus, they are included in the numerator. For the updated current estimate, retailers that were permanently disqualified or paid a civil money penalty in lieu of permanent disqualification were considered to be trafficking only

the particular categories that are created within the variables. For instance, that study denoted the cut-point for very highly urbanized areas as 90 percent. Alternatively, it could have specified 95 percent. In the sensitivity analyses, it showed that varying the cut points, as long as they were not drastically different, did not have a significant impact on estimates (see the 2002–2005 report for details).

⁸The extent to which specific retailers traffic is unknown. Some retailers may traffic on all their SNAP transactions, whereas others will not traffic at all. The trafficking estimates presented in this report assume that if a small store is identified as trafficking, 90 percent of their SNAP redemptions are trafficked, and for large stores that are identified as trafficking, this percentage is 40 percent.

⁹ See Appendix E for definition.

¹⁰ The addition of closed Watch List case retailers broadens the definition of the denominator to any store that has been reviewed as a result of suspicious SNAP transaction patterns. Closed cases include stores for which the suspicious redemption patterns are explained as legitimate or result in disqualification or withdrawal.

¹¹ When an in-store investigation is conducted and trafficking occurs, these instances are noted in the Store Tracking and Retailer System (STARS) by a flag.

if the reason explicitly given for the disqualification is trafficking and that determination was upheld on appeal or judicial review (when appropriate).

The following indicators were estimated under both the current and updated current definitions of trafficking:

- Total dollar amount of SNAP redemptions that are trafficked;
- Trafficking rate, or the proportion of SNAP redemptions that are trafficked; and
- Store violation rate, or the proportion of authorized stores that engaged in trafficking.

3. SNAP TRAFFICKING IN 2015–2017

3.1. NATIONAL ESTIMATES

This report presents current and updated current trafficking estimates for the calendar years between 2015 and 2017 and found the following:

- Under the current estimation definition, \$1.271 billion in SNAP benefits annually were trafficked and thereby diverted from their intended purpose. Using the updated current estimation definition, \$1.021 billion were diverted.
- Under the current estimation definition, about 2.0 percent of total SNAP benefits were trafficked. Using the updated current estimation definition, about 1.6 percent of total SNAP benefits were trafficked.
- Under the current estimation definition, approximately 14.3 percent of all authorized SNAP stores engaged in trafficking. Using the updated current estimation definition, about 12.7 percent of all authorized SNAP stores engaged in trafficking.

These figures are in the context of a program in which retailers redeemed an average of just over \$65 billion annually in benefits per year between 2015 and 2017. It should be noted that the figures reported in the study period 2012–2014 for the proportion of benefits trafficked and the proportion of SNAP retailers trafficking were about 1.5 percent and 11.8 percent, respectively, using the current estimation formula.

3.2. TRAFFICKING BY STORE TYPE

Since the 1993 report on SNAP trafficking, store type has always been a critical variable for determining the potential for trafficking.¹² As observed in previous studies, small stores, particularly small groceries and convenience stores, were notably more likely to be involved in trafficking than other stores. Using the current estimation formulation, about 25 percent of those stores classified as small groceries and 21 percent of those classified as convenience stores were estimated to have trafficked (Exhibit 1). Using the updated current formulation, about 25 percent of small groceries and 17 percent of convenience stores were estimated to have trafficked. For larger stores (supermarkets and large groceries) under the current estimation formulation, only 0.31 percent were estimated to have trafficked. Using the updated current formulation, 0.15 percent were estimated to have trafficked (Exhibit 1.UC). In terms of redemptions under the current rate, about 22 percent of redemptions at small groceries and 18 percent of redemptions at convenience stores were estimated to have been trafficked (Exhibit 1). This compares with a rate of 0.1 percent for large stores. Using the updated current estimation formula, about 19 percent of redemptions at small groceries and 13 percent of redemptions at convenience stores were

¹² Authorized SNAP retailers are presently classified into 16 different store-type categories. Consistent with previous reports, these store types were collapsed into seven more inclusive categories. Superstores were classified along with supermarkets for the purposes of this study. Large stores identified as combination stores were not. The combination/other store type served as a catchall for stores not otherwise categorized as well as for including stores whose food sales are not substantial when compared to revenues from other products. These are so-called “box stores.”

estimated to have been trafficked (Exhibit 1.UC). The contribution of stores included in the combination/other category to the estimates presented in this report were among the lowest of the small stores. Trafficking rates were 6.3 percent for the current estimates and 7.7 percent for the updated current estimates ¹³

**Exhibit 1: Current Trafficking Estimates for Redemptions and Stores, by Store Type,
Calendar Years 2015–2017**

Type of Store		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Large Stores							
Supermarkets		\$53,834,569,862	\$39,551,745	0.07%	41,020	31	0.07%
Large groceries		\$1,366,182,812	\$17,697,999	0.13%	4,585	112	2.44%
Subtotal		\$55,200,752,674	\$57,249,744	0.10%	45,605	142	0.31%
Small Stores							
Medium-sized groceries		\$1,352,943,860	\$102,636,105	7.59%	12,232	1,067	8.72%
Small Groceries		\$827,063,925	\$180,732,289	21.85%	20,280	4,995	24.63%
Convenience stores		\$3,585,497,018	\$643,380,525	17.94%	154,065	32,121	20.85%
Specialty foods		\$746,268,149	\$73,275,212	9.82%	10,848	1,279	11.79%
Combination/other		\$3,425,693,155	\$214,054,242	6.25%	68,667	4,949	7.21%
Subtotal		\$9,937,466,107	\$1,214,078,373	12.22%	266,092	44,411	16.69%
All Stores							
All stores		\$65,138,218,781	\$1,271,328,117	1.95%	311,697	44,554	14.29%
SLoE^a	5%	NA	\$1,147,886,160	1.76%	NA	42,234	13.55%
	95%	NA	\$1,403,792,819	2.16%	NA	47,008	15.08%

Note: Column values may not sum to column totals due to rounding

^a**SLoE:** Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

¹³ Although the amounts have been annualized to provide a summary of the average dollar amount of trafficking per year during the study period, the rates reflect a similar concept—that of summarizing the entire period.

**Exhibit 1.UC: Updated Current Trafficking Estimates for Redemptions and Stores, by
Store Type, Calendar Years 2015–2017**

Type of Store		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Large Stores							
Supermarkets		\$53,834,569,862	\$0	0.00%	41,020	0	0.00%
Large groceries		\$1,366,182,812	\$5,234,903	0.38%	4,585	66	1.44%
Subtotal		\$55,200,752,674	\$5,234,903	0.01%	45,605	66	0.15%
Small Stores							
Medium-sized groceries		\$1,352,943,860	\$71,098,081	5.26%	12,232	1,232	10.07%
Small Groceries		\$827,063,925	\$153,335,873	18.54%	20,280	5,120	25.25%
Convenience stores		\$3,585,497,018	\$474,527,403	13.23%	154,065	25,838	16.77%
Specialty foods		\$746,268,149	\$53,734,721	7.20%	10,848	1,383	12.75%
Combination/other		\$3,425,693,155	\$262,607,755	7.67%	68,667	5,836	8.50%
Subtotal		\$9,937,466,107	\$1,015,303,833	10.22%	266,092	39,408	14.38%
All Stores							
All stores		\$65,138,218,781	\$1,020,538,735	1.57%	311,697	39,474	12.66%
SLoE*	5%	NA	\$631,382,091	0.97%	NA	36,921	11.85%
	95%	NA	\$1,109,963,694	1.70%	NA	41,097	13.18%

Note: Column values may not sum to column totals due to rounding

^a**SLoE:** Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

3.3. TRAFFICKING BY STORE OWNERSHIP

Publicly owned stores constitute about 28% of the retailer population but 47% of SNAP redemptions. Using the current estimate definition, trafficking occurred in only one publicly owned store during this study period resulting in a 0.1 percent store violation rate. In contrast, 19.3 percent of privately-owned stores were estimated to have trafficked, with a redemption-based trafficking rate of 3.6 percent.

Using the updated current definition for trafficking, no publicly owned stores were found to have trafficked. However, 17.5 percent of privately-owned retailers trafficked with a redemption-based trafficking rate of 3.0 percent. (see Exhibits 2 and 2.UC).

Exhibit 2: Current Trafficking Estimates for Redemptions and Stores, by Store Ownership Type, Calendar Years 2015–2017

Store Ownership Type		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Privately owned stores		\$34,529,943,533	\$1,238,681,278	3.59%	225,737	43,574	19.30%
Publicly owned stores		\$30,608,275,249	\$32,646,839	0.11%	85,960	980	1.14%
All Stores							
All stores		\$65,138,218,782	\$1,271,328,117	1.95%	311,697	44,554	14.29%
SLoE*	5%	NA	\$1,147,886,160	1.76%	NA	42,234	13.5%
	95%	NA	\$1,403,792,819	2.16%	NA	47,008	15.08%

Note: Column values may not sum to column totals due to rounding

^a**SLoE:** Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

Exhibit 2.UC: Updated Current Trafficking Estimates for Redemptions and Stores, by Store Ownership Type, Calendar Years 2015–2017

Store Ownership Type		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Privately owned stores		\$34,529,943,533	\$1,020,538,735	2.96%	225,737	39,474	17.49%
Publicly owned stores		\$30,608,275,249	\$0	0.00%	85,960	0	0.00%
All Stores							
All stores		\$65,138,218,782	\$1,020,538,735	1.57%	311,697	39,474	12.66%
SLoE*	5%	NA	\$631,382,091	0.97%	NA	36,921	11.85%
	95%	NA	\$1,109,963,694	1.70%	NA	41,097	13.18%

Note: Column values may not sum to column totals due to rounding

^aSLoE: Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

3.4. TRAFFICKING AND POVERTY LEVEL OF STORE LOCATION

As in previous reports, trafficking was more likely to occur in poorer neighborhoods.

Using the definition for the current trafficking estimate, stores in the most impoverished areas (where more than 30 percent of households live in poverty) were estimated to have a trafficking rate of 5.8 percent while stores in the least impoverished areas (where less than 10 percent of households live in poverty) had a 0.5 percent trafficking rate. With the updated current estimate definition, retailers in the poorest neighborhoods trafficked at a rate of 2.3 percent and those in the least impoverished neighborhoods exhibited a trafficking rate of 0.5 percent (See Exhibits 3 and 3.UC). Although stores in the highest poverty area (>30 percent) represent approximately 11 percent of the total population of authorized stores, they account for slightly less than 36 percent of the total annualized amount trafficked under the current estimate definition and 18 percent using the updated current definition of trafficking.

In terms of the percentage of stores trafficking, there is approximately a 250 percent increase between stores estimated to have trafficked in the lowest poverty areas (Current estimate: 9.2 percent; updated current estimate: 7.3 percent) and those in the highest areas (Current estimate: 22.3 percent; Updated current estimate: 18.5%).

Exhibit 3: Current Trafficking Estimates for Redemptions and Stores, by Poverty Rate in Retailer's Neighborhood, Calendar Years 2015 - 2017

Percentage of Households in Poverty in ZIP Code Where Store Is Located		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%		\$11,917,348,724	\$61,242,243	0.51%	70,990	6,509	9.17%
11–20%		\$28,778,900,513	\$390,325,866	1.36%	134,049	18,421	13.74%
21–30%		\$16,623,242,581	\$363,348,249	2.19%	71,673	11,837	16.51%
More than 30%		\$7,818,726,963	\$456,411,760	5.84%	34,985	7,788	22.26%
All Stores							
All stores		\$65,138,218,781	\$1,271,328,117	1.95%	311,697	44,554	14.29%
SLoE*	5%	NA	\$1,147,886,160	1.76%	NA	42,234	13.55%
	95%	NA	\$1,403,792,819	2.16%	NA	47,008	15.08%

Note: Column values may not sum to column totals due to rounding

^aSLoE: Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

Exhibit 3.UC: Updated Current Trafficking Estimates for Redemptions and Stores, by Poverty Rate in Retailer's Neighborhood, Calendar Years 2015 – 2017

Percentage of Households in Poverty of ZIP Codes Where Stores Are Located		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%		\$11,917,348,724	\$57,457,619	0.48%	70,990	5,210	7.34%
11–20%		\$28,778,900,513	\$466,302,739	1.62%	134,049	15,820	11.80%
21–30%		\$16,623,242,581	\$316,880,729	1.91%	71,673	11,958	16.68%
More than 30%		\$7,818,726,963	\$179,897,649	2.30%	34,985	6,486	18.54%
All Stores							
All stores		\$65,138,218,782	\$1,020,538,735	1.57%	311,697	39,474	12.66%
SLoE*	5%	NA	\$631,382,091	0.97%	NA	36,921	11.85%
	95%	NA	\$1,109,963,694	1.70%	NA	41,097	13.18%

Note: Column values may not sum to column totals due to rounding

^aSLoE: Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

3.5. TRAFFICKING AND POPULATION DENSITY OF STORE LOCATION

Trafficking was most likely to occur in the most urban areas. Using the current definition of trafficking, stores in the most urban areas (more than 91 percent urban) were estimated to have a trafficking rate of 2.54 percent while stores in the two most rural categories (less than 10 percent urban and 11 to 50 percent urban) each had a trafficking rate of approximately a third of a percent. Stores in the suburban category (51-90 % urban) had a trafficking rate of 0.73 percent. Using the updated current trafficking definition, the relationship between population density and trafficking is u-shaped. Trafficking rates are highest in the most urban and the most rural areas – 1.85 percent and 1.78 percent respectively – and more moderate in areas with an urbanization of 11 to 50 percent (0.96 percent) and 51 to 90 percent (0.8 percent). See Exhibits 4 and 4.UC).

The store violation rates rose in accordance with the level of urbanization. Using the definition for the current estimate, the most rural area had the lowest store violation rate of 4.3 percent and the most urban area had the highest store violation rate of 18.1 percent. Using the updated current definition in the most rural area, 7.1 percent of stores were estimated to have trafficked and, in the most urban area, 15.2 percent.

Exhibit 4: Current Trafficking Estimates for Redemptions and Stores, by Urbanization Level in Retailer's Neighborhood, Calendar Years 2015–2017

Percentage Urbanization of ZIP Codes Where Stores Are Located		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%		\$2,031,076,489	\$6,858,795	0.34%	29,728	1,285	4.32%
11–50%		\$3,382,737,563	\$11,196,345	0.33%	19,942	1,645	8.25%
51–90%		\$14,452,293,463	\$105,289,614	0.73%	69,249	6,714	9.70%
91–100%		\$45,272,111,266	\$1,147,983,363	2.54%	192,778	34,909	18.11%
All Stores							
All stores		\$65,138,218,781	\$1,271,328,117	1.95%	311,697	44,554	14.29%
SLoE*	5%	NA	\$1,147,886,160	1.76%	NA	42,234	13.55%
	95%	NA	\$1,403,792,819	2.16%	NA	47,008	15.08%

Note: Column values may not sum to column totals due to rounding

^a**SLoE:** Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

Exhibit 4.UC: Updated Current Trafficking Estimates for Redemptions and Stores, by Urbanization Level in Retailer's Neighborhood, Calendar Years 2015–2017

Percentage Urbanization of ZIP Codes Where Stores Are Located		Total Annualized Redemptions	Annualized Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%		\$2,031,076,489	\$36,210,695	1.78%	29,728	2,097	7.05%
11–50%		\$3,382,737,563	\$32,393,094	0.96%	19,942	2,185	10.96%
51–90%		\$14,452,293,463	\$116,179,164	0.80%	69,249	5,849	8.45%
91–100%		\$45,272,111,266	\$835,755,782	1.85%	192,778	29,343	15.22%
All Stores							
All stores		\$65,138,218,782	\$1,020,538,735	1.57%	311,697	39,474	12.66%
SLoE*	5%	NA	\$631,382,091	0.97%	NA	36,921	11.85%
	95%	NA	\$1,109,963,694	1.70%	NA	41,097	13.18%

Note: Column values may not sum to column totals due to rounding

^a**SLoE:** Simulated limits of Estimation. The 5th and 95th percentiles estimated from 2,000 random samples of size 10,000 drawn from the population of 311,697 stores

NA: Not applicable. Values are not estimates.

4. TRAFFICKING TRENDS

Trends in trafficking could be an important indicator for program improvement strategies, targeting investigative practices, changes in redemption processing, or retailer selection practices. Studies prior to the calendar years 2006–2008 study, showed decreasing trafficking trends, perhaps reflecting the introduction of EBT. Meaningful comparisons of the studies require that the same approach be used to calculate estimates at each point in time.

The data presented in Exhibits 5, 6, and 7 reflect the most up to date estimates for each study time period. The “current estimate” is based on estimates reported for the 2002–2005 period and later. This is because the estimates earlier than those reported for 2002–2005 are based on similar but less comprehensive definitions of the investigative sample and trafficking. The “original” estimates refer to estimates from studies in 1993 and 1996–1998, and the “revised” estimates are based on the 1999–2002 study. This report also uses the new “updated current” definition for producing trafficking estimates. Details on estimate definitions are provided in Appendix E.

4.1. TRENDS IN BENEFITS TRAFFICKED

From the first estimate for 1993 up to the 2006–2008 study period, the amount of trafficked benefits declined. However, beginning with the 2006–2008 study period, the amount of trafficked benefits has increased over time. Over the long-term, this increase is a reflection of the overall growth of total SNAP redemptions, though from the 2012 – 2014 study period to the 2015 – 2017 period, SNAP redemptions have declined. For the current estimates in 2015–2017, the amount of annualized trafficking increased by approximately \$194 million from the previous study period in 2012–2014 (from \$1,077 million to \$1,271 million. See Exhibit 5). At the same time there was a decline in annualized redemptions from \$72.1 billion in the 2012–2014 study period to \$65.1 billion in the 2015–2017 study period.¹⁴

The proportion of redemptions trafficked was still relatively small. The rate of trafficking increased from 1.5 percent in 2012–2014 to 2.0 percent in 2015–2017 using the current trafficking definition. This measure indicates the extent of trafficking, holding the total value of redemptions constant. Exhibit 6 presents trends in the trafficking rate by study period. The data show that the trafficking rate remained constant between the 2002–2005 and 2006–2008 study periods. The rate increased slightly between the 2006–2008 study period and the 2009–2011 study period and increased again in the 2015 – 2017 study period. Throughout this period of increase, trafficking rates remained low.

It is presently only possible to compare trends over time using the current trafficking definition. Rates were not calculated in previous studies using the updated current definition so comparisons over time using two different definitions are problematic. However, trafficking rates may have been lower in earlier periods if the updated current trafficking definition were used so overall trends, if not specific values, would likely have remained similar.

¹⁴ Certain store types, and States and territories were excluded from the analysis. In addition, only retailers with redemptions over the entire year were included.

Exhibit 5: Annualized Dollar Amount of Trafficking, by Study Period

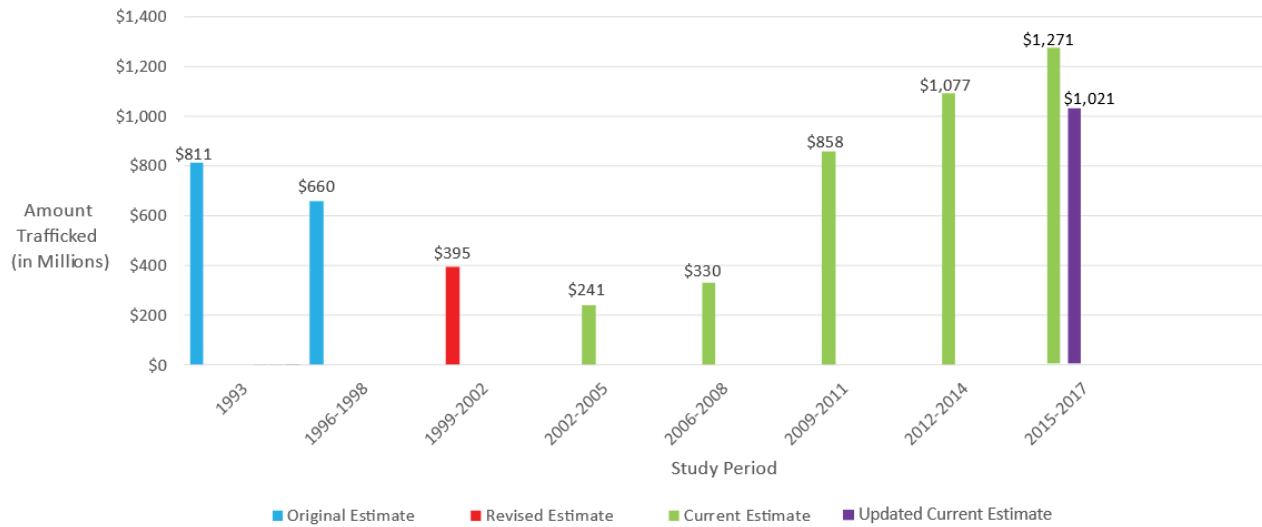
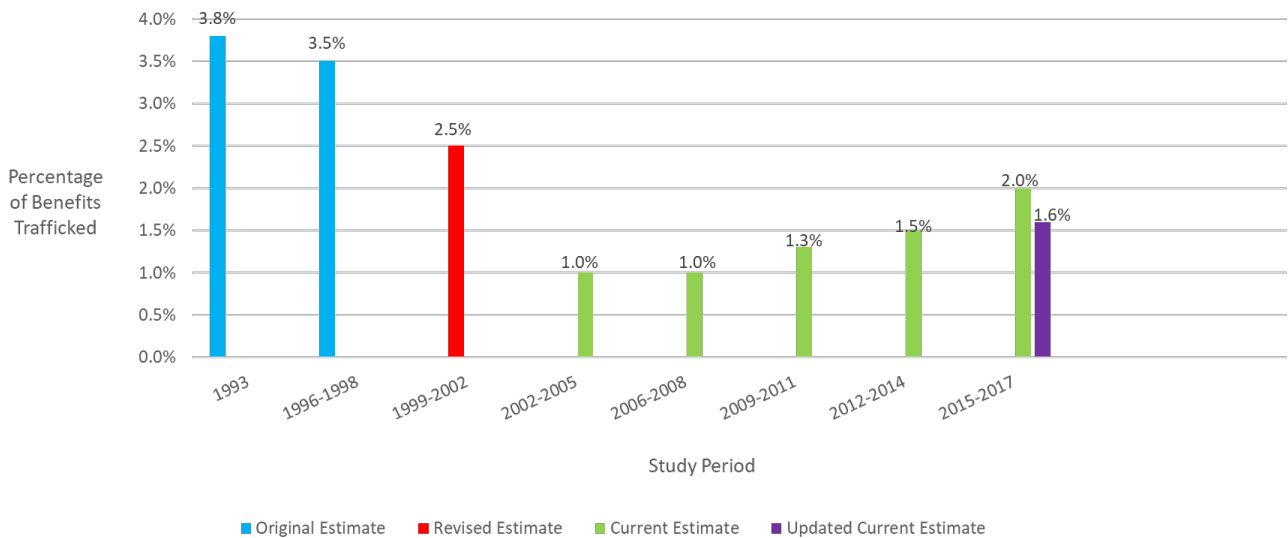


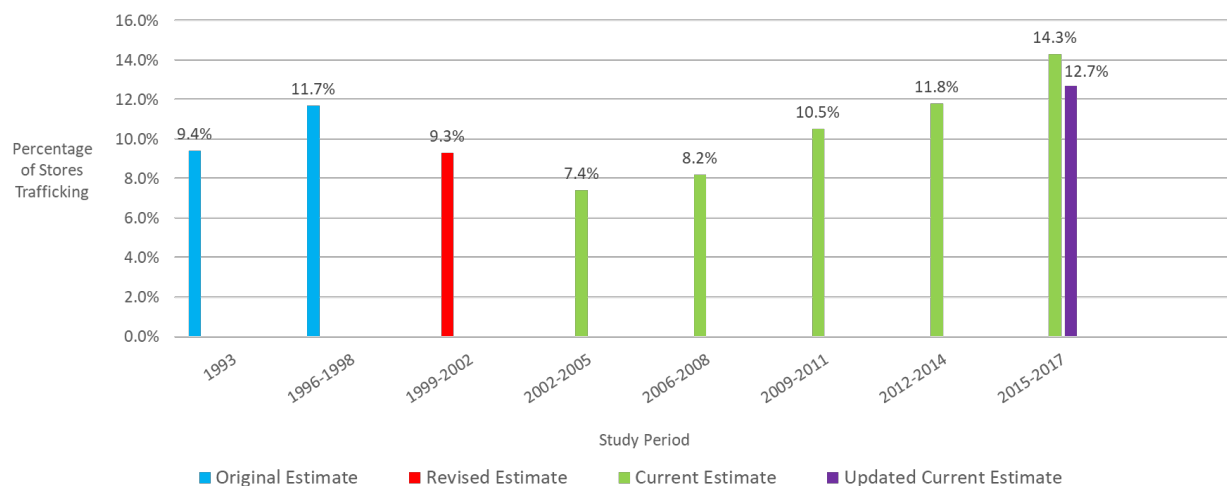
Exhibit 6: Rate of Trafficking, by Study Period



4.2. STORE VIOLATIONS

Store violation rates have increased in the 2015–2017 study period compared to previous study periods. The proportion of store violations has increased over the past five study periods, from 7.4 percent in 2002–2005 to 8.2 percent in 2006–2008, to 10.5 percent in 2009–2011, to 11.8 percent in 2012–2014, and to 14.3 percent in 2015 to 2017 using the current estimate definition (see Exhibit 7).

Exhibit 7: Rate of Store Violations, by Study Period



4.3. EXPLAINING THE CHANGE IN TRAFFICKING

This study shows an increase in the rates and in the annualized amount of trafficking when compared to the previous study. Unlike in the previous study periods, overall SNAP redemptions declined during this study period. As in previous study periods, though, the number of small retailers authorized to redeem benefits continued to grow at a faster rate than the number of large stores (2.82 percent versus 1.95 percent). The increases in the number of smaller stores was driven entirely by convenience stores, which increased at a rate of 15.3 percent, and may have affected the rise in trafficking rates (Exhibit 8).

4.3.1. Effects of Store Composition

Exhibit 9 shows there were 311,697 retailers authorized to participate in SNAP and who redeemed SNAP benefits at any point within the contiguous 48 states between January 1, 2015 and December 31, 2017.¹⁵ This represents a 2.7 percent increase over the 303,522 retailers in the previous three-year study period. As in the previous study period, almost all of this growth was due to the increase in the number of convenience stores. There were 20,420 more convenience stores in this study period than there were in 2012 – 2014. This represents an increase of 15.3 percent over the previous period. Convenience stores were the only type of store manifesting an increase with the exception of supermarkets and large grocery stores which, combined, increased by 874 stores, a more modest rate of 2 percent (Exhibit 8).

Exhibit 8: Changes in the Retailer Population 2012-2014 Through 2015–2017, by Store Type

Type of Store	2012-2014		2015-2017		Difference	
	No. of Stores 2012-14	Pct. of All Stores	No. of Stores 2015-17	Pct. of All Stores	Difference in Number of Stores	Percentage Change
Large Stores						
Supermarkets	40,370	13.30%	41,020	13.16%	650	1.61%
Large groceries	4,361	1.44%	4,585	1.47%	224	5.14%
Subtotal	44,731	14.74%	45,605	14.63%	874	1.95%
Small Stores						
Medium-sized groceries	14,816	4.88%	12,232	3.92%	-2,584	-17.44%
Small groceries	20,794	6.85%	20,280	6.51%	-514	-2.47%
Convenience Stores	133,645	44.03%	154,065	49.43%	20,420	15.28%
Specialty Foods	12,366	4.07%	10,848	3.48%	-1,518	-12.28%
Combination/other	77,170	25.42%	68,667	22.03%	-8,503	-11.02%
Subtotal	258,791	85.26%	266,092	85.37%	7,301	2.82%
All Stores	303,522	100.00%	311,697	100.00%	8,175	2.69%

Note: Totals may not match individual row amounts due to rounding

¹⁵ This would include all retailers except those omitted from the study population. See Appendix B for description of study population.

It was previously noted (Chapter 3, section 3.2) that convenience stores have a high estimated trafficking rate. A question is whether the growth in convenience stores led to the increase in the amount trafficked. To answer this question, we examine the change in the trafficking rates estimated for the 2012–2014 period and the 2015–2017 period for all retailers. Exhibit 9 shows an overall increase in the estimated violation rates for almost all categories of retailers classified as small stores. For small stores overall, the rate increased by over 2 percentage points (11.8 percent vs. 14.3 percent). For small groceries, which had the highest estimated trafficking rates, the store violation rate increased by over 1 percentage point from 23.3 percent to 24.6 percent. Convenience stores, the largest category of small retailers, showed an increase in the trafficking rate of 1.4 percentage points. For large stores, the trafficking rates remained very low, below a third of a percent (0.3 percent).

Exhibit 9: Comparison of Estimated Number of Trafficking Stores and Store Violation Rates for 2012-2014 (Current) and 2015–2017 (Current), by Store Type

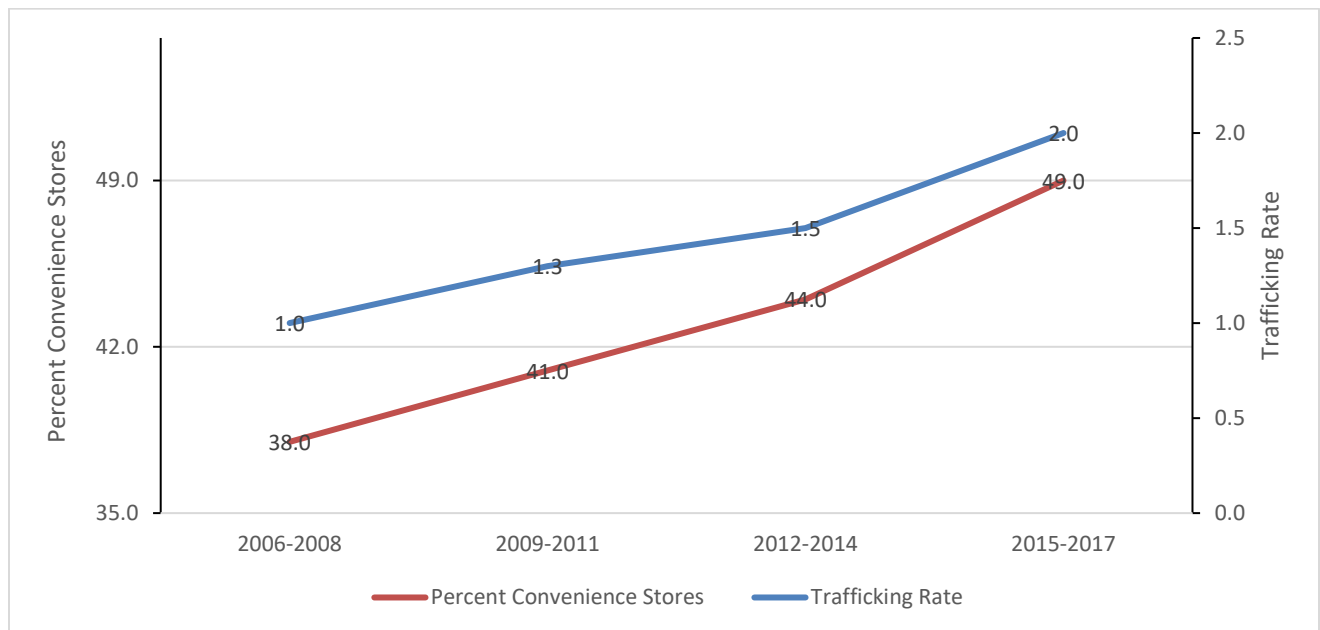
Type of Store		2012-2014			2015-2017		
		Estimated No. of Stores Trafficking	Pct. of All Estimated Trafficking Stores	Store Violation Rate	Estimated No. of Stores Trafficking	Pct. of All Estimated Trafficking Stores	Store Violation Rate
Large Stores							
Supermarkets		30	0.08%	0.07%	31	0.07%	0.07%
Large groceries		42	0.12%	0.98%	112	0.25%	2.44%
Subtotal		72	0.20%	0.16%	142	0.32%	0.31%
Small Stores							
Medium-sized groceries		1,700	4.74%	11.47%	1,067	2.39%	8.72%
Small Groceries		4,850	13.51%	23.32%	4,995	11.21%	24.63%
Convenience Stores		25,954	72.31%	19.42%	32,121	72.10%	20.85%
Specialty Foods		948	2.64%	7.66%	1,279	2.87%	11.79%
Combination/other		2,366	6.59%	3.07%	4,949	11.11%	7.21%
Subtotal		35,818	99.80%	13.84%	44,411	99.68%	16.69%
All Stores							
All stores		35,890	100%	11.82%	44,554	100%	14.29%
SLoE*	5%	33,621	NA	11.08%	37,166	NA	13.55%
	95%	37,747	NA	12.44%	49,105	NA	13.55%

Note: Totals may not match individual row amounts due to rounding

*SLoE = Simulated limits of Estimation

On the whole, there appears to be a relationship between the percentage of convenience stores in the population and the trafficking rate over time. As shown in Exhibit 10, while there are only four points to compare, the two variables may be related.

Exhibit 10: Changes in the Trafficking Rate and the Percentage of Convenience Stores in the Population of SNAP Authorized Stores – 2006-2008, 2009-2011, 2012-2014, and 2015-2017



4.3.2. Other Factors

The trafficking estimates discussed above are subject to several types of variation related to how FNS identifies and tracks trafficking retailers. These variations can affect estimates within and across study periods. First, the violations sample compiled from investigations and administrative actions can be associated with sampling and measurement variation within and across periods of study. The sampling variation represents decisions to select some retailers for investigations or actions and not others. It should be noted that the sample is not a probability sample, and although it arises from a systematic selection process, it cannot provide exact estimates of statistical variation. A final important aspect affecting the estimates is how trafficking is defined. This report has introduced a new method for defining trafficking yet there are certainly other ways than those we have used in this report. The effects of modifying what constitutes trafficking are explored in Appendix I.

APPENDIX A
ESTIMATION ERROR

The trafficking figures in this report are estimates and may be subject to multiple factors—some that understate and others that overstate actual trafficking rates.

SOURCES OF UNDERESTIMATION

Our procedures underestimate trafficking to the extent that the available data and detection procedures do not capture all instances of trafficking. Some violating retailers will traffic with strangers, whereas others restrict their illegal activities to known individuals. This latter type of behavior is known as network trafficking. Investigators can and do catch this type of trafficking, but it usually involves a more complicated investigation occurring over a longer period. Sustaining this type of investigation is difficult, particularly when resources are limited. As a result, some network trafficking will not be represented in our estimates.

EBT data-based cases, which depend on the analysis of observed EBT transaction patterns, can have greater success at identifying network trafficking. Given the range of filters used to detect suspicious cases in the ALERT system, it is possible to identify potential traffickers without an onsite investigation; however, a thorough review of the store's characteristics, business practices, comparison stores and other available information is needed. Thus, the addition of EBT data-based cases to the estimate decreases, but does not eliminate, concern about underestimating this form of trafficking.

SOURCES OF OVERESTIMATION

Our approach is likely to overestimate the prevalence of trafficking. The sources of overestimation are likely to apply equally to estimates using the current definition of trafficking and the updated current definition. One source of possible overestimation is the decision rule used to specify the relative amount of legitimate and illegitimate food sales among stores that traffic. Investigations and administrative cases tell us only whether a store has trafficked, not the extent to which trafficking occurred. In establishing an estimate, we assumed that if a large store (i.e., a supermarket or large grocery) trafficked, 40 percent of all the store's redemptions were illegitimate (even if the trafficking involved only a single clerk away from the register area). Among small stores caught trafficking, we assumed that 90 percent of redemptions were trafficked. We therefore assumed throughout the study period that a retailer that was caught trafficking did so many times. While these figures are unrealistically high, we purposefully chose them because they serve the goal of minimizing the risk of understating the value of benefits diverted by trafficking.

A major source of overestimation may result from the nature of the stores in the investigative sample and how trafficking is inferred. That portion of the estimate relying on in-store investigations might decrease substantially if investigators selected a representative sample of cases from all stores, rather than intentionally targeting stores that raised suspicions. Likewise, another portion of the estimate might be considerably smaller if the charge letters elicited from analysis of administrative data were sent to a representative sample of all stores, rather than just those identified by the screens (and additional analysis of store characteristics, business practices, comparison stores and other information) for unusual EBT transaction patterns. This potential bias is somewhat offset for the estimates by including all closed cases on the Watch List as part of the

denominator.¹ Appendix G examines the distribution of stores used to produce the estimate denominator compared with the distribution of stores authorized to participate in the SNAP. The larger list of retailers used in the denominator allowed us to incorporate stores with varying degrees of suspicious behavior. The resulting sample was not as selective as the alternative measures (i.e., the original and revised measures) that were reported on in previous studies. Still, store selection bias is arguably one factor with the largest impact on our estimate.

Several other factors should be mentioned in terms of estimation:

- First, the weights, and therefore the estimates, are based on stores within different strata and should be representative of the stores in similar strata in the population if the variables describing the stores are good indicators of trafficking. The determination of the variables and the categorizations of strata are, therefore, important in developing unbiased estimates. If we have categorized retailers in a way in which one or more strata are affected by another unstated correlated factor, the weight obtained from the raking procedure will not adequately represent all retailers in that strata. To some extent this has been addressed by, for example, separating out convenience stores in urban areas from the same type of stores in rural areas. However, for example, it may also be important to distinguish stores in the convenience store strata that are relatively new to the program from those that are not, a factor that we did not take into account.
- Second, we have assumed that a retailer in the investigation sample and population is active throughout the estimation period. In reality, some stores are disqualified or leave the program for other reasons, and some retailers are authorized throughout the period. Although many stores remained in the program for all three years, many stores leave the program for various reasons. The absence of stores throughout part of the estimation period, however, can affect the estimates. For example, a store that traffics and is disqualified in the middle of the study period represents a lower amount of trafficked redemptions than if that store was present throughout the period. This is critical because the store's behavior is extrapolated through the raking process to the population, some of whom were present for the entire period.
- Third, the post-stratification process used to generate the estimates has some notable weaknesses, one of the most critical being the differential in cell sizes across the raking matrix. This differential results from the problems associated with the number of cells being generated by the five dimensions utilized in this study. This results in varying weights and issues in providing solid estimates. For instance, if there were two supermarkets investigated with one being found to have trafficked, this would translate to a very high trafficking rate among these stores and overall, which reflects the large volume of redemptions accounted for by these stores.

¹ The Watch List is a compilation of stores exhibiting suspicious behaviors. It is further defined in Appendix B on page B-3.

APPENDIX B

APPROACHES FOR DETECTING TRAFFICKING, DATA SOURCES, AND CREATION OF ANALYSIS FILES

APPROACHES FOR DETECTING TRAFFICKING

For this report, trafficking is defined as buying or selling benefits for cash or consideration other than eligible food.¹ In order for this to occur, a transaction must take place between a retailer and an individual possessing an EBT card. It may be a one time or infrequent occurrence, or it may represent a continuing relationship between a retailer and a customer. In either case, the transaction is generally private. FNS has two ways of identifying actual or potential trafficking:

- **Investigations**—One approach to identifying trafficking is through covert activities that simulate a purchase. After receiving a request for an investigation, a FNS Retailer Investigations Branch (RIB) investigator or confidential informant attempts to traffic with the retailer. Retailers caught trafficking by investigators are charged. Investigations of large-scale trafficking are escalated to the Office of the Inspector General (OIG), which may work with a variety of partners and investigative strategies.
- **EBT data analysis cases**—With the introduction of EBT benefit issuance, FNS introduced the ALERT system. The ALERT system analyzes EBT transaction data and identifies transaction patterns that suggest fraud. FNS reviews the information, along with store characteristics and many other factors. If, after examination, the store is judged to be in violation, a charge letter is issued.

All stores charged with trafficking have an opportunity to respond prior to the Agency's determination. Following a formal trafficking determination, the store is permanently disqualified. Retailers may request an administrative review of the sanction action, followed by an opportunity for judicial review.

DATA SOURCES AND ESTABLISHING MASTER DATA FILES

The data used in deriving these estimates are from the Store Tracking and Redemption System (STARS) database, and Census data sources.

¹ The full definition of trafficking, as listed in 7 CFR 271.2 is: "Trafficking means:

- (1) The buying, selling, stealing, or otherwise effecting an exchange of SNAP benefits issued and accessed via Electronic Benefit Transfer (EBT) cards, card numbers and personal identification numbers (PINs), or by manual voucher and signature, for cash or consideration other than eligible food, either directly, indirectly, in complicity or collusion with others, or acting alone;
- (2) The exchange of firearms, ammunition, explosives, or controlled substances, as defined in section 802 of title 21, United States Code, for SNAP benefits;
- (3) Purchasing a product with SNAP benefits that has a container requiring a return deposit with the intent of obtaining cash by discarding the product and returning the container for the deposit amount, intentionally discarding the product, and intentionally returning the container for the deposit amount;
- (4) Purchasing a product with SNAP benefits with the intent of obtaining cash or consideration other than eligible food by reselling the product, and subsequently intentionally reselling the product purchased with SNAP benefits in exchange for cash or consideration other than eligible food; or
- (5) Intentionally purchasing products originally purchased with SNAP benefits in exchange for cash or consideration other than eligible food.
- (6) Attempting to buy, sell, steal, or otherwise affect an exchange of SNAP benefits issued and accessed via Electronic Benefit Transfer (EBT) cards, card numbers and personal identification numbers (PINs), or by manual voucher and signatures, for cash or consideration other than eligible food, either directly, indirectly, in complicity or collusion with others, or acting alone.

STARS

The primary source of data for this study is STARS. The data generated from STARS includes retailer characteristics, redemption histories, and compliance activities.

Authorized Food Retailer Characteristics and Redemption Histories

STARS contains characteristics for all food retailers ever authorized under the Supplemental Nutrition Assistance Program (SNAP). Although this database file contains extensive information on authorized SNAP retailers, only a few data fields are relevant to this study. They include:

- **Store identification number**—This number is assigned by FNS to uniquely identify the retailer.
- **Store or business type**—Prior to June 2007, these categories were self-declared by the retailer according to categories specified on the SNAP application form and verified by an FNS Field Office worker. As of June 2007, a new business-type classification schema was established, and retailers were classified by FNS staff using multiple variables on the application form and a set of business rules. This change raised an issue regarding which classifications to use for this set of estimates. In the 2006 - 2008 study, a comparison was made to identify the impact of the new store classification schema on the estimates, with a conclusion that this impact was not a strong one.
- **Location information (including ZIP Code)**—This information is provided by the retailer on the application form and, when possible, verified against the address provided. The information represents the actual location of the store, rather than the mailing address. This information is used to locate the retailer in a correct ZIP Code Tabulation Area (ZCTA) and link the information to the demographic characteristics of that area from Census data.
- **Ownership type (private or public)**—Retailers are required to indicate ownership type on the application form. One category allows the retailer to specify that the store is publicly owned. This is the categorical variable used to differentiate privately owned from publicly owned retailers.

STARS also contains monthly redemption histories for all authorized stores. The unique store identification number allows the linkage of redemption information to the retailer characteristics information.

Investigations and Administrative Action Data

In studies prior to the 2002–2005 update, data files maintained by RIB were used for investigations. In general, these files offered the following data elements for each investigated case:

- Store identification number,
- Case number, and
- Outcome (trafficking/no trafficking).

For this 2015–2017 study period and the four prior study periods, the data on investigation-based and EBT data-based cases has been maintained within STARS. STARS contains histories for all cases scrutinized by FNS. These histories are maintained and described by a series of event and outcome codes. For the original, revised and current definitions of trafficking, the identification of trafficking can be inferred from the events, activities, and activity outcomes. For the updated current definition, trafficking is not inferred. A retailer is counted as a trafficker only if the store was permanently disqualified, remains permanently disqualified and the reason for the disqualification recorded in STARS is “Trafficking” or “Failure to pay trafficking civil money penalty. See Appendix E for details.

Watch List

The Watch List includes authorized food retailers that exceeded an ALERT score threshold and met other criteria that trigger additional scrutiny. It was used in the denominators of the current and updated current trafficking estimates. Only closed Watch List cases were used for this analysis, and the store identification number was the single data element extracted.

Census Data

Data from the Census Bureau were used for identifying the degree of poverty and urbanization associated with retailer locations. The geographic unit of focus for this study was the Census ZCTA, which closely corresponds to U.S. Postal Service ZIP Code areas. Although many SNAP retailers can be associated with a particular ZCTA through their locational ZIP Code information,² some cannot; therefore, a labor-intensive effort was undertaken to determine the ZCTA nearest to those stores.³ Information on urbanization, calculated from the number of persons classified as urban in the ZCTA, was derived from information generated from the 2010 Census effort. Information on poverty was generated from the American Community Survey and represents the number of households in poverty within the last six months prior to the survey. Although the American Community Survey is an annual survey, various locations are

² The STARS system contains both the mailing and location addresses of the retailer. The mailing address could differ from the location since in the case of chains it usually refers to a national, regional, or local office and not to the store itself.

³ The ZCTA had the aim of providing areas approximating postal ZIP Code areas and providing demographics for those areas. There are many business areas with their own ZIP Codes or smaller residential areas that are combined with other areas to form the ZCTA.

surveyed each year, and can only provide a national profile at the ZIP Code level from a five-year aggregate.

CREATION OF ANALYSIS FILES

A single analysis file was created from the data sources described above. The file was limited to all retailers that had positive redemptions between January 2015 and December 2017 and were located in the contiguous United States. Also eliminated were military commissaries. Household poverty and urbanization levels associated with each retailer's Census ZCTA designation were added. Edits were made to modify and collapse store-type and ownership fields. In addition, case data from STARS were added.

These case data included:

- All investigations conducted by RIB during the timeframe;
- All investigations conducted by OIG, the States, or other authorities during the timeframe;
- All cases in which a charge letter was sent to the retailer during the timeframe;
- All cases in which there was a permanent disqualification or in which a civil money penalty was assessed in lieu of permanent disqualification; and
- All cases on the Watch List that were closed during the timeframe.

The resulting case file is structured so that a particular retailer may be represented several times as the retailer enters and leaves particular action steps within the case-development process. The retailer may also be subjected to one or more of the above actions (e.g., a retailer may have trafficked with a RIB investigator and may have also received a charge letter).

To avoid multiple representations of a single retailer, we included only one case per retailer, selecting the case that represented a positive trafficking determination. Thus, if a retailer was represented in two cases, one with no finding of trafficking and one with a finding of trafficking, the latter was included. If none of the cases resulted in a positive trafficking determination, the retailer was coded as “investigated but no trafficking found.”

The updated current trafficking definitions make use of the same case data prepared for analysis in the same way. The only differences are that the updated current definition makes use of the variable `Action_Reason_ID` which provides the explicit reason for why a retailer may have been permanently disqualified, and `CurrentStoreStatuCode` which indicates if, as of September 2018, the retailer remains permanently disqualified.

APPENDIX C

POST-STRATIFICATION ESTIMATION METHODOLOGY

KEY STEPS FOR USING POST-STRATIFICATION TO ESTIMATE TRAFFICKING

Estimates for 2015–2017 were based on the approach used in previous updates. The steps are as follows:

1. Retailers that were examined or investigated based on questionable transaction patterns were assigned to categories associated with five variables: type of store (7 categories), type of ownership (2 categories), level of SNAP redemption (10 categories), population density associated with the store's ZIP Code (4 categories), and poverty level (4 categories) associated with the store's ZIP Code. Each store was counted only once.¹ The same procedure was applied to the corresponding amount of SNAP redemptions transacted by each of these retailers. This activity produced two five-dimensional tables—one for retailers and one for redemptions. Each table contained 2,240 cells.
2. All stores and the dollar value of SNAP benefits redeemed during the 2015–2017 timeframe were aggregated by the five variables described in step 1 to create five separate marginal distributions, each corresponding to a particular dimension as defined in step 1.
3. An analytic procedure known as raking was used to create weights for each category of store type and location. Raking is an iterative process by which the cell frequencies from the sample (the tables generated in step 1) are adjusted to the population marginal frequencies (the product of step 2). Weights were obtained separately for stores and redemptions.
4. The weights produced in step 3 were applied to the file of SNAP retailers examined or investigated during the 2015–2017 timeframe in order to estimate the total number of stores engaging in trafficking and the amount of benefits redeemed that were trafficked.
5. Adjustments were made to the estimated dollar value of trafficked benefits because even among violating stores, it is unlikely that all SNAP sales are trafficked. We made the assumption that 90 percent of redemptions in violating small stores were trafficked, and 40 percent in violating large stores were trafficked.
6. The trafficking rate (i.e., the percentage of all redemptions estimated to be trafficked) and store violation rate (i.e., the percentage of stores trafficking) were calculated.

See Appendix I for details of the sensitivity analyses that were conducted with respect to some of the methodological decisions and assumptions associated with these procedures.

¹ The variable descriptions and specific categories within each variable are provided in Appendix D.

APPENDIX D

VARIABLES EMPLOYED IN THE RAKING MODEL

The five dimensions we employed consist of three that categorize stores (type of store, ownership type, and amount of Supplemental Nutrition Assistance Program (SNAP) redemptions) and two that categorize the ZIP Codes in which stores were located (degree of urbanization and percentage of households below the poverty level). Specific definitions are provided in the following sections.

TYPE OF STORE

Experience, backed up by years of research, has indicated that type of store is an important differentiator in trafficking. In particular, and according to these analyses, larger stores do not traffic as much as smaller stores.

In June 2007, FNS instituted a new store, or business type, classification scheme that used a set of business rules to classify retailers, instead of relying on retailer self-reports.¹ We summarized retailers according to the new store-type codes, according to the following categories:

- Supermarkets,
- Large groceries,
- Medium-sized groceries,
- Small groceries,
- Convenience stores,
- Specialty food stores, and
- Combination/other food stores.

OWNERSHIP TYPE

Ownership types as indicated on the FNS application form were collapsed into the following categories to ensure an adequate number of cases of each type:

- **Private**—Any store identifying itself as other than publicly owned. This includes private (i.e., closely held) corporations as well as partnerships, sole proprietorships, and co-ops; and
- **Public**—Any store identifying itself as a public corporation (i.e., a retailer whose stock is publicly traded).

AMOUNT OF SNAP REDEMPTIONS

Stores were categorized into deciles on the basis of SNAP redemptions. Although the original intent was statistical, rather than analytical (i.e., to ensure that large disparities in redemptions by stores did not distort results), the variable was useful as a size measure that could be used in conjunction with the store type measure.

¹ Prior to 2007, store type was based on the combination of a self-reported store type variable and gross sales. All reports preceding the 2006–2008 study were based on the older store type category. In the 2006–2008 report, a comparative analysis of the old and new store type classifications was conducted—showing little if any impact on the estimates. For more information on the older store types, see the 2006–2008 report.

DEGREE OF URBANIZATION

The urbanization variable was based on data collected for the 2010 U.S. Census. The Census provides for each ZIP Code Tabulation Area (ZCTA) an estimate of the number of individuals in that ZCTA who could be considered living in an urban area. This was divided by the total number of individuals in that area, which was available from the same data source.

Four categories were used that reflected an analysis conducted in 1993 for the first trafficking study. Their selection reflects our attempt to distribute stores across a range of categories to achieve some balance as well as create meaningful distinctions. These categories were:

- 0–10 percent urban population,
- 11–50 percent urban population,
- 51–90 percent urban population, and
- More than 90 percent urban population.

PERCENTAGE OF HOUSEHOLDS BELOW THE POVERTY LEVEL

The percentage of households below the poverty level was based on the 2016 American Community Survey 5-year data estimates for the ZIP Code Tabulation Area (ZCTA) in which each store was located. The total number of households in poverty within a ZCTA was divided by the total number of households in that area. As with the urbanization categories, the poverty-level categories were established for the 1993 study. Again, we attempted to establish a meaningful range for describing neighborhoods by poverty level while creating some balance in store totals across categories. Four categories were used:

- 0–10 percent of the residential population below the poverty level,
- 11–20 percent of the residential population below the poverty level,
- 21–30 percent of the residential population below the poverty level, and
- More than 30 percent of the residential population below the poverty level.

APPENDIX E
ESTIMATE DEFINITION

Prior to the trafficking study encompassing the 2002–2005 period, the investigative sample contained information based on FNS conducted investigations and administrative actions involving the issuance of charge letters. In 2002–2005, two new sets of data were introduced. First, we included Watch List cases. In 2002, the implementation of a new trafficking rate formula used to produce watch list counts had two effects. First, more retailers came under special systematic scrutiny (i.e., their status had to be resolved by field office staff). This increase resulted in a broader base of retailers subject to additional review (see the retailer distribution comparisons within the sensitivity analyses in Appendix I), and we expect that this larger population is more representative of the authorized retailer population as a whole. Second, the Watch List created an interactive system among investigators and those conducting retailer reviews that may have influenced the kinds of cases that were referred for investigation.

The estimate reported in this latest study includes all currently available data sources for FNS investigations. It also includes OIG investigations, State investigations, and investigations by other agencies. This study also introduced a new definition for trafficking – the updated current estimate - that is more closely aligned with how FNS presently defines trafficking for reporting purposes such as the Fiscal Year End Reports.

Key terms for the current and updated current estimates were defined as follows:

- **“Current” Denominator:**
 - All cases in which Event Code = “03” (completed investigation) and Investigation Agency = “CB,” “OI,” “SL,” or “OT” (i.e., RIB, OIG, States, or other agency); or
 - All cases in which a retailer was sent a charge letter; or
 - All administrative (EBT) cases where the store was permanently disqualified or paid compensation in lieu of permanent disqualification; or
 - Any retailer on the Watch List with a status of closed.¹
- **“Current” Numerator:**
 - Any case in which the Event Code = “03” (completed investigation) and Investigation Code = “CB” (i.e., RIB) and the trafficking flag is “1”; or
 - Any case in which the Event Code = “03” (completed investigation) and Investigation Code = “OI,” “SL,” or “OT” (i.e., OIG, States, or other agency) and the result is a positive violation; or
 - Any case in which the retailer was permanently disqualified or assessed a civil money penalty in lieu of a permanent disqualification.²
- **“Updated Current” Denominator:**
 - Identical to the “current” definition Denominator.

¹ Resolution involves any of the following statuses: 1) No Further Action (NFA), 2) Store Disqualified, 3) Store Withdrawn, 4) No Case Action (NCA), 5) Sanction Action, and 6) Other Adverse Action. The two statuses “NFA” and “NCA” are associated with determinations that for one reason or another, the store did not violate SNAP regulations.

² This includes stores that had an EBT (administrative) case and were permanently disqualified as well as those that received trafficking charge letters but may not have been permanently disqualified in the end.

- **“Updated Current” Numerator:**
 - All retailers identified for inclusion in the Updated Current denominator who were permanently disqualified (ActionType =4) and for whom the reason for the action was “Trafficking” (Action_Reason_ID = 4) or “Failure to Pay [a] Trafficking CMP [Civil Money Penalty]” (Action_Reason_ID = 1) and,
 - Have a current store status in the STARS stores characteristics records of permanently disqualified (CurrentStoreStatus =7)

For both the Current and Updated Current estimates, the denominators and numerators come from unduplicated lists of retailers meeting one or more of these conditions. In other words, a retailer is counted only once, regardless of the number of times it was identified.

The Current Estimate employs a definition of trafficking that has evolved since the first trafficking report for 1993³. Electronic benefits transfer was only a pilot project in the “Food Stamp Program” as SNAP was known at the time. Transactions were largely conducted with paper coupons and FNS compliance branch staff conducted undercover investigations into trafficking and other non-compliance issues. The analysis of these compliance branch (CB) cases is a legacy now known as the “Original” estimates and is defined by the first bullet under the definition for the current denominator and the first two bullets under the definition of the numerator.

By the time of the 1999 – 2002 report⁴, EBT became a major medium for conducting SNAP transactions. With EBT came the Anti-fraud Locator using EBT Retailer Transactions (ALERT) tool. The “administrative cases” that resulted from the analysis of the electronic transaction data were added to the Original estimates to produce the “Revised” estimates of trafficking. The “Revised” estimates are defined with the first three bullets of the current estimate denominator and all three of the bullets under the current estimate numerator.

Because FNS did not have the resources to representatively sample and investigate the retailer population, “[f]or the 2002-2005 estimates, a more inclusive list of retailers, the Watch List, [was added to] the denominator. This list is still focused on stores that exhibit suspicious behavior, but the selection screen is so broad that almost 1 out of every 5 stores is included. This allows us to examine a less selective sample than those used in previous studies and thus ameliorated the bias issue to some extent”⁵. This gave rise to the “Current Estimates”.

The “Current Estimates” are, therefore, a stove-piped approach to estimating trafficking, adapting previous approaches as technologies changed and information collection broadened. In contrast, the “Updated Current Estimates” are homogeneous and take advantage of computational and data storage capabilities that were not available in 1995. It is consistent with how FNS currently defines trafficking for its Fiscal Year End Summaries, for example, and is

³ Theodore F. Macaluso, The Extent of Trafficking in the Food Stamp Program (Alexandria, VA: Food and Nutrition Service, USDA; 1995)

⁴ U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation, The Extent of Trafficking in The Food Stamp Program: 1999—2002, FSP-03-TRAF, by Theodore F. Macaluso, Ph.D.

⁵ <https://fns-prod.azureedge.net/sites/default/files/Trafficking2005.pdf>. Mantovani, Richard E. and Carol Olander. The Extent of Trafficking in the Food Stamp Program: 2002-2005, p. 5, footnote 3.

more conservative than “Current Estimates”. Under the “Current Estimates” a retailer who is permanently disqualified for any reason is deemed to have trafficked. Under the “Updated Current Estimates” the investigative case must be closed, the data must indicate that the action taken against the permanently disqualified retailer was for the explicit, documented reason of trafficking, and the retailer must remain permanently disqualified beyond the 2015 – 2017 study period. This latter step is meant to check for and exclude false positives due to retailers who were accused of trafficking and later exonerated.

APPENDIX F

STATISTICS ON INVESTIGATIONS AND ADMINISTRATIVE ACTIONS

This appendix provides statistics for retailers by the criteria for defining the denominator (a store that has been investigated and has received a charge letter or has been put on the Watch List). In other words, it defines the sample.

- Exhibit F1: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Retailer Type – Current Estimate
- Exhibit F1.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Retailer Type – Updated Current Estimate
- Exhibit F2: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Ownership Type – Current Estimate
- Exhibit F2.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Ownership Type – Updated Current Estimate
- Exhibit F3: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Poverty Level of Retailer’s Neighborhood – Current Estimate
- Exhibit F3.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Poverty Level of Retailer’s Neighborhood – Updated Current Estimate
- Exhibit F4: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Urbanization Level of Retailer’s Neighborhood - Current Estimate
- Exhibit F4.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Urbanization Level of Retailer’s Neighborhood – Updated Current Estimate

**Exhibit F1: Redemptions, Retailer Count, and Trafficking Statistics for Investigated
Retailers during 2015–2017, by Retailer Type – Current Estimate**

Type of Store	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Large Stores						
Supermarkets	\$3,936,816,514	\$13,849,975	0.35%	879	4	0.46%
Large groceries	\$876,657,328	\$28,707,535	3.27%	650	14	2.15%
Subtotal	\$4,813,473,842	\$42,557,510	0.88%	1,529	18	1.18%
Small Stores						
Medium-sized groceries	\$1,633,708,876	\$142,869,458	8.75%	2,834	319	11.26%
Small groceries	\$1,273,121,925	\$315,109,807	24.75%	5,734	1,631	28.44%
Convenience Stores	\$1,765,874,539	\$374,789,620	21.22%	12,539	3,333	26.58%
Specialty Foods	\$434,831,086	\$49,975,846	11.49%	500	82	16.40%
Combination/ other	\$748,298,178	\$56,657,479	7.57%	1,348	153	11.35%
Subtotal	\$5,855,834,604	\$939,402,210	16.04%	22,955	5,518	24.04%
All stores	\$10,669,308,446	\$981,959,720	9.20%	24,484	5,536	22.61%

Exhibit F1.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Retailer Type – Updated Current Estimate

Type of Store	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Large Stores						
Supermarkets	\$503,148,826	\$0	0.00%	152	0	0.00%
Large groceries	\$389,039,683	\$7,643,360	1.96%	264	5	1.89%
Subtotal	\$892,188,509	\$7,643,360	0.86%	416	5	1.20%
Small Stores						
Medium-sized groceries	\$1,270,968,611	\$97,500,549	7.67%	2,086	265	12.70%
Small groceries	\$1,173,732,678	\$277,731,427	23.66%	5,314	1,529	28.77%
Convenience Stores	\$1,779,468,402	\$315,844,142	17.75%	13,135	3,025	23.03%
Specialty Foods	\$276,949,683	\$39,804,514	14.37%	405	71	17.53%
Combination/ other	\$400,703,687	\$45,955,330	11.47%	953	131	13.75%
Subtotal	\$4,901,823,061	\$776,835,962	15.85%	21,893	5,021	22.93%
All stores	\$5,794,011,570	\$784,479,322	13.54%	22,309	5,026	22.53%

Exhibit F2: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Ownership Type - Current Estimate

Store Ownership Type	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Privately owned stores	\$10,273,368,868	\$981,190,647	9.55%	24,295	5,535	22.78%
Publicly owned stores	\$395,939,579	\$769,073	0.19%	189	1	0.53%
All stores	\$10,669,308,447	\$981,959,720	9.20%	24,484	5,536	22.61%

Exhibit F2.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Ownership Type – Updated Current Estimate

Store Ownership Type	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
Privately owned stores	\$5,730,592,748	\$784,479,322	13.69%	22,221	5,026	22.62%
Publicly owned stores	\$63,418,822	\$0	0.00%	88	0	0.00%
All stores	\$5,794,011,570	\$784,479,322	13.54%	22,309	5,026	22.53%

Exhibit F3: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Poverty Level of Retailer’s Neighborhood – Current Estimate

Percentage of Households in Poverty in ZIP Code Where Store Is Located	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%	\$717,320,681	\$32,410,397	4.52%	1,975	262	13.27%
11–20%	\$3,474,688,432	\$218,923,558	6.30%	8,206	1,540	18.77%
21–30%	\$3,630,328,000	\$321,484,579	8.86%	7,860	1,807	22.99%
More than 30%	\$2,846,971,333	\$409,141,187	14.37%	6,443	1,927	29.91%
All stores	\$10,669,308,446	\$981,959,721	9.20%	24,484	5,536	22.61%

Exhibit F3.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Poverty Level of Retailer’s Neighborhood – Updated Current Estimate

Percentage of Households in Poverty in ZIP Code Where Store Is Located	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%	\$270,003,886	\$22,188,757	8.22%	1,518	222	14.62%
11–20%	\$1,525,298,703	\$169,013,809	11.08%	7,108	1,394	19.61%
21–30%	\$1,991,982,317	\$258,866,431	13.00%	7,325	1,650	22.53%
More than 30%	\$2,006,726,664	\$334,410,325	16.66%	6,358	1,760	27.68%
All stores	\$5,794,011,570	\$784,479,322	13.54%	22,309	5,026	22.53%

Exhibit F4: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Urbanization Level of Retailer’s Neighborhood – Current Estimate

Percentage Urbanization of ZIP Codes Where Stores Are Located	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%	\$673,871,201	\$10,344,020	1.54%	1,736	142	8.18%
11–50%	\$397,132,276	\$8,113,321	2.04%	821	103	12.55%
51–90%	\$1,434,624,460	\$50,673,182	3.53%	2,673	429	16.05%
91–100%	\$8,163,680,510	\$912,829,198	11.18%	19,254	4,862	25.25%
All stores	\$10,669,308,447	\$981,959,721	9.20%	24,484	5,536	22.61%

Exhibit F4.UC: Redemptions, Retailer Count, and Trafficking Statistics for Investigated Retailers during 2015–2017, by Urbanization Level of Retailer’s Neighborhood – Updated Current Estimate

Percentage Urbanization of ZIP Codes Where Stores Are Located	Total Redemptions	Amount of Trafficking	Trafficking Rate	Total Stores	Trafficking Stores	Store Violation Rate
0–10%	\$145,403,846	\$7,616,883	5.24%	1,064	121	11.37%
11–50%	\$95,553,892	\$6,896,047	7.22%	681	91	13.36%
51–90%	\$450,031,259	\$39,835,604	8.85%	2,288	371	16.22%
91–100%	\$5,103,022,573	\$730,130,789	14.31%	18,276	4,443	24.31%
All stores	\$5,794,011,570	\$784,479,323	13.54%	22,309	5,026	22.53%

APPENDIX G

STATISTICS ON COMPARISONS BETWEEN RETAILERS IN THE INVESTIGATIVE SAMPLE AND IN THE POPULATION OF RETAILERS

In order to judge how the investigative sample varies from the population, distributions by retailer type, ownership type, poverty level, and urbanization were generated. The statistics in these tables represent activity over the three-year period (as opposed to annualized figures presented in other parts of the report).

The following provides an index to the tables:

I. Redemptions

- Exhibit G1: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Store Type (Amounts Represent Three-Year Totals)
- Exhibit G2: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Store Ownership Type (Amounts Represent Three-Year Totals)
- Exhibit G3: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Poverty Level in Retailer's Neighborhood (Amounts Represent Three-Year Totals)
- Exhibit G4: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Urbanization Level in Retailer's Neighborhood (Amounts Represent Three-Year Totals)

II. Retailers

- Exhibit G5: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Store Type (Amounts Represent Three-Year Totals)
- Exhibit G6: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Store Ownership Type (Amounts Represent Three-Year Totals)
- Exhibit G7: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Poverty Level in Retailer's Neighborhood (Amounts Represent Three-Year Totals)
- Exhibit G8: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Urbanization Level in Retailer's Neighborhood (Amounts Represent Three-Year Totals)

Exhibit G1: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Store Type (Amounts Represent Three-Year Totals)

Type of Store	Total Redemptions for the Population		Redemptions for the Investigative Sample	
	Amount	Pct.	Amount	Pct.
Large Stores				
Supermarkets	\$161,503,709,586	82.65%	\$11,810,449,542	36.90%
Large groceries	\$4,098,548,436	2.10%	\$2,629,971,984	8.22%
Subtotal	\$165,602,258,022	84.74%	\$14,440,421,526	45.12%
Small Stores				
Medium-sized groceries	\$4,058,831,580	2.08%	\$4,901,126,628	15.31%
Small groceries	\$2,481,191,775	1.27%	\$3,819,365,775	11.93%
Convenience Stores	\$10,756,491,054	5.50%	\$5,297,623,617	16.55%
Specialty Foods	\$2,238,804,447	1.15%	\$1,304,493,258	4.08%
Combination/ other	\$10,277,079,465	5.26%	\$2,244,894,534	7.01%
Subtotal	\$29,812,398,321	15.26%	\$17,567,503,812	54.88%
All stores	\$195,414,656,343	100.00%	\$32,007,925,338	100.00%

Exhibit G2: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Store Ownership Type (Amounts Represent Three-Year Totals)

Store Ownership Type	Total Redemptions for the Population		Redemptions for the Investigative Sample	
	Amount	Pct.	Amount	Pct.
Privately owned stores	\$103,589,830,599	53.01%	\$30,820,106,604	96.29%
Publicly owned stores	\$91,824,825,747	46.99%	\$1,187,818,737	3.71%
All stores	\$195,414,656,346	100.00%	\$32,007,925,341	100.00%

**Exhibit G3: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Poverty Level in Retailer's Neighborhood
(Amounts Represent Three-Year Totals)**

Percentage of Households in Poverty in ZIP Code Where Store Is Located	Total Redemptions for the Population		Redemptions for the Investigative Sample	
	Amount	Pct.	Amount	Pct.
0-10%	\$35,752,046,172	18.30%	\$2,151,962,043	6.72%
11-20%	\$86,336,701,539	44.18%	\$10,424,065,296	32.57%
21-30%	\$49,869,727,743	25.52%	\$10,890,984,000	34.03%
More than 30%	\$23,456,180,889	12.00%	\$8,540,913,999	26.68%
All stores	\$195,414,656,343	100.00%	\$32,007,925,338	100.00%

**Exhibit G4: Distribution of Redemptions for the Entire Retailer Population and for the Investigative Sample, by Urbanization Level in Retailer's Neighborhood
(Amounts Represent Three-Year Totals)**

Percentage Urbanization of ZIP Codes Where Stores Are Located	Total Redemptions for the Population		Redemptions for the Investigative Sample	
	Amount	Pct.	Amount	Pct.
0-10%	\$6,093,229,467	3.12%	\$2,021,613,603	6.32%
11-50%	\$10,148,212,689	5.19%	\$1,191,396,828	3.72%
51-90%	\$43,356,880,389	22.19%	\$4,303,873,380	13.45%
91-100%	\$135,816,333,798	69.50%	\$24,491,041,530	76.52%
All stores	\$195,414,656,343	100.00%	\$32,007,925,341	100.00%

Exhibit G5: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Store Type (Number of Stores Represent Three-Year Totals)

Type of Store	Total Retailers for the Population		Retailers for the Investigative Sample	
	Stores	Pct.	Stores	Pct.
Large Stores				
Supermarkets	41,020	13.16%	879	3.59%
Large groceries	4,585	1.47%	650	2.65%
Subtotal	45,605	14.63%	1,529	6.24%
Small Stores				
Medium-sized groceries	12,232	3.92%	2,834	11.57%
Small groceries	20,280	6.51%	5,734	23.42%
Convenience Stores	154,065	49.43%	12,539	51.21%
Specialty Foods	10,848	3.48%	500	2.04%
Combination/other	68,667	22.03%	1,348	5.51%
Subtotal	266,092	85.37%	22,955	93.76%
All stores	311,697	100.00%	24,484	100.00%

Exhibit G6: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Store Ownership Type (Number of Stores Represent Three-Year Totals)

Store Ownership Type	Total Retailers for the Population		Retailers for the Investigative Sample	
	Stores	Pct.	Stores	Pct.
Privately owned stores	225,737	72.42%	24,295	99.23%
Publicly owned stores	85,960	27.58%	189	0.77%
All stores	311,697	100.00%	24,484	100.00%

**Exhibit G7: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Poverty Level in Retailer's Neighborhood
(Number of Stores Represent Three-Year Totals)**

Percentage of Households in Poverty in ZIP Code Where Store Is Located	Total Retailers for the Population		Retailers for the Investigative Sample	
	Stores	Pct.	Stores	Pct.
0-10%	70,990	22.78%	1,975	8.07%
11-20%	134,049	43.01%	8,206	33.52%
21-30%	71,673	22.99%	7,860	32.10%
More than 30%	34,985	11.22%	6,443	26.32%
All stores	311,697	100.00%	24,484	100.00%

Exhibit G8: Distribution of Retailers for the Entire Retailer Population and for the Investigative Sample, by Urbanization Level in Retailer's Neighborhood (Number of Stores Represent Three-Year Totals)

Percentage Urbanization of ZIP Codes Where Stores Are Located	Total Retailers for the Population		Retailers for the Investigative Sample	
	Stores	Pct.	Stores	Pct.
0-10%	29,728	9.54%	1,736	7.09%
11-50%	19,942	6.40%	821	3.35%
51-90%	69,249	22.22%	2,673	10.92%
91-100%	192,778	61.85%	19,254	78.64%
All stores	311,697	100.00%	24,484	100.00%

APPENDIX H
ESTIMATE INTERVALS

The estimates provided in the main body of the report were generated using the data raking algorithm on the complete set of cases in the investigation sample (i.e., 24,484 or 22,309 retailers depending on whether the estimate is current or updated current). Because in all instances the cases constitute a sample, there is some basis for examining how the estimate could vary if the cases chosen for investigation or for administrative follow-up were different. **As in previous SNAP Trafficking studies, to simulate this variation, and to establish boundaries around the estimates, we generated estimates based on iteratively sampling the investigative sample, current and updated current.** It should be noted that because the sample is selected in a purposive manner, the interpretation of the intervals is not consistent with the interpretation if the sample were based on probability sampling. These are not confidence intervals. We refer to them as Simulated Limits of Estimation (SLoE). It is also not intended to allow significance testing across years. The process involved selecting a random sample of 10,000 retailers from the investigative sample and using the raking algorithm to provide 2,000 different estimates. The 2,000 values were then processed to provide mean values (for store and redemption values and rates) and fifth and ninety-fifth percentile values for each of the variables. Overall, the average of these results, as seen in the following table, was relatively close to the estimates presented in the main body of the report. Percentiles were calculated by ordering the results and then reporting the cut points for the lowest five percent and highest 95 percent of values.

Comparison of Raked-Only Value versus Simulated Iterative Value

Set of Trafficking Estimates	Estimated Redemptions Trafficked		Estimated Stores Trafficking	
	Annualized Amount (in millions)	Rate	Number	Rate
Current estimate raked-only value	\$1,271	1.95%	44,554	14.29%
Updated current estimate raked-only value	\$1,021	1.57%	39,474	12.66%
Current estimate simulated value based upon repeated sampling	\$1,272	1.95%	44,472	14.27%
Updated current estimate simulated value based upon repeated sampling	\$889	1.36%	39,085	12.54%

In addition to those produced for the national estimates, SLoE were also produced on the basis of store type, ownership type, poverty level, and urbanization. The values provide rough indications of how the estimates for each level of these variables would have been affected if different stores were selected for investigation or administrative review. However, care should be taken in the interpretation and use of these estimate intervals. They are derived from smaller samples and thus, are subject to the estimation errors associated with the sampling process.

It should also be noted that the amounts representing the fifth and ninety-fifth percentiles are not necessarily reflected in the rates. The procedure estimated the fifth and ninety-fifth percentiles for amounts and rates separately. This resulted in different values for rates than would occur if the amounts were divided by total annualized redemptions. Nevertheless, the values should closely approximate the rates as if the amounts were used.

The following provides an index to the tables:

- Exhibit H1: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking for All Retailers – Current Estimate
- Exhibit H1.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking for All Retailers – Updated Current Estimate
- Exhibit H2: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Type – Current Estimate
- Exhibit H2.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Type – Updated Current Estimate
- Exhibit H3: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Ownership Type – Current Estimate
- Exhibit H3.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Ownership Type – Updated Current Estimate
- Exhibit H4: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Poverty Level of Retailer’s Neighborhood – Current Estimate
- Exhibit H4.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Poverty Level of Retailer’s Neighborhood – Updated Current Estimate
- Exhibit H5: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Urbanization Level of Retailer’s Neighborhood - Current Estimate
- Exhibit H5.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Urbanization Level of Retailer’s Neighborhood – Updated Current Estimate

Exhibit H1: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking for All Retailers – Current Estimate

Store Type		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
All stores	Estimate	\$1,271,631,965	\$1,147,886,160	\$1,403,792,819	44,472	42,234	47,008
	Rate	1.95%	1.76%	2.16%	14.27%	13.55%	15.08%

Exhibit H1.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking for All Retailers – Updated Current Estimate

Store Type		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
All stores	Estimate	\$888,619,075	\$631,382,091	\$1,109,963,694	39,085	36,921	41,097
	Rate	1.36%	0.97%	1.70%	12.54%	11.85%	13.18%

Exhibit H2: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Type – Current Estimate

Store Type		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
Supermarkets	Estimate	\$40,097,906	\$0	\$90,765,997	30	0	64
	Rate	0.07%	0.00%	0.17%	0.00%	0.00%	0.16%
Large groceries	Estimate	\$17,831,628	\$4,080,360	\$33,826,626	112	39	189
	Rate	1.31%	0.30%	0.25%	2.44%	0.84%	4.12%
Medium-sized groceries	Estimate	\$102,963,490	\$83,417,891	\$124,063,042	1,066	926	1,205
	Rate	7.61%	6.17%	9.17%	0.87%	0.76%	0.99%
Small groceries	Estimate	\$180,831,121	\$167,158,025	\$195,440,668	4,983	4,726	5,239
	Rate	21.86%	20.21%	23.63%	24.57%	23.30%	25.83%
Convenience Stores	Estimate	\$638,212,799	\$592,603,991	\$682,838,337	32,004	30,466	33,571
	Rate	17.80%	16.53%	19.04%	20.77%	19.78%	21.79%
Specialty Foods	Estimate	\$74,180,611	\$48,395,536	\$103,703,657	1,278	969	1,599
	Rate	9.94%	6.49%	13.90%	11.78%	8.93%	14.74%
Combination/ other	Estimate	\$217,514,410	\$131,465,475	\$320,898,756	5,000	3,348	7,235
	Rate	6.35%	3.84%	9.37%	7.28%	4.88%	10.54%

Exhibit H2.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Type – Updated Current Estimate

Store Type		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
Supermarkets	Estimate	\$0	\$0	\$0	0	0	0
	Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Large groceries	Estimate	\$4,875,227	\$0	\$13,520,453	65	0	135
	Rate	0.36%	0.00%	0.99%	1.42%	0.00%	2.94%
Medium-sized groceries	Estimate	\$68,588,529	\$42,363,506	\$93,141,272	1,224	1,055	1,393
	Rate	5.07%	3.13%	6.88%	10.01%	8.63%	11.39%
Small groceries	Estimate	\$144,766,905	\$117,686,501	\$171,639,429	5,087	4,807	5,356
	Rate	17.51%	14.23%	20.76%	25.08%	23.70%	26.41%
Convenience Stores	Estimate	\$388,166,629	\$227,975,753	\$500,893,482	25,356	22,895	27,357
	Rate	10.83%	6.36%	13.97%	16.46%	14.86%	17.76%
Specialty Foods	Estimate	\$47,900,278	\$16,757,500	\$90,268,315	1,377	982	1,802
	Rate	6.42%	2.25%	12.10%	12.69%	9.05%	16.61%
Combination/ other	Estimate	\$234,321,507	\$112,647,026	\$359,237,139	5,977	4,652	7,530
	Rate	6.84%	3.29%	10.49%	8.70%	6.78%	10.97%

Exhibit H3: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Ownership Type – Current Estimate

Store Ownership		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
Privately owned stores	Estimate	\$1,236,281,554	\$1,131,259,157	\$1,339,415,699	43,479	41,954	45,107
	Rate	3.58%	3.28%	3.88%	19.26%	18.59%	19.98%
Publicly owned stores	Estimate	\$35,350,411	\$0	\$114,977,512	993	0	2,894
	Rate	0.12%	0.00%	0.38%	1.16%	0.00%	3.37%

Exhibit H3.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Store Ownership Type – Updated Current Estimate

Store Ownership		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
Privately owned stores	Estimate	\$888,619,075	\$631,382,091	\$1,109,963,694	39,085	36,921	41,097
	Rate	2.57%	1.83%	3.21%	17.31%	16.36%	18.21%
Publicly owned stores	Estimate	\$0	\$0	\$0	0	0	0
	Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Exhibit H4: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Poverty Level of Retailer's Neighborhood – Current Estimate

Percentage of Households in Poverty in ZIP Code Where Store Is Located		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
0-10%	Estimate	\$63,367,561	\$27,699,259	\$120,208,525	6,563	5,478	7,788
	Rate	0.53%	0.23%	1.01%	9.24%	7.72%	10.97%
11-20%	Estimate	\$385,437,910	\$273,310,586	\$520,084,323	18,366	16,305	20,749
	Rate	1.34%	0.95%	1.81%	13.70%	12.16%	15.48%
21-30%	Estimate	\$365,886,599	\$262,839,905	\$476,076,490	11,789	10,711	12,869
	Rate	2.20%	1.58%	2.86%	16.45%	14.94%	17.96%
More than 30%	Estimate	\$456,939,895	\$373,655,421	\$552,025,015	7,755	6,919	8,582
	Rate	5.84%	4.78%	7.06%	22.17%	19.78%	24.53%

Exhibit H4.UC: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Poverty Level of Retailer's Neighborhood – Updated Current Estimate

Percentage of Households in Poverty in ZIP Code Where Store Is Located		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
0-10%	Estimate	\$49,146,214	\$5,472,557	\$132,582,052	5,190	4,034	6,405
	Rate	0.41%	0.05%	1.11%	7.31%	5.68%	9.02%
11-20%	Estimate	\$388,787,538	\$183,496,420	\$597,430,792	15,779	14,138	17,396
	Rate	1.35%	0.64%	2.08%	11.77%	10.55%	12.98%
21-30%	Estimate	\$264,636,712	\$77,576,156	\$479,333,250	11,765	10,524	12,854
	Rate	1.59%	0.47%	2.88%	16.42%	14.68%	17.93%
More than 30%	Estimate	\$186,048,611	\$30,659,252	\$382,507,346	6,351	5,194	7,452
	Rate	2.38%	0.39%	4.89%	18.15%	14.85%	21.30%

Exhibit H5: Intervals for Annualized Redemption Dollars Trafficked and Retailers Trafficking, by Urbanization Level of Retailer's Neighborhood – Current Estimate

Percentage Urbanization in ZIP Code Where Store Is Located		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
0-10%	Estimate	\$6,622,583	\$4,257,905	\$9,501,500	1,288	953	1,666
	Rate	0.33%	0.21%	0.47%	4.33%	3.20%	5.60%
11-50%	Estimate	\$11,416,330	\$5,720,557	\$19,617,761	1,700	1,220	2,270
	Rate	0.34%	0.17%	0.58%	8.52%	6.12%	11.38%
51-90%	Estimate	\$102,506,680	\$67,302,584	\$143,570,664	6,695	5,745	7,730
	Rate	0.71%	0.47%	0.99%	9.67%	8.30%	11.16%
91-100%	Estimate	\$1,151,086,372	\$1,019,427,478	\$1,295,315,887	34,789	32,511	37,295
	Rate	2.54%	2.25%	2.86%	18.05%	16.86%	19.35%

**Exhibit H5.UC: Intervals for Annualized Redemption Dollars Trafficked and
Retailers Trafficking, by Urbanization Level of Retailer's
Neighborhood – Updated Current Estimate**

Percentage Urbanization in ZIP Code Where Store Is Located		Estimate and Intervals for Trafficked Redemptions			Estimate and Intervals for Trafficking Stores		
		Dollars Trafficked	Intervals		Retailers Trafficking	Intervals	
			5th Percentile	95th Percentile		5th Percentile	95th Percentile
0-10%	Estimate	\$31,511,942	\$9,724,339	\$64,584,991	2,178	1,453	3,026
	Rate	1.55%	0.48%	3.18%	7.33%	4.89%	10.18%
11-50%	Estimate	\$100,449,194	\$2,604,072	\$243,257,863	2,236	1,493	3,052
	Rate	2.97%	0.08%	7.19%	11.21%	7.49%	15.30%
51-90%	Estimate	\$97,407,145	\$26,697,636	\$206,301,140	5,866	4,560	7,433
	Rate	0.67%	0.18%	1.43%	8.47%	6.59%	10.73%
91-100%	Estimate	\$659,250,794	\$376,313,726	\$955,499,207	28,806	25,950	31,215
	Rate	1.46%	0.83%	2.11%	14.94%	13.46%	16.19%

APPENDIX I

SENSITIVITY OF ESTIMATES TO VIOLATION DEFINITIONS

The estimates derived through the raking procedure for the population of SNAP retailers reflect the samples of suspicious cases. The samples constitute all cases in which an undercover investigation was conducted by the FNS; retailers that received a charge letter and those that received a permanent disqualification or a civil money penalty in lieu of permanent disqualification (current estimate) or received a permanent disqualification or a civil money penalty in lieu of permanent disqualification for the explicit reason of trafficking (updated current estimate); FNS Office of the Inspector General (OIG) and State law enforcement bureau (SLEB) cases and positive outcomes associated with these investigations; and all closed Watch List cases.

It is critical to note that there is some uncertainty about what types of cases should be defined as investigatory; therefore, the size of the denominator for the estimates could arguably be expanded or contracted. Similarly, the numerator for the estimates is dependent on how trafficking is defined. Clearly, if a retailer traffics with an undercover FNS investigator, it is a violation. It is less clear that permanent disqualification or civil money penalty in lieu of permanent disqualification after the retailer is given a charge letter constitutes trafficking, hence why we developed the updated current estimates for this iteration of the study. A case might also be made that any violation, including the selling of ineligible items, is at least a strong indication that the retailer would be willing to traffic and should be included in the numerator of the estimates.

In this appendix, we explore the sensitivity of trafficking estimates to such variations in definitions using four additional checks, including the updated current estimate, that employ differing criteria for inclusion in the numerator or denominator of the estimate. Exhibit I1 provides the criteria for these checks.

The check labeled “NFA (No Further Action) excepted” assumes that retailers with these designations are not being actively pursued and that there is no reason, after deliberation, to consider them suspicious and no chance to consider them as potential traffickers.

The final check assumes that even among the retailers that are given an NFA status, there is a substantial amount of trafficking occurring. The potential of denoting them as traffickers would never be realized. The assumption was that 18 percent of these retailers trafficked¹.

Exhibit I2 provides the outcomes of using these definitions in terms of redemptions trafficked and stores trafficking. As is indicated, the amount trafficked is higher in all cases than the base estimates – the current and updated current estimates - provided in the report.¹ In some cases, the estimates are more than twice as high, both in terms of redemptions trafficked and retailers trafficking. These limits should be considered, in addition to the figures presented in the last section to indicate the possible extent of trafficking.

¹ We took three samples for the last random selection measure and averaged the three results. Redemption amounts are annualized.

**Exhibit I1: Criteria for Including Retailers as a Violating Case and
a Suspicious Case, by Estimate Type**

Estimate Type	Violating Cases (Numerator)	Suspicious Cases (Denominator)
Base estimate (current definition)	RIB investigation with a trafficking violation or a permanent disqualification or payment of civil money penalty in lieu of permanent disqualification, or a positive trafficking outcome in an OIG or a SLEB case	RIB investigation or an ALERT system-derived case with the issuance of a charge letter, or an OIG or a SLEB case, or a closed Watch List case, or a permanent disqualification or payment of civil money penalty in lieu of permanent disqualification, or a positive trafficking outcome
Base estimate (updated current definition)	RIB investigation with a trafficking violation or a permanent disqualification or payment of civil money penalty in lieu of permanent disqualification if the reason for the disqualification is explicitly trafficking, or a positive trafficking outcome in an OIG or a SLEB case. The case must be closed, and the permanent disqualification sustained beyond the study period.	RIB investigation or an ALERT system-derived case with the issuance of a charge letter, or an OIG or a SLEB case, or a closed Watch List case, or a permanent disqualification or payment of civil money penalty in lieu of permanent disqualification if the reason for the disqualification is explicitly trafficking, or a positive trafficking outcome
NFA excepted	Same as current base estimate	Same as current base estimate except cases designated as NFA on the Watch List are omitted
Random selection of 18% of NFA Watch List retailers assumed trafficking	Same as current base estimate with the assumption that 18 percent of the NFA retailers trafficked	Same as current base estimate

**Exhibit I2: Outcomes Using the Definition Relating to Selection of Retailers
into the Sample**

	Annualized Amount of Trafficking	Trafficking Rate	Trafficking Stores	Store Violation Rate
Current measure	\$1,271,328,117	1.95%	44,554	14.29%
Updated current measure	\$1,020,538,735	1.57%	39,474	12.66%
NFA excepted	\$2,006,488,169	3.08%	53,109	17.04%
Random selection of 18% of NFA Watch List retailers assumed trafficking	\$4,312,527,220	6.62%	59,139	18.97%

ⁱ In prior reports we also check an expanded definition we labeled “All disqualifications”. It assumed that retailers that have transacted ineligible buys or otherwise violated SNAP regulations would be willing to traffic. This assumption, for example, infers that a retailer that sells beer or liquor to someone using SNAP benefits would in all likelihood traffic, if given a viable opportunity. Under this definition any retailer on the watch list whose status is permanently or temporarily disqualified was assumed to be a trafficker. However, the watchlist data for this report included no disqualified retailers whose case was closed. Therefore, the results are identical to those for the Current definition measure.