Food Safety and Waste at Food Recovery Locations

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Abstract

Recent data estimates 30% or more of the overall food supply is discarded due to food safety-related issues of spoilage, damage, and expiration (USDA, 2015). At the same time, food insecurity poses an equally significant issue within the United States. There are limited research studies involving food safety and food waste at food recovery locations, particularly in Virginia. This project facilitated semi-structured interviews with five food recovery managers in multiple localities in Virginia on how decisions are made regarding food waste and safety within their facilities. The interviews revealed a need for on-going food safety education, as many food recovery locations struggle with the dilemma of short-term and one-time volunteers, and resources on how to combat food waste through additional redistribution and agricultural waste recovery. Future research should focus on the challenges specific to reducing food waste at food recovery locations in order to better meet the needs of this population.
Acknowledgements

My sincerest thanks to my advisor, Dr. Melissa Chase, for her guidance through the research process. Thank you for all of the encouragement and understanding the work of an Extension Agent.

To my committee members Dr. Joe Eifert and Dr. Richard Rateau, I appreciate your willingness to serve in this capacity and thank you for supporting me in class and during this project.

And to my husband Ben, thank you for reminding me that I can do anything I set my mind to.
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Food Safety and Waste at Food Recovery Locations

**Introduction**

**Background and Setting**

Food waste is a growing concern throughout the country. Recent data estimates 30% or more of the overall food supply is discarded due to food safety-related issues of spoilage, damage, and expiration (USDA, 2015). At the same time, food insecurity poses an equally significant issue within the United States. The paradox of food waste versus food insecurity describes a need for waste prevention and food redistribution practices within the whole food system (Sert, 2017). Nearly 900,000 Virginians, or 1 in 9 people of the state’s total population, face food insecurity at any given time (Feeding America, 2016). This reveals a substantial need for food recovery locations to provide adequate food access for all. Virginia has seven food banks that coordinate hundreds of food recovery locations throughout the state and serve as the liaison between the Virginia Federation of Food Banks and the overarching organization of Feeding America. Most food recovery locations within the state partner with one of the food banks for procedural support, however there are also locations unaffiliated with a larger organization that operate independently.

The research process of this project provided insight on food safety and anti-waste initiatives and guidelines in food recovery locations, though the sources are limited. This project concentrates on safety and waste at one segment of the food supply chain at redistribution sites and does not include data on these topics within the farming, processing, retail, or consumer sectors. It is important to understand how food recovery locations make operational decisions regarding food safety and waste so that recommendations can be made for future research and program development at Virginia Tech. These developments can then be utilized in educational
progamming through Virginia Cooperative Extension (VCE) and the Virginia Family Nutrition Program (FNP).

FNP provides nutrition education programming for limited-resource families by facilitating interventions described in the SNAP-Ed Plan Guidance that is released annually through the USDA’s Food and Nutrition Service. These interventions include direct education methods and those designated as policy, systems, and environmental (PSE) change for sustained programming. The Fiscal Year 2019 Plan Guidance includes a desire to reduce food waste by partnering with local organizations, including food recovery locations, to maximize the consumption of healthy food resources through PSE initiatives (SNAP-Ed Connection, 2018).

This research project provides a basic understanding of the desired training and educational needs at food recovery locations that can be used at the university and local levels to collaborate with organizations on combating the paradox of food waste and food insecurity.

**Statement of the Problem**

There are limited research studies involving food safety and waste at food recovery locations, particularly at those located within Virginia. An abundance of the available research regarding these topics pertain to schools, retailers, and other industries. Due to the minimal sources available, this project focuses solely on food recovery locations in Virginia. The lack of research makes it unclear how food recovery locations are basing their decisions and subsequently provides a shortage of details on how to improve food safety and waste issues at their facilities.

**Purpose of the Research**

The purpose of this project is to interview food recovery managers on how decisions are made regarding food waste and food safety within their facilities. The interviews will result in
feedback necessary to inform additional food safety training and research in the Department of Food Science and Technology and the Department of Human Nutrition, Foods, and Exercise at Virginia Tech. Future developed trainings and research findings can then be incorporated in VCE and FNP programming for knowledge extension within the community. This project will inform FNP on the issues that food recovery locations face and which ones to prioritize that will ultimately complement the USDA’s increased interest in food waste as described in the most recent SNAP-Ed Plan Guidance. The development of pertinent resources and training for Virginia is needed to reduce food waste and increase food safety knowledge in food recovery locations. These trainings and resources should provide safer foods for their clientele and the greater community.

The questions guiding this research were:

1) How do food recovery managers make decisions to discard food within their locations?

2) How do decisions regarding safe food handling guidelines impact food waste?

**Project Objectives**

The objectives of the project include gaining knowledge of food recovery location operational procedures and understanding how their guidelines affect food safety and waste. This research study was based on the Theory of Reasoned Action, a commonly used theoretical framework for health behavior (Montano & Kasprzyk, 2008). This theory was utilized to better understand what could be occurring at food recovery locations and the decisions that are being made at the facilities based on the current perceived attitudes and behaviors of the managers.
Definition of Terms

Food Recovery Terms

1. *Feeding America*- The largest hunger-relief organization in the United States that hosts a nationwide network of 200 food banks (Feeding America, 2018).

2. *Food bank*- A facility that stores and distributes food from producers, retailers, and industries to smaller food recovery locations (Chaifetz & Chapman, 2015).

3. *Food donation*- Food product given for redistribution (Food Recovery Committee, 2007).

4. *Food recovery location*- Collects food donated from public and private sources to redistribute to hungry individuals (Food Recovery Committee, 2007).

5. *Food recovery manager*- Individual in charge of daily procedures (Food Recovery Committee, 2007).

Package Dating Terms

6. *Best if used by (or before) date*- The time a product will be of best flavor or quality, but is not a purchase or safety date (USDA, 2019).

7. *Sell-by date*- Tells retailers how long to display a product for sale and consumers when to purchase by, but is not a safety date (USDA, 2019).

8. *Use-by date*- The last date for use of a product while at peak quality, but is not safety date except when used on infant formula (USDA, 2019).

Additional Terms

9. *Food insecurity*- Inconsistent access to safe, nutritious food (Federal Food Donation Act, 2008).

10. *Food waste*- Food discarded or uneaten (Food Recovery Committee, 2007).
11. *ServSafe Food Protection Manager Certification* - Food and beverage safety training and certificate program offered through the National Restaurant Association (National Restaurant Association Education Foundation, 2019).


13. *Virginia Cooperative Extension (VCE)* - The educational outreach program of Virginia’s land grant universities, Virginia Tech and Virginia State University, that provides non-formal classes, workshops, and events to all localities in Virginia in order to improve the quality of life (Virginia Cooperative Extension, 2019).

14. *Virginia Family Nutrition Program (FNP)* - Offered through VCE as the educational outreach to teach limited-resource families how to make healthier food choices based on their available food resources. Funded by the Expanded Food and Nutrition Education Program (EFNEP) and the Supplemental Nutrition Assistance Program Education (SNAP-Ed) (Virginia Cooperative Extension, 2019).

**Review of Literature**

This literature review provides an overview of the food waste and food insecurity paradox within the United States to emphasize the need for food recovery locations, despite the overabundance of current food waste. The main purpose of this review was to identify the potential food safety and waste issues within food recovery locations in order to then recommend strategies to prevent such problems. It was equally as important to examine guidelines provided by Feeding America to determine what is being required of partnering food bank organizations and compare this to what is actually being done within the individual food recovery locations based on information received from the interviews with food recovery managers.
Research clearly indicates food waste as a rising concern nationally, even so for food recovery locations, but additional research is needed to combat this issue on the local level (USDA, 2015). In 2013, the United States Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) listed food waste and loss as a primary concern by creating the U.S. Food Waste Challenge to encourage a sustainable and secure food system (USDA, 2015). As a further initiative in 2015, USDA and EPA launched the U.S. 2030 Food Loss and Waste Reduction Goal with the ambition of reducing food waste by 50% in the next fifteen years (USDA, 2015). The Challenge and Goal provide guidelines on how sectors can reduce their overall food waste through recycling, redistributing, and composting resources (USDA, 2015). While these initiatives provide basic advice for consumers, retailers, and industries, they do not specifically target food recovery locations on how to improve this global issue. Recommendations for food recovery locations are essential as the majority of the food donations they receive are already at the end of quality, further advancing potential food waste within their facilities.

The paradox with food waste is the coinciding rate of food insecurity with 10.6% of all Virginians, or approximately 900,000 of the total state’s population, facing daily hunger (Feeding America, 2016). Of those that are food insecure, 63% are at or below the 185% federal poverty level, which qualifies them for nutrition assistance programs, such as the Supplement Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), Child Nutrition Programs (CNP), and others (Feeding America, 2016). Additional statistics reveal the average meal cost in Virginia is $3.07 with an annual food budget shortfall of over $468 million (Feeding America, 2016). The national food insecurity rate is 12.9%, or over 41 million of the total population, of which 73% qualify for food assistance.
programs (Feeding America, 2016). Food recovery locations typically determine client eligibility based on income and its associated ranking of the federal poverty level, while some do not require eligibility criteria. The Map the Meal Gap project indicates that those on nutrition assistance programs are also seeking support from local food recovery locations (Feeding America, 2016). Further research reveals national averages of 25% of individuals are considered food insecure but are ineligible for federal nutrition assistance programs (Feeding America, 2018). This data provides evidence in support of food recovery locations in order to meet the hunger needs of those within Virginia and the greater United States.

There are seven food banks in Virginia, all of which are partner organizations with Feeding America, which provides food distribution and resources for affiliated food recovery locations. Feeding America requires partner organizations to follow food donation guidelines that mirror those retailers, manufacturers, and restaurants adhere to, including Current Good Manufacturing Practices, the FDA Food Code, the Model Salvage Code, Federal Food, Drug, and Cosmetic Act, and the Fair Packaging and Labeling Act (Feeding America, 2018). The partner organizations are then responsible for relaying all guidelines to the individual food recovery locations. Feeding America encourages partner organizations to complete the ServSafe Food Protection Manager Certification and to hire or consult with Registered Dietitians to ensure procedures are adequately followed (Feeding America, 2018). Food recovery locations that are not a partnering organization with a Feeding America affiliated food bank are considered independent and operational procedures are unknown from a research standpoint.

The Food and Drug Administration (FDA) includes guidelines for food recovery programs in multiple editions of the FDA Food Code (FDA, 2017). The FDA Food Code provides a redirection to the Comprehensive Resource for Food Recovery Programs document
that outlines requirements for establishing a food recovery program and its associated responsibilities, food safety guidelines, and how to plan for food defense (Food Recovery Committee, 2016). This document also describes the legal concern for food donation liability that protects citizens and businesses by law through the Bill Emerson Good Samaritan Food Donation Act, barring intentions are done in good faith (Food Recovery Committee, 2016). The guidelines list a chart of acceptable foods and labeling requirements for donated items, which was initially created by Feeding America, and is still in use by their partnering food bank organizations (See Appendix A). The document further emphasizes that all food recovery locations adhere to the national food standards for retailers as provided in the FDA Food Code (Food Recovery Committee, 2016).

A recent study reports that food recovery locations in Massachusetts struggle with food waste as a result of a lack of evidence-based operational procedures for food acceptance or rejection and other food safety concerns, such as the unavailability of storage for cold items and mishandling of food (Asante, Asare, & Amellal, 2015). This study concludes that many food recovery locations do not understand date labels on canned items and assume that if an item is deemed expired it is thrown away, but in reality the date actually represents when food is at its peak quality and does not pose food safety concern, excluding baby formula (Asante, Asare, & Amellal, 2015). Another study argues that a majority of food waste is due to expired items, accounting for more than 75% of the overall waste, with the highest rates in households (Farr-Wharton, Foth, & Choi, 2014). These perceived household behaviors may influence food acceptance and rejection procedures in food recovery locations and that food recovery managers tend to provide guidance based on their individual beliefs and understandings (Asante, Asare, & Amellal, 2015). Numerous factors influence food waste decisions, such as societal norms,
understanding of food, and situational conditions, however waste prevention can be overcome through education and training (Farr-Wharton, Foth, & Choi, 2014).

Another study reviewed the effects of food safety intervention at food recovery locations in New York and found that training should be ongoing throughout the year for effective results, as many organizations rely on one-time or short-term volunteers (Finch & Daniel, 2005). This study provided voluntary food safety trainings on foodborne illness, safe food handling practices, and prevention methods for the purpose of increasing knowledge and maximizing food resources within the facility (Finch & Daniel, 2005). This study revealed the connection between proper food safety practices and how it prevents food waste, which is crucial for organizations serving in emergency food capacities (Finch & Daniel, 2005). The lack of literature on food recovery locations within Virginia indicates a need for additional research specific to this state.

**Theoretical Framework**

This research used the Theory of Reasoned Action as guidance for understanding what may be happening at food recovery locations regarding how food safety and food waste decisions are made by the managers. This theory is traditionally used in health behavior research since it relies on knowing the attitudes and beliefs of the individual in relation to performing behavior (Montano & Kasprzyk, 2008). The Theory of Reasoned Action focuses on individual motivation, such as the behavioral intention and associated performance, as represented in Figure 1. This theory suggests a change in attitude can increase the likelihood of performing a specific behavior and has been used in many health education studies to predict and explain intentions and performance of safety and security behaviors, such as use of sun protection, seatbelts, STD-prevention, and food safety (Montano & Kasprzyk, 2008, Hinsz & Nickell, 2015).
Figure 1. Theory of reasoned action (Montano and Kasprzyk, 2008).

One study examined job satisfaction and organizational commitment as ways to predict adherence to food safety standards and found that increased satisfaction and positive attitudes revealed greater safety behaviors (Hinsz & Nickell, 2015). The study argues perceived societal norms significantly influence behavior, meaning the degree of belief that others who are deemed important to the individual either approve or disapprove of the performed behavior (Hinsz & Nickell, 2015). The perceived societal norms can be understood in an organizational hierarchy or personal and familial viewpoints. The study concludes that individuals will ultimately perform behaviors they want to, but will just as easily perform behaviors they think others want them to do (Hinsz & Nickell, 2015).

For this study, the theory was primarily used to compare behaviors from information gathered from the manager interviews and in some cases, understand actual behavior as they personally conveyed. The theory was also used to examine how guidelines from an overarching organization affected local procedures within individual food recovery locations. The interviews provided details about the level behaviors were performed based on perceived consequences from the larger organization, such as internal and external audits and fear of a disconnected partnership. While this study did not create food safety and food waste trainings, the Theory of
Reasoned Action predicts that educational resources would increase knowledge of such topics amongst the managers and volunteers at food recovery locations.

**Project Overview**

**Study Timeline and Participating Audience**

This study was conducted between January and February 2019 with food recovery managers in Virginia. Five managers from multiple localities agreed to participate in the project. Managers were recruited through email and phone based on contact information collected from the food recovery location websites, social media pages, and the associated food bank online directory. The only exclusion factor to participate was the manager had to be 18 years of age or older. The interviews were either held at the food recovery location or a public space, depending upon the preference and availability of the manager.

**Research Design and Procedure**

This project focused on food safety and food waste at food recovery locations, therefore managers of such locations were recruited to participate. The qualitative method used included one-time, semi-structured interviews with food recovery managers to evaluate their operational procedures, knowledge of food safety issues, and desired resources for their facility and volunteers.

The managers were recruited and introduced to the project via email, or when this contact method was unavailable, by phone. The managers were asked if they would like to participate in an interview regarding food safety and food waste at their facility. It was emphasized that the interview is completely voluntary and confidential, but will be recorded using an audio recorder for documentation purposes. Each location was assigned a code to ensure confidentiality and names were not collected during the interview process. The managers completed consent forms
at the onset of the interview. Once consent was given, a consent script was read by the researcher, which included the ability to withdraw without penalty and privacy of the project. After the script was read, the audio recorder was turned on and the interview questions were asked and discussed (See Appendix B). Additional topics were discussed as the managers presented them, further engaging in the semi-structured process.

Currently, there is not a universal set of standards for food safety at food recovery locations due to the variability of independent versus affiliated facilities. Previously noted resources were reviewed to determine the types of questions to include in the manager interviews to best identify the needs of this population (Feeding America, 2018, Food Recovery Committee, 2016, & Federal Food Donation Act, 2008). The interview topics included questions on trainings and procedures provided by affiliated organizations, types of food donations received, which sectors food donations come from, guidelines for package dating and determining if food is safe for consumption, food waste statistics, who regulates the facility for compliance, and food safety trainings that would be beneficial for the facility and volunteers.

**Delimitations**

Several factors created boundaries for the scope of this project. The first was four of the five food recovery locations are partner organizations with a single food bank that is affiliated with Feeding America, while the fifth location is an independent facility. This decision was made for proximity reasons and to compare procedures at affiliated versus independent locations. Four of the five locations are located either within or onsite of faith-based organizations with the fifth location being community-based and located on county-owned property. All food recovery locations for this study only provide unprepared food items and do not serve meals within the facility. In addition to regular food distribution, several facilities are supplemented by federal
programs of USDA to provide extra food for their clients. One location distributes the
Commodity Supplemental Food Program (CSFP), which provides low-income elderly
individuals with USDA Foods, and three locations distribute USDA Foods to low-income
families through The Emergency Food Assistance Program (TEFAP), and as a result these
locations have additional agency regulations compared to the others.

Limitations

All food recovery locations are within a two-county region based on the willingness of
participants, but this does not accurately reflect the recruitment efforts in other counties and
cities. Twenty-five managers from four counties and four cities were invited to participate in the
study, however only five agreed to be interviewed. Several managers were unable to participate
due to lack of volunteer staff time, weather constraints, and additional responsibilities at the
facility due to the government shutdown in January 2019. A majority of food recovery locations
are run by volunteers and time outside of normal operating hours are limited. Since the project
was conducted in January and February, winter weather resulted in some food recovery locations
closing for several days, therefore making it even more difficult to schedule interviews. Faith-
based locations were challenging to contact during the government shutdown due to them
providing additional outreach and meals at their facilities.

Summary

Research Outcomes

Through the interview transcription process of this study, several responses were
presented by the managers regarding decisions to discard food, safe food handling guidelines,
and trainings offered by the facility or affiliated food bank. Table 1 provides a list of interview
questions with the associated patterns, number of responses, and selected quotations.
Table 1. Food recovery manager interview results.

<table>
<thead>
<tr>
<th>Interview Question</th>
<th>Patterns (Number of Responses)</th>
<th>Selected Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is your food pantry affiliated with a larger organization? If so, what training is</td>
<td>-Food safety (4)</td>
<td>“We go once a year for updates in what’s happening as far as food pantries and what</td>
</tr>
<tr>
<td>provided by this larger organization?</td>
<td>-Volunteer requirements (4)</td>
<td>we need to do.”</td>
</tr>
<tr>
<td></td>
<td>-Computer system (4)</td>
<td>“[The food bank] will provide any training that we need.”</td>
</tr>
<tr>
<td>Have your volunteers completed training on safe food handling?</td>
<td>-Annual training by the food recovery location (1)</td>
<td>“We do this on an annual basis.”</td>
</tr>
<tr>
<td></td>
<td>-Annual training by food bank (3)</td>
<td>“That’s provided in the training with [the food bank] so it’s not a separate training.”</td>
</tr>
<tr>
<td></td>
<td>-No formal training (1)</td>
<td>“In part we do but just less formal.”</td>
</tr>
<tr>
<td>What types of food donations do you receive?</td>
<td>-Canned and packaged items (5)</td>
<td>“We accept just about anything from the public…including personal care products.”</td>
</tr>
<tr>
<td></td>
<td>-Frozen items (4)</td>
<td>“Our pantry receives surplus items from farmers and hunters.”</td>
</tr>
<tr>
<td></td>
<td>-Fresh produce (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Meats (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Milk and dairy (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Home processed items (1)</td>
<td></td>
</tr>
<tr>
<td>Where do your food donations come from?</td>
<td>-Grocery stores (5)</td>
<td>“We have 32 scheduled pick-ups each week.”</td>
</tr>
<tr>
<td></td>
<td>-General public (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Local farmers (4)</td>
<td></td>
</tr>
<tr>
<td>What are your guidelines for determining if donated foods are safe for consumption?</td>
<td>-Food safety guidebook from food bank (4)</td>
<td>“As far as canned items go, if they’re not rusted and leaking, and they have an ingredient list on them, they’re okay.”</td>
</tr>
<tr>
<td></td>
<td>-General appearance must be clean and undamaged (5)</td>
<td>“A lot of it is the date.”</td>
</tr>
<tr>
<td></td>
<td>-Expiration dates (5)</td>
<td></td>
</tr>
<tr>
<td>What guidelines are in place for how to handle food and when to reject or throw out</td>
<td>-Policy guidebook (4)</td>
<td>“[The food bank] has a policy guidebook for us to use.”</td>
</tr>
<tr>
<td>food that is deemed unsafe?</td>
<td>-Expiration dates (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-General appearance (5)</td>
<td></td>
</tr>
<tr>
<td>What are the reasons you would use to throw food away?</td>
<td>-Dented, spoiled, unlabeled, or open items (5)</td>
<td>“When in doubt, throw it out.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“If there’s doubt, throw it out.”</td>
</tr>
<tr>
<td>How often is food thrown out due to expiration dates, damage, or spoilage?</td>
<td>-Daily (1)</td>
<td>“We throw away food as needed.”</td>
</tr>
<tr>
<td></td>
<td>-Weekly (3)</td>
<td>“Some weeks we do not throw away any food.”</td>
</tr>
<tr>
<td></td>
<td>-Rarely (1)</td>
<td></td>
</tr>
<tr>
<td>Who is responsible for deciding when and how food is thrown out?</td>
<td>-Managers (3)</td>
<td>“It’s common sense when food is bad.”</td>
</tr>
<tr>
<td></td>
<td>-Trained and untrained volunteers (3)</td>
<td>“We train our volunteers.”</td>
</tr>
<tr>
<td>Interview Question</td>
<td>Patterns (Number of Responses)</td>
<td>Selected Quotations</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Approximately how much food is thrown out in a month?</td>
<td>-3,000 pounds (1)</td>
<td>“A pig farmer comes to pick up the rejected food for feed.”</td>
</tr>
<tr>
<td></td>
<td>-1,700 pounds (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Difficult to track/unknown (3)</td>
<td></td>
</tr>
<tr>
<td>How often is food thrown out because of an overabundance of a particular food item?</td>
<td>-Daily (1)</td>
<td>“We often have an overabundance of bread.”</td>
</tr>
<tr>
<td></td>
<td>-Weekly (3)</td>
<td>“We only order what we know we can give away.”</td>
</tr>
<tr>
<td></td>
<td>-Never (1)</td>
<td></td>
</tr>
<tr>
<td>What are your guidelines for package dating?</td>
<td>-Must have a date (3)</td>
<td>“It’s good past [the expiration date], but you got to really watch that because you could go over it if you’re not on top of stuff.”</td>
</tr>
<tr>
<td></td>
<td>-Out-dated items can be distributed, excluding baby food and formula (5)</td>
<td></td>
</tr>
<tr>
<td>Do you use sell-by, use-by, best-by, or another method to determine when food needs to be thrown out?</td>
<td>-Use all methods (5)</td>
<td>“We use any method that has a date.”</td>
</tr>
<tr>
<td>What do you do for non-dated products?</td>
<td>-Items are discarded (3)</td>
<td>“We do not accept non-dated items.”</td>
</tr>
<tr>
<td></td>
<td>-Last in, last out (2)</td>
<td>“Items are rotated based on when they were received.”</td>
</tr>
<tr>
<td>How often are cold storage areas inspected for proper functioning?</td>
<td>-Daily through a mobile app (1)</td>
<td>“The app will alert me when it’s malfunctioning.”</td>
</tr>
<tr>
<td></td>
<td>-Weekly (1)</td>
<td>“We track this information monthly and [the food bank] checks on this each year.”</td>
</tr>
<tr>
<td></td>
<td>-Monthly (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Quarterly (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Not applicable (1)</td>
<td></td>
</tr>
<tr>
<td>How often are storage areas cleaned and inspected for safety? (To include cold storage, pantry storage, and open shelving.)</td>
<td>-Weekly (3)</td>
<td>“Our volunteers do this as needed.”</td>
</tr>
<tr>
<td></td>
<td>-As needed basis (2)</td>
<td>“We do this each week.”</td>
</tr>
<tr>
<td>Who has completed a ServSafe certification course or similar food safety course?</td>
<td>-Manager (1)</td>
<td>“I think one of our volunteers did ServSafe.”</td>
</tr>
<tr>
<td></td>
<td>-Volunteers (1)</td>
<td>“I do not know of anyone that has.”</td>
</tr>
<tr>
<td></td>
<td>-None (3)</td>
<td></td>
</tr>
<tr>
<td>What food safety training(s) would be most beneficial for your pantry?</td>
<td>-Food demonstration training (1)</td>
<td>“We would really love to have that [food demonstration training] done.”</td>
</tr>
<tr>
<td></td>
<td>-Food safety manual for new volunteers (1)</td>
<td>“Written procedures that any new volunteer would receive.”</td>
</tr>
<tr>
<td>Who regulates your organization for food safety compliance?</td>
<td>-Food bank (4)</td>
<td>“[The food bank] checks on us each year.”</td>
</tr>
<tr>
<td></td>
<td>-USDA (3)</td>
<td>“USDA inspects us since we receive CSFP.”</td>
</tr>
</tbody>
</table>
The listed patterns provided insight on current guidelines within the facilities and how procedures are enforced. The managers revealed that they make decisions to discard food based on policies in a guidebook and package dating. Similar responses were noted among the locations affiliated with the food bank, however there were also differences based on the number of families served and leadership availability. One difference was the varying amount of pounds of food waste each month due to the size of each location in descending order. The largest location reported nearly 3,000 pounds of waste, while a medium-sized location reported 1,700 pounds and smaller locations did not report due to it being unknown or lack of significant waste. A second difference was who is responsible for discarding food with answers varying from the manager to trained and untrained volunteers or whoever is present that day. Four of the five locations mentioned difficulty in retaining volunteers and managing the facility as a whole due to lack of abled staff. Another difference was the acceptance of dated versus undated items. A majority of locations do not allow undated items, however, some allow processed meats from Hunters for the Hungry and other homemade items. For those locations accepting home canned foods, if not processed properly according to the USDA Canning Guidelines, the food products could pose food safety risks (The National Center for Home Food Preservation, 2015). The food bank affiliated locations often stated their reliance on the organization to provide training, policy guidelines, and general operating procedures in order to meet the needs of their clientele and volunteers.

**Discussion**

This study captured a sample of how decisions are made in food recovery locations and the opportunities for food safety education. Four of the five locations were consistent in their procedures since they are partner organizations with a food bank, while the fifth independently
establishes policies for the facility. It was important to study both types of locations in order to recognize what is already working and areas for improvement.

Of the four similar locations, each still has a varying degree of independence regarding daily operations as participants stated the food bank typically does site visits on an annual basis, except during outside agency compliancy inspections, including those from USDA. Participants stated the food bank provides a policy guidebook for all locations, but it is up to the manager to determine how this document is interpreted and enforced. A common pattern among the managers at these locations was their trust and willingness to contact the food bank for assistance when needed, whether on procedural matters, trainings, or general questions. This suggests that future services provided by the food bank, including food safety training, would be well-received. The independent location indicated the need for written procedures and visuals based on current guidance from the USDA. This facility is run without formal policies, of which they could benefit from future VCE and FNP program development for this population.

Participants stated the food bank provides an annual in-person food safety training to all partner agencies, however it is voluntary and occurs during normal business hours. They report that while this is a valuable training, it is not feasible for managers and volunteers with other employment and those having limited availability. The facilities that are unable to attend this training have to wait until the following year, which may indicate new volunteers are also not trained for an extended period of time. This could result in safety and waste concerns when handling, sorting, and shelving food donations. It was also reported that the food bank supplies each location with a policy guidebook in which food safety recommendations are outlined, however it varies whether all volunteers have access to this document.
All locations are challenged with the volunteer dilemma of inconsistent staff and the fact that almost all are unpaid. This presents inconsistent availability at times, which can further complicate how procedures are enforced and followed. One location is challenged with increasing food waste due to their facility only operating twice a month due to staff having full-time jobs and other commitments. This location states they are unable to provide the same amount of produce as when they were open weekly due to spoilage concerns. The managers reported a need for committed volunteers in order for the facility to operate normally.

All of the locations report using numerous methods of package dating, including sell-by, best-by, and use-by. The sell-by date informs retailers how long to display the item and consumers when to purchase. The best-by date is when the item is at its best flavor or quality. The use-by date is when the item is at peak quality. It is important to note that these dates are not specifying when food becomes unsafe, excluding infant formula. The managers recognize that food is still acceptable after the package date, except for infant formula, but there were inconsistencies noted as to how long managers and volunteers interpret this food can be kept. Managers noted items can be kept for six months or a year after the date, but many do not have a written procedure or visual for volunteers to follow. This theme, along with information on non-dated items, could be used to develop a resource or additional training to reduce unnecessary food waste and clarify any food safety concerns.

Food waste is an inevitable concept within food recovery locations since a large amount of the food donations are nearing the end of quality and other factors, such as transportation and mishandling, can cause damage to the items. All of the locations receive donations from grocery stores and volunteers are tasked with picking up the food and bringing it to the facility. Food that is not handled properly or stored incorrectly during transport may result in these items being
spoiled and discarded. It is important to examine ways to reduce waste by better understanding of package dates and how to safely handle fresh, frozen, and canned items. When either of these options are not feasible, the facilities are attempting to redistribute to other organizations or divert the food waste to animal feed. One location already has a partnership with a local pig farmer to pick up discarded food at the facility. Several locations are partnering with nearby homeless shelters to provide abundantly-received items for their daily meals, therefore ensuring food is reaching the hungry instead of being wasted.

**Recommendations**

This study revealed the need for on-going food safety education, particularly at unaffiliated locations that do not have resources from a larger organization. While food banks do provide this type of training, it is usually only done once a year and is not mandatory. This means the manager, if in attendance, is responsible for relaying the information to volunteers, however all facilities experience a challenge in thoroughly training new volunteers, especially those that are one-time or short-term, due to lack of staff and time. There is a present need for a simple, abbreviated version of food safety training as a manual with visuals for these types of volunteers to review onsite. These educational resources would also benefit long-term volunteers as reminders for recommended procedures. There is also a need for package dating training due to the inconsistent responses from the managers on how long food can be kept after the labeled date.

For those doing similar research in the future, it would be advantageous to partner with the local food bank when possible, as this will provide a trusted and stronger connection with the partnering food recovery locations. Forming a partnership with the food bank will ensure resources are not overlapping and services fit within the organization’s allotted guidelines. This
research study could be expanded upon by interviewing additional managers at community and faith-based locations within Virginia. Based on feedback received from the managers, the most beneficial trainings consist of how to conduct safe food demonstrations and general food safety for volunteers. Future research and program development at Virginia Tech should focus on the challenges specific to food recovery locations in order to accurately meet the needs of this population.
References


Appendix A

Feeding America Acceptable Foods and Labeling Requirements

Acceptable Foods and Labeling Requirements

<table>
<thead>
<tr>
<th>Food Type</th>
<th>Prepared Foods</th>
<th>Packaged Foods</th>
<th>Fresh Produce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources</td>
<td>Hotels</td>
<td>National and local donors</td>
<td>Any donor or vendor of fresh produce</td>
</tr>
<tr>
<td></td>
<td>Restaurants</td>
<td>National and local vendors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Institutes</td>
<td>Retail store donations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Food Service Facilities</td>
<td>Reclaim and food drives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bakeries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examples of foods</td>
<td>Prepared meat, poultry, entrees, pasta, pizza, vegetables, chilled foods, etc.</td>
<td>Canned, boxed, or packaged foods</td>
<td>Whole produce in bins and bags</td>
</tr>
<tr>
<td>Label requirement</td>
<td>Fair Packaging and Labeling Act (FPLA) does not apply.</td>
<td>Fair Packaging and Labeling Act (FPLA) applies.</td>
<td>Fair Packaging and Labeling Act (FPLA) does not apply.</td>
</tr>
<tr>
<td>Recommended language for label to state</td>
<td>1. The name and location of FDO (pre-printed) 2. The name and location of donor 3. The food description 4. The date of donation 5. Allergen disclaimer statement (pre-printed) WARNING! This container holds rescued food! This food may contain, have come in contact with, or have been produced in a facility which also produces milk, eggs, peanuts, tree nuts (walnuts, almonds, pecans, hazelnuts/filberts, pistachios, cashews, coconuts, pine nuts, macadamia nuts, and/or Brazil nuts), fish, shellfish (crab, crawfish, lobster, shrimp, mussels, and/or oysters), wheat, soybeans, and/or sesame seeds.</td>
<td>1. The common or usual name of the produce 2. The name and place of business of the manufacturer, packer, or distributor 3. The net quantity of the contents 4. The common or usual name of each ingredient, listed in descending order of prominence</td>
<td>No label required</td>
</tr>
<tr>
<td>Comments</td>
<td>Label is applied to all containers.</td>
<td>These products are assumed to have the proper retail label already on the packaged product when they are received by the member.</td>
<td></td>
</tr>
</tbody>
</table>

*See sample labels in Appendix D

Appendix B

Questions for Food Recovery Manager Interviews

Introductory statement: This interview is about food safety and food waste at your food recovery location. It has been developed so that you can tell me what you do in regards to these topics. The information you give will be used to develop better food safety training and education for food recovery locations. The answers you give will be kept private. Answer the questions based on what you really do. No names will ever be reported. Completing the interview is voluntary. If you are not comfortable answering a question, I will ask the next question. Please note that your answers will be recorded using an audio recorder, which will then be transcribed by the research team to ensure the accuracy of my note taking. Thank you very much for your help.

- Is your food pantry affiliated with a larger organization? Which one? Is there more than one?
  - What training is provided by this larger organization?
  - Have your volunteers completed training on safe food handling? Who currently provides this training (if not the larger organization)?
  - Does the larger organization have specific policies and procedures for managing the food pantry? If so, would you be willing to share a copy of those policies? (this is optional—the policies will be kept confidential).
  - If more than one organization, are the policies different or similar? If different, how so?
  - What records are required by the larger organization (such as daily donations, cold storage temperatures, etc.)?

- What types of food donations do you receive, such as:
  - Packaged items, such as cereal, crackers, peanut butter, etc.
  - Milk
  - Meats
  - Fresh Produce
  - Frozen items
  - Canned items
  - Home canned items
  - Others?

- Are you receiving food items that are further processed by your organization, such as an accompanying kitchen with food that is canned or frozen on-site?
• Where do your food donations come from, such as:
  o Grocery stores
  o General public/individual donations
  o Restaurants
  o Commissaries
  o Food processors/food outlet stores
  o Farmers market vendors
  o Gleaning organizations or programs
  o Other?

• What are your guidelines for determining if donated foods are safe for consumption?
  o Do you reject donated food that is deemed expired, damaged, or spoiled?
  o What guidelines are in place for how to handle food (fresh, frozen, and canned) and when to reject or throw out food that is deemed unsafe? Does your pantry have a policy guidebook to determine operational procedures?

• What are the reasons you would use to throw the food away?
  o How often is food thrown out due to expiration dates, damage, or spoilage?
  o Is this done daily, weekly, monthly?
  o Who is responsible for deciding when and how food is thrown out?
  o If your volunteers are responsible for doing this, how are they trained to do it?
  o Approximately how much food is thrown out in a month?
  o How often is food thrown out because of an over-abundance of a particular food item, such as loaf bread, etc.?

• What are your guidelines for package dating?
  o Do you use sell-by, use-by, best-by, or another method to determine when food needs to be thrown out (in other words, pre-dated packages)?
  o What do you do for non-dated products, such as produce meats (such as Hunters for the Hungry)?
  o What additional guidelines or criteria (if any) do you use to decide when food should be thrown out?

• Do you have cold storage areas? (If yes)
  o How often are cold storage areas inspected for proper functioning?
  o How often are storage areas cleaned and inspected for safety?
  o To include cold storage, pantry storage, and open shelving.

• What are your guidelines for preparing food safely or conducting a safe food demonstration?
  o Who has completed a ServSafe certification course or a similar food safety class (such as volunteers, pantry manager, etc.)?

• What food safety training(s) would be most beneficial for your pantry?

• Who regulates your organization for food safety compliance? VDH? VDACS? Or someone else?