

Master of Public Health
Integrative Learning Experience Report

***A STEP-BY-STEP OVERVIEW OF THE DEPARTMENT OF THE
ARMY'S FOOD INSPECTION PROCESS IN FT. RILEY,
KANSAS***

by

Fredrick Deya, B.S.

MPH Candidate

submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

Graduate Committee:

Justin Kastner, PhD

Abbey Nutsch, PhD

Ellyn Mulcahy, PhD, MPH

Public Health Agency Site:

Fort Riley, Kansas

August 21, 2023 - October 23, 2023

Site Preceptor:

Nuessle William (Captain), Chief Environmental Health- Irwin Army Community Hospital

KANSAS STATE UNIVERSITY

Manhattan, Kansas

2024

Copyright

FREDRICK DEYA

2024

Abstract

This report summarizes my Integrative Learning Experience (ILE) at the Public Health Department in Fort Riley, Kansas. The experience lasted for two months, during which I had the opportunity to touch upon every section within the department. My emphasis was on food safety management systems, which are practices implemented by food establishments to ensure that food does not harm consumers along its supply chain. Food contamination occurs due to physical, chemical, and biological hazards such as bacteria, viruses, parasites, fungi, harmful substances (e.g., sanitizers, refrigerant gases), and physical particles (e.g., plastics, wood). These contaminants are often introduced during the receiving, processing, storage, preparation, and serving stages of food distribution. Contamination can result from improper hygiene, sanitation, temperature checks, and cross-contamination caused by food handlers. Consumption of contaminated food can lead to illnesses and fatalities, including salmonellosis (foodborne infection caused by *Salmonella* spp.), *Clostridium perfringens*, and *Clostridium botulinum*, among others. Several studies have proposed different approaches to managing food contamination. At the federal level, key agencies involved in advancing food safety regulatory activities include the Food and Drug Administration (FDA), the Food Safety and Inspection Service (FSIS), the Environmental Protection Agency (EPA), and the National Marine Fisheries Service (NMFS). These federal agencies collaborate with state and private institutions to promote food safety goals. For instance, the FDA's Food Code provides scientific benchmarks and suggestions that states and local administrations can adopt to improve food safety in restaurants and institutional food settings. The code delineates temperature standards for cooking, cooling, refrigerating, reheating, and holding food. Additionally, it advocates for regular inspections of restaurants, recommending a frequency of visits every six months or as deemed necessary.

Subject Keywords: Fort Riley, Public Health, FDA's, Commissary, DFAC, Codex Alimentarius

Table of Contents

Copyright	ii
Abstract.....	iii
Chapter 1 - Food Safety Management	2
Introduction.....	2
Hazard Analysis Critical Control Point (HACCP)	2
Table 1.1 Physical, chemical, biological hazards and preventions	5
Table 1.2 Refrigerated storage of foods and critical limits of temperature and time	6
Good Manufacturing Practices (GMPs).....	7
Chapter 2 - Learning Objectives and Project Description.....	9
Learning Objectives	9
Project Description	9
Chapter 3 - Noteworthy Findings, Reflections, and Future Research Questions	12
Noteworthy Findings and Reflections	12
Portfolio Product A: Poster of experience gained while conducting internship.....	12
Portfolio Product B: Department of Army Food Inspector Handbook	12
Future Research Questions:	13
Chapter 4 - Competencies	14
Student Attainment of MPH Foundational Competencies	14
Table 4. 1 Summary of MPH Foundational Competencies	14
Student Attainment of MPH Emphasis Area Competencies	15
Table 4.2 MPH Emphasis Area Competencies	15
References	17
Appendices A and B	18

Chapter 1 - Food Safety Management

Introduction

Contaminated food poses health risks to consumers, making it imperative for the food industry to prioritize the safety of their practices and products along the production and supply chain. Various food regulations, such as ISO 22000, have been established to ensure that the food reaching the consumer's table is safe. ISO 22000 emphasizes the need for a global standard for managing food safety, and organizations should adhere to this standard to demonstrate their capacity to uphold food safety hazards, ensuring their safety practices and products meet global standards. The success of food safety management is contingent on integrating essential elements such as knowledge, tools (including risk assessment), and mechanisms (like HACCP, described below) into the organization's food safety management system.¹ ISO 22000 integrates and complements elements of ISO 9001, the standard for quality management systems, good manufacturing practice (GMP), good hygiene practice (GHP), and the hazard analysis critical control point (HACCP) system.²

Hazard Analysis Critical Control Point (HACCP)

HACCP is a proactive, systematic approach to thinking about food safety that puts prevention at the forefront. Instead of simply reacting to potential hazards after the fact, HACCP aims to anticipate and mitigate risks at every step of the food production process. At the heart of HACCP is the identification and assessment of hazards. These hazards can be biological (bacteria, viruses, parasites, molds, yeasts, and naturally occurring toxins), chemical (pesticides, sanitizers), or physical (foreign objects that should not be in our food) as depicted in Table 1.1. By focusing on critical control points (CCPs), HACCP helps monitor potential dangers and act before they become a problem. The ultimate goal of HACCP is the prevention of hazards occurring.³

An international standard-setting body, the Codex Alimentarius Commission, also reiterates that HACCP is a systematic and preventive approach to food safety management that emphasizes proactive measures at every stage of the food production process. By focusing on

¹ McMeekin et al., "Predictive Microbiology."

² Abebe et al., "Drivers for the Implementation of Market-based Food Safety Management Systems."

³ Scott and Chen, "Food Safety Management Systems."

product design, process control, and good hygiene practices, HACCP helps to safeguard food safety from the outset and throughout the entire food supply chain.⁴

Researchers argue that the success and effectiveness of HACCP in managing food safety rely on the employee's training received. This training is critical in equipping individuals with the necessary knowledge, skills, and understanding of food safety principles to implement and maintain a robust food safety system. Furthermore, it helps employees understand the hazards and potential risks associated with food production, processing, handling, and control measures at CCPs, such as temperature control, sanitation practices, and hygiene protocols.⁵

HACCP incorporates the following steps:

- i. Conducting a Hazard Analysis by identifying biological, chemical, or physical hazards that threaten food safety. This identification and analysis of the food hazards is the precursor to a safe food chain, as it provides information to interpret GMP requirements and identify specific product or process training needs for staff.⁶
- ii. Determination of Critical Control Points (CCPs) by identifying the steps in the food production process where food hazard controls are applied to prevent, eliminate, or reduce hazards to acceptable levels. This includes pivotal points where we want to ensure things are just right, from temperature to time to the physical aspects of our food.
- iii. Establishment of Critical Limits (CL) involves the establishment of specific criteria for each CCP, such as temperature, time, and physical dimensions, which will ensure control of the hazards. It is not enough to know where our control points are; we also need to go further in setting clear standards for what constitutes safety at each of these critical points by defining what "safe" looks like, whether a specific temperature or a precise amount of time as depicted in table 1.2.
- iv. Monitoring Procedures for each CCP to ensure control measures are operational as intended. This involves keeping an eye on each critical control point so that if procedures go wrong, there are steps to make them right.
- v. Corrective Action includes procedures undertaken when monitoring a CCP leads to the discovery of a violation of a critical limit; this ensures food entering the food chain is safe (and steps are taken to fix deviations).

⁴ Weinroth, Belk, and Belk, "History, Development, and Current Status of Food Safety Systems Worldwide."

⁵ Karaman et al., "Barriers and Benefits of the Implementation of Food Safety Management Systems among the Turkish Dairy Industry."

⁶ McMeekin et al., "Predictive Microbiology."

- vi. Verification Procedures that help ensure the HACCP system is working effectively. Indeed, it is not enough to assume our system is working; we need to be sure it is functioning as it should.
- vii. Establish Record-Keeping and Documentation Procedures to maintain records for the HACCP system's effectiveness.

Table 1.1 Physical, chemical, biological hazards and preventions

(SOURCE: Mayes, Tony, and Sara Mortimore, eds. *Making the Most of HACCP: Learning from Other's Experience*. Woodhead Publishing in Food Science and Technology. Boca Raton, Fla. : Cambridge, England: CRC Press; Woodhead Pub. Ltd, 2001, page .)

Causative Agent	Types of illness	Symptoms onset	Common food	Prevention
Biological Hazards				
Escherichia coli 0157:H7	Bacterial infection or toxin-medial infection	Bloody diarrhea followed by kidney failure and hemolytic uremic syndrome (HUS) in severe cases (12-72 hrs.)	Undercooked hamburger, raw milk, unpasteurized apple cider, lettuce	Practice good food sanitation, handwashing; properly handle and cook food
Salmonella	Bacterial infection	Nausea, fever, vomiting, abdominal cramps, diarrhea (6-48hrs)	Raw meats, raw poultry, eggs, milk, daily products	Properly cook foods avoid cross contamination
Clostridium perfringens	Bacterial toxin-mediated infection	Intense abdominal pains and severe diarrhea (8-22hrs.)	Spices, gray, improperly cooked food (especially meats and gravy dishes)	Properly cook, cool and reheat food
Bacillus cereus	Bacterial intoxication or toxin-mediated infection	Diarrhea type abdominal cramps (8-16hrs) 2 Vomiting type: voting, diarrhea, abdominal cramps (30 min-6 hrs.)	Diarrhea type: meats milk vegetable 2 Vomiting type: rice starchy food grains cereals	Properly heat, cool and reheat foods
Chemical Hazards				
Scombrototoxin	Seafood toxin originating from histamine producing bacteria	Dizziness, burning feeling in the mouth, facial rash or hives peppery taste in mouth, headache, itching, tears eyes, runny nose (1-30min)	Tuna, mahi-mahi, bluefish, sardines, mackerel, anchovies, amberjack, abalone	Purchase fish from a reputable supplier; store fish a low temperature to prevent growth of histamine-producing bacteria; toxin IS NOT inactivated by cooking
Mycotoxin	Intoxication	1 Acute onset-hemorrhage, fluid buildup 2 Chronic onset-cancer from small doses over time.	Moldy grains, corn, corn products, peanuts pecans, walnuts and milk	Purchase food from a reputable suppliers; keep grains and nuts dry; and protect production from humidity.
Physical Hazards				
Fragment of glass, metal pieces, human hair and jewelry				Wash raw food, don't wear jewelry during food preparation, sieves and magnets.

Table 1.2 Refrigerated storage of foods and critical limits of temperature and time

(SOURCE: Mayes, Tony, and Sara Mortimore, eds. *Making the Most of HACCP: Learning from Other's Experience*. Woodhead Publishing in Food Science and Technology. Boca Raton, Fla. : Cambridge, England: CRC Press; Woodhead Pub. Ltd, 2001, page .)

Food	Recommended temperature (F/C)	Maximum storage period	Comments
Meat			
Roast, steaks, chops	2-36/ 0-2.2	3 to 5 days	wrap loosely
Ground and stewing	32-36/0-2.2	1 to 2 days	wrap loosely
Variety meats	32-36/0-2.2	1-2 days	wrap loosely
Whole ham	32-36/ 0-2.2	7 days	may wrap tightly
Poultry			
Whole chicken, turkey, ducks	32-36/ 0-2.2	1 to 2 days	wrap loosely
Stuffing	32-36/ 0-2.2	1 to 2 days	covered container
Fish			
Fatty fish	30-34/ -1.1- 1.1	1 to 2 days	wrap loosely
Fish-not iced	30-34/ -1.1-1.1	1 to 2 days	wrap loosely
Eggs			
Eggs in shell	40/4.4	1 week	do not wash, remove from container
Leftover York/white	40-45/ 4.7-7.2	2 days	cover yolks with water
Dried eggs	40-45/ 4.4-7.2	1 year	same treatment as egg in shells
Dairy Products			
Fluid milk	38-39/ 3.3-3.9	5 to 7 days after date on carton	Keep covered and in original container.

Good Manufacturing Practices (GMPs)

As mentioned earlier, ensuring food safety is essential from the beginning of the food production process to the final consumer. Systems associated with Good Manufacturing Practices (GMP) have been established across the food supply chain to ensure its success. The GMP system covers various aspects, including the following:

- Implementing good agricultural practices for food production
- Enforcing good practices in animal husbandry
- Promoting good aquacultural practices
- Stressing good practices for food handlers and consumers alike, such as ensuring good catering practices and maintaining hygiene in domestic kitchens.

These practices are crucial in safeguarding food from contamination and ensuring the highest safety standards from the farm to the consumer's table.⁷ Additionally, the most effective implementation of HACCP is commonly recognized to take place within an environment with well-managed prerequisite programs (PRPs).⁸ Though the precise definition of PRPs may vary, their core concept aligns with what is commonly known as Good Manufacturing Practice (GMP). GMPs mainly address general policies, practices, procedures, processes, and other measures essential for consistently producing safe, suitable foods of uniform quality. Good Hygiene Practice (GHP) is a subset of GMP; GHPs specifically target the necessary precautions to ensure appropriate hygiene, often stressing the essential prerequisites for HACCP.⁹

Good Manufacturing Practices and Good Hygiene Practice requirements encompass the following:

- The hygienic design and construction of food manufacturing premises
- The hygienic design, construction, appropriate use, and maintenance of machinery
- Cleaning and disinfection procedures for plant and equipment
- General hygienic and safety practices in food processing, including microbial quality of raw materials and supplier quality assurance, hygienic operation of each process step, pest, water, and air control, product rework and recall procedures, waste management,

⁷ Blackburn and McClure, *Foodborne Pathogens*.

⁸ Mayes and Mortimore, *Making the Most of HACCP*.

⁹ Mayes and Mortimore.

labeling and traceability systems, transportation, hygiene of personnel and their training in hygiene and food safety.¹⁰

In the manufacturing process, some stages may not be identified as Critical Control Points (CCPs). However, applying GMPs to these stages is crucial to ensure that necessary controls and standards are in place. While GMPs cannot replace the need for a CCP, they collectively minimize the chances of hazards occurring, thereby reducing the need for a CCP. Effective GMPs help manage “general” or “establishment” hazards, which would otherwise require a CCP. Without GMPs, there would be more CCPs in the HACCP plan, covering both “general/establishment” and product-specific hazards. Therefore, GMPs act as vital preventive measures, ensuring food safety standards are maintained throughout the production process, even in non-CCP areas.

¹⁰ Mayes and Mortimore.

Chapter 2 - Learning Objectives and Project Description

Learning Objectives

The author's APE sought to achieve the following learning objectives:

- To examine specific threats to the food system and scientifically investigate how each can be prevented, controlled, and/or mitigated in the food production system.
- To understand different food safety laws, regulations, regulatory bodies, and their unique legislative authorities, missions, and jurisdictions.
- To identify food safety and biosecurity-related technical needs of different stakeholders and make judgments as to the appropriate methods of collaboration in the food system.

Project Description

Having developed an interest in conducting my field experience with the Fort Riley Public Health Department, I successfully negotiated my field experience under the guidance of Dr. Kastner starting from February 2023, ultimately securing placement on April 3, 2023. My field experience primarily focused on military procedures and regulations on food safety, food-borne pathogens, and control measures in their dining facilities and commissary. My preceptor, Captain William Nuessle, integrated me into the overall public health domain, giving me invaluable insights into the intricate roles played by different sections in advancing health within the Fort Riley garrison. He later helped me emphasize environmental and veterinary services that can help ensure dining facilities and commissaries achieve food safety standards as highlighted below:

- **Environmental Health (EH):** Tasked with diverse responsibilities to safeguard public health from natural and unnatural environmental hazards. Its activities include monthly food safety inspections, water quality checks, insect surveillance, medical waste inspections, and hazardous waste disposal through collaboration with local healthcare facilities.¹¹
- **Veterinary Services (VS):** Conducts food facility evaluations, disease monitoring, and the identification of zoonotic diseases. i.e., ensure food that enters the commissary from the suppliers meets all the set military health standards.

¹¹ Moeller, *Environmental Health*.

Through the environmental health section, I became acquainted with the military's food inspection regulation book, specifically TB MED 5-30 (the guide for inspecting dining facilities and commissaries in military establishments). The inspections were scheduled bi-monthly and encompassed observing culinary staff conduct on the dining floor, food storage, preparation, serving areas, dining areas, equipment, and documentation standards, ensuring subsequent compliance. Veterinary Services provided an opportunity to learn procedures to ensure food is safe on the back shelf. Through veterinary services, I realized a lot of emphasis is placed on food management systems such as HACCP and Preventive Controls (PC) for human food, such as conducting food facility evaluations, disease monitoring, and the identification of zoonotic diseases, to ensure food that enters the commissary from suppliers meets all set military health standards.

In all aspects, I gained insights into public health's role in advancing food safety, providing me with valuable hands-on experience. Additionally, I tapped into additional knowledge from other public health sections that, while not directly involved with food safety, impact the overall health of people in Fort Riley like:

- **Army Wellness Center (AWC):** offers behavioral health counseling services, incorporating assessments like total weight, body fat percentage and fat-free mass (BodPod) scans, and YMCA fitness tests/measures of individual cardiovascular (aerobic) fitness level. Additionally, stress management and smoking cessation classes are part of their undertakings.¹²
- **Industrial Hygiene (IH):** It is responsible for inspecting industrial factories (motor pools, waste recycling plant), monitoring indoor air quality, addressing public health initiatives, and collaborating with the Army Health Promotion (AHP) on sound decibel levels.¹³
- **Occupational Health (OH):** focuses on monitoring the health of prospective employees by conducting pre-employment physicals and regular health assessments of employees based on job requirements.
- **Army Hearing Program:** Aims to protect military and civilian personnel from noise exposure, providing earplugs and conducting annual hearing tests and health recommendations.
- **Public Health Nursing (PHN):** PHN tracks and reports diseases, offering counseling services and engaging the community through health fairs.

¹² Rivera et al., "An Evaluation of Army Wellness Center Clients' Health-Related Outcomes."

¹³ Spellman, *Industrial Hygiene Simplified*.

The entire experience was both enlightening and fulfilling, not only enhancing my skills but also enabling me to make a valuable contribution to the objectives of the Ft. Riley Public Health Department. Further, the conclusion of the field experience also led to two research products: a poster outlining my internship experience at the Fort Riley Public Health Department and the Department of Army Food Inspector Handbook, both covered in Chapter 3.

Chapter 3 - Noteworthy Findings, Reflections, and Future Research Questions

Noteworthy Findings and Reflections

During my regular discussions and meetings with Dr. Kastner, my major advisor, and throughout the in-person field experiences, I acquired invaluable learning opportunities crucial to my degree journey. A recurring theme was the close-knit relationship between food safety and management systems. This relationship underscores how the measures taken to enforce food management systems significantly influence the quality of food output that guided the development of my research products found in Appendix A and B and also highlighted below:

Portfolio Product A: Poster of experience gained while conducting internship.

The poster explores the historical backdrop of Fort Riley's public health department, its accreditations, guiding regulations, and the essential “dos” and “don'ts” observed in their dining facilities. It also delves into the lessons learned from the 40th *Frontier* Field Trip in Council Grove, Kansas, entitled “I Will Be There for You: Living in a Microbe Paradise,” which was a reminder of the *E. coli* O157:H7 foodborne illness crisis during the early 1990s in the United Kingdom. Beyond using posters to inform, I acquired incredible writing and analytical skills by amalgamating both hands-on insights and experiences from my classes.

Portfolio Product B: Department of Army Food Inspector Handbook

The Food Inspector Handbook serves as a simplified guide to the food inspection process designed to be understandable to individuals with varying levels of expertise, including those with no prior background in food safety. Created in PowerPoint, the step-by-step manual proceeds slide-by-slide, breaking down the inspection process into digestible steps and incorporating visual aids and emphasis for each inspection stage. By providing a comprehensive overview of food safety regulations and inspection steps, the handbook equips individuals with the necessary knowledge to navigate the food inspection process efficiently, thereby contributing to overall food safety standards.

Future Research Questions:

As an MPH student in Food Safety and Biosecurity, I am interested in the future of food safety. Therefore, I wonder about the following questions:

- i. How can technology advancements like artificial intelligence (AI) be incorporated into Military Dining Facilities and Commissary food safety management systems to improve real-time monitoring, analytics, detection, and control of hazards?
- ii. What is achievable through collaborations with regional civilian health departments, academic institutions, and industry associations in the food safety industry?
- iii. How can military food safety management systems be enhanced to enable swift responses and efficient containment of foodborne illness outbreaks or other food safety crises?

Chapter 4 - Competencies

Student Attainment of MPH Foundational Competencies

The diverse classes at Kansas State University have been a cornerstone of my academic and professional development. My journey through the MPH program has not only equipped me with an understanding of 22 essential Public Health Foundational Competencies. Still, it has also allowed me to hone 5 crucial competencies during my APE experience as highlighted in Table 4.1 below.

Table 4. 1 Summary of MPH Foundational Competencies

Number and Competency		Description
8.	Planning and Management to Promote Health	Apply awareness of cultural values and practices to the design or implementation of public health policies or programs
9.	Planning and Management to Promote Health	Design a population-based policy, program, project or intervention.
18.	Communication	Select communication strategies for different audiences and sectors.
19.	Communication	Communicate audience-appropriate public health content, both in writing and through oral presentation
21	Interprofessional Practice	Perform effectively on interprofessional teams.

I achieved Competencies 8 and 9 by formulating the food inspection process in a military dining facility. The existing procedures, though non-prescriptive, serve as guidelines for food inspectors to develop tailor-made steps based on the prevailing circumstances while ensuring compliance with the TB Med 530 Tri-Service Food Code.

Competencies 18, 19, and 21 were acquired by creating an informative poster for circulation to the Public Health Department of Fort Riley, Kansas State University, and the Military Science Department. Additionally, the internship involved engaging professionally with

various departmental staff at Fort Riley Public Health and collaborating with scholars from diverse disciplines during the 40th *Frontier* Field Trip, in which we re-enacted a real-life foodborne illness event.

Furthermore, I incorporated Competency 22, which involves "systems thinking-process mapping," by creating a process flow chart diagram. You can find this diagram in my APE document on page 11.

Student Attainment of MPH Emphasis Area Competencies

My emphasis area in my MPH is Food Safety and Biosecurity, and through the APE and ILE, my understanding of food safety and public health has been enhanced. During my studies, I took several memorable classes, such as *Trade and Agricultural Health* with Dr. Justin Kastner and *Food Protection and Defense-Essential Concepts* with Dr. Abbey Nutsch. These classes reinforced important food safety concepts. For instance, *Trade and Agricultural Health* examined issues like trade, the globalization of the food industry, animal health, and trade relations. It also highlighted the importance of uniform food safety regulations, such as the Codex Alimentarius and the World Organization for Animal Health (WOAH) guidelines. On the other hand, *Food Protection and Defense-Essential Concepts* delved into real-world food safety examples, including food defense, bioterrorism, fraud, and their potential impacts on various systems.

The practical experiences, alongside the theoretical literature, have improved my knowledge and competencies, as outlined in Table 4.2 below.

Table 4.2 MPH Emphasis Area Competencies

Food Safety and Biosecurity (FSB) Emphasis Area Competencies		
Number and Competency		Description
1	Food safety and biosecurity	Evaluate solutions appropriate for different food safety, biosecurity, and defense issues in the food production continuum.
2	Threats to the food system	Examine specific threats to the food system and scientifically investigate how each can be prevented,

		controlled, and/or mitigated in the food production system.
3	Food safety laws and regulations	Differentiate key U.S. food safety regulatory bodies and their unique legislative authorities, missions, and jurisdictions
4	Food safety policy and the global food system	Analyze and distinguish how food safety and governmental biosecurity policies, globalization, and international trade cooperation influence public health.
5	Multidisciplinary leadership	Contrast the food safety and biosecurity technical needs of different stakeholders and make judgments as to the appropriate methods of collaboration.

As an MPH student with a Food Safety and Biosecurity emphasis, I have realized competencies 1 through 4 during my APE by actively conducting food inspection operations at the military dining facilities in Fort Riley. The inspection process prioritized the control of chemical, biological, and physical hazards at each stage. I ensured that food handler's ServSafe certifications were up to date as required by the National Restaurant Association. Additionally, I had the opportunity to conduct water, ice, and food sample tests at the Department of Public Health entomology lab to check for pathogens like salmonella and E-coli. For more advanced tests, samples were sent to the Army laboratory at Aberdeen, Maryland, especially during reported foodborne disease outbreaks.

For food safety policy and the global food system (Competency 5), I applied TB MED 530, the Tri-Service Food Code, during the food inspection process. This regulation specifies the requirements for military, civilian, contract, and volunteer personnel providing military food service on installations that complement federal food regulations from organizations like the FDA, FSIS, EPA, and NMFS.

For Competency 6 (Multidisciplinary Leadership), I rotated through various public health sections, including epidemiology, industrial hygiene, and public health nursing. These rotations allowed me to gain practical experience in epidemiological surveillance, data analysis, noise monitoring, air sampling, and ensuring food handlers are up to date on their vaccine requirements.

My participation in the 40th *Frontier* Field Trip at Council Grove, Kansas, further broadened my understanding of how foodborne illness outbreaks are manageable using a multidisciplinary approach.

References

- Abebe, Gumataw Kifle, Rachel Anne Bahn, Ali Chalak, and Abed Al Kareem Yehya. "Drivers for the Implementation of Market-based Food Safety Management Systems: Evidence from Lebanon." *Food Science & Nutrition* 8, no. 2 (February 2020): 1082–92. <https://doi.org/10.1002/fsn3.1394>.
- Blackburn, Clive de W., and Peter McClure. *Foodborne Pathogens: Hazards, Risk Analysis and Control*. Woodhead Publishing in Food Science and Technology. Boca Raton: Woodhead Publishing, 2002.
- Karaman, Ayse Demet, Ferit Cobanoglu, Renan Tunalioglu, and Gulden Ova. "Barriers and Benefits of the Implementation of Food Safety Management Systems among the Turkish Dairy Industry: A Case Study." *Food Control* 25, no. 2 (June 2012): 732–39. <https://doi.org/10.1016/j.foodcont.2011.11.041>.
- Mayes, Tony, and Sara Mortimore, eds. *Making the Most of HACCP: Learning from Other's Experience*. Woodhead Publishing in Food Science and Technology. Boca Raton, Fla. : Cambridge, England: CRC Press ; Woodhead Pub. Ltd, 2001.
- McMeekin, T.A., J. Olley, D.A. Ratkowsky, and T. Ross. "Predictive Microbiology: Towards the Interface and Beyond." *International Journal of Food Microbiology* 73, no. 2–3 (March 2002): 395–407. [https://doi.org/10.1016/S0168-1605\(01\)00663-8](https://doi.org/10.1016/S0168-1605(01)00663-8).
- Moeller, D. W. *Environmental Health*. 4th ed. Cambridge, Mass: Harvard University Press, 2011.
- Rivera, L. Omar, Jessica Danielle Ford, Meredith Marie Hartzell, and Todd Allan Hoover. "An Evaluation of Army Wellness Center Clients' Health-Related Outcomes." *American Journal of Health Promotion* 32, no. 7 (September 2018): 1526–36. <https://doi.org/10.1177/0890117117753184>.
- Scott, Virginia N., and Yuhuan Chen. "Food Safety Management Systems." In *Pathogens and Toxins in Foods*, edited by Vijay K. Juneja and John N. Sofos, 478–92. Washington, DC, USA: ASM Press, 2014. <https://doi.org/10.1128/9781555815936.ch30>.
- Spellman, Frank R. *Industrial Hygiene Simplified: A Guide to Anticipation, Recognition, Evaluation, and Control of Workplace Hazards*. Lanham, Md: Government Institutes, 2006.
- Weinroth, Margaret D, Aerial D Belk, and Keith E Belk. "History, Development, and Current Status of Food Safety Systems Worldwide." *Animal Frontiers* 8, no. 4 (November 9, 2018): 9–15. <https://doi.org/10.1093/af/vfy016>.

Appendices A and B

Two portfolio products follow. These include the following:

- Appendix A - Poster of experience gained while conducting internship.
- Appendix B - Department of the Army Food Inspector Handbook.

My Internship Experience at the Fort Riley Public Health Department.

Fredrick Deya, Master of Public Health Student at Kansas State University

Background

- The Department of Public Health at Irwin Army Community Hospital (Fort Riley, Kansas) achieved national public health accreditation in 2018 through the Public Health Accreditation Board (PHAB), making it the first military site to do so. Currently, the department is in the process of obtaining re-accreditation. It encompasses several divisions: Environmental Health, Army Wellness Center, Industrial Hygiene, Occupational Health, Army Hearing Program, Health Promotions Officer, Public Health Nursing, and Veterinary Services that entirely serve to promote soldiers, their families, and Army Civilian employee's health and wellness, and to prevent disease and injury.

Objective

- To examine specific threats to the food system and scientifically investigate how to prevent, control, or mitigate them in the food production system.
- Understand different food safety laws, regulations, regulatory bodies, and their unique legislative authorities, missions, and jurisdictions.
- To Identify different stakeholders' food safety and bio-security technical needs and the appropriate collaboration in the food system.



Figure 3. A photo of Fort Riley Public Health Department Accreditation in 2018.



Figure 4. Dented food can cause poisoning due to the bacteria *Clostridium botulinum*. Whiteside Warrior Restaurant, 2023.

Additional Learning Experience

The 40th Frontier Field Trip: "I'll be there for you: Living in a microbe's paradise" at Council Grove, Kansas

- Learned about a 1990s-era public health crisis that prompted new regulatory approaches in the United Kingdom and beyond.
- Understood the history of the 1990s foodborne disease outbreak that culminated in a tragic disaster, involving unfortunate morbidity and mortality in the United Kingdom.
- Explored the role of public health regulatory minds inside and outside of Great Britain in the 1990s, including scientists and policymakers across the Atlantic in the U.S., who played a crucial role in solving the foodborne outbreak crisis.



Key outcomes

- Understanding of military food safety laws, regulations, and the roles of regulatory bodies, including an awareness of their legislative authorities, missions, and jurisdictions such as Defense Personnel Support Center (DPSC) Handbook 4155.2, Tri-Service Food Code (TB MED 530/NAVMED P-5010-1/AFMAN 48-147_IP), Army Regulation 30 – 22 (Food Program)
- The ability to identify specific threats to the food system/conduct food inspection, and provide scientifically informed prevention, control, and mitigation strategies in military dining facilities and food outlets on Garrison using Department of Defense (DD) forms:
 - DD Form 2972, Food Facility Risk Assessment Survey
 - DD Form 2973, Food Operation Inspection Report
 - DD Form 2974, Tactical Kitchen Food Sanitation
- Implementing programs to promote health and wellness in the Fort Riley community, like staff flu vaccinations at Irwin Community Hospital

Snapshot of "DO's" observed during Internships

Snapshot of "DO NOT's" observed during Internships



Figure 1: Food packages in contact with floor (store At least 6 inches 15 centimeters above the floor or on top of plastic pallets)



Figure 2: Wrong thawing approach (food not completely submerged under running drinking water).



Figure 3: Personal beverage containers should be kept away from refrigeration/warming/cooking units



Figure 4: Scoop handle in contact with popcorn



Figure 5: Cold water thawing (frozen food completely sunk in water)



Figure 6: Mobile water container and inspection for field training exercise



Figure 7 : Picture 1, 2 & 3 MPH lecturers, Dr. Jason Ackleson (facilitating discussion group), Dr. Valentina Trinetta (facilitating discussion group), and Dr. Justin Kastner (participating in role-play as a 24-year-old university-based professor Robbie Williams). Picture 4, 5 & 6 students drawn from various disciplines engage in discussions and role plays.

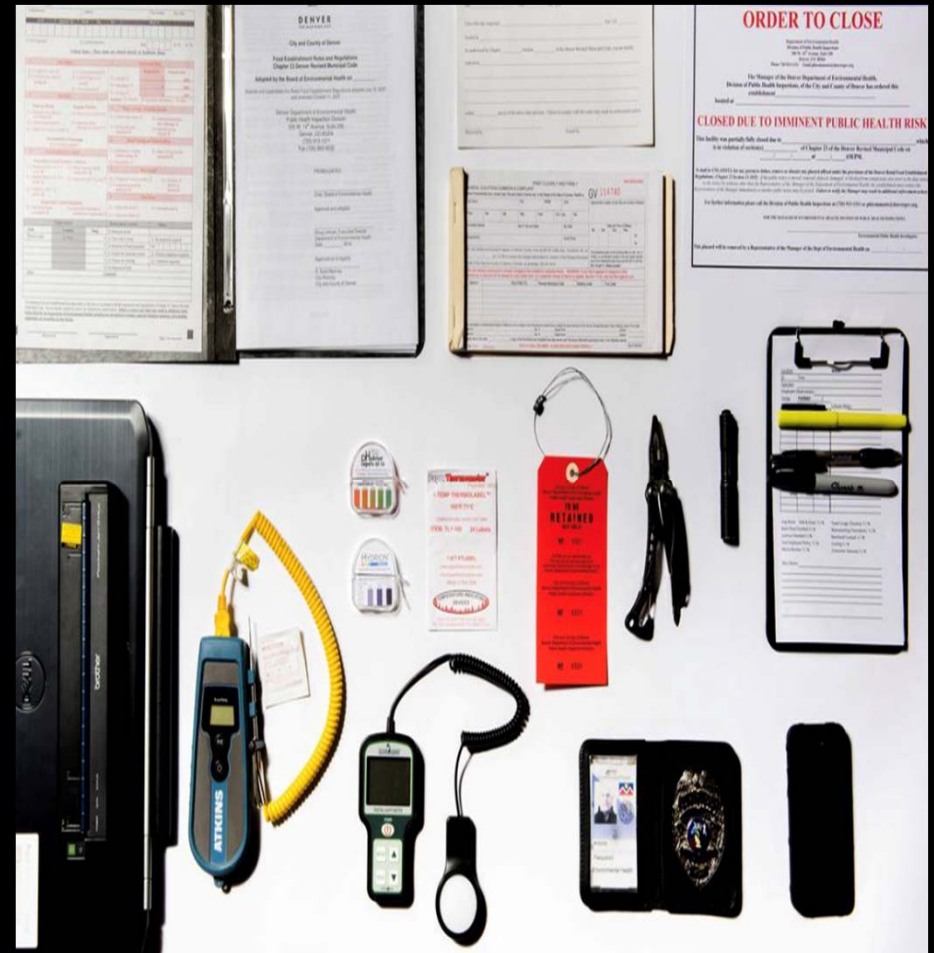
Department of Army Food Inspector Handbook



Regulation: TB MED 530

1.Preparation

- Flashlight
- Calibrated thermometer
- Notebook
- Camera/cellphone with a camera
- Inspection forms



2.Introduction



- When entering the premises, we declare, “Public Health is conducting a routine inspection.”
- Subsequently, we display badges with names and job titles.

3. Hand-washing Station

- A hand-washing facility must have the following:
 - Soap
 - Paper towels
 - Hot (at least 100°F/38°C) & cold running water
 - Trash container
 - Hand-washing sign



4. Food Storage

- Check for food labels (common name, expiry date).
- No rust, dust, or mold on storage racks
- Salads in refrigeration are sealed or covered.



Food storage guidelines

- Ensure raw meat, poultry, and fish are kept separate from cooked/ready-to-eat food (or stored below cooked and ready-to-eat food)
- Keep food away from chemicals and cleaning supplies (X)



Food storage guidelines

- Ensure accurate temperature displays and no ice contact with food in freezers and refrigeration storage units.



Food storage guidelines



- Ensure dry food storage is elevated 6" above the floor, off walls for pest control; maintain an 18" clearance above for fire safety.

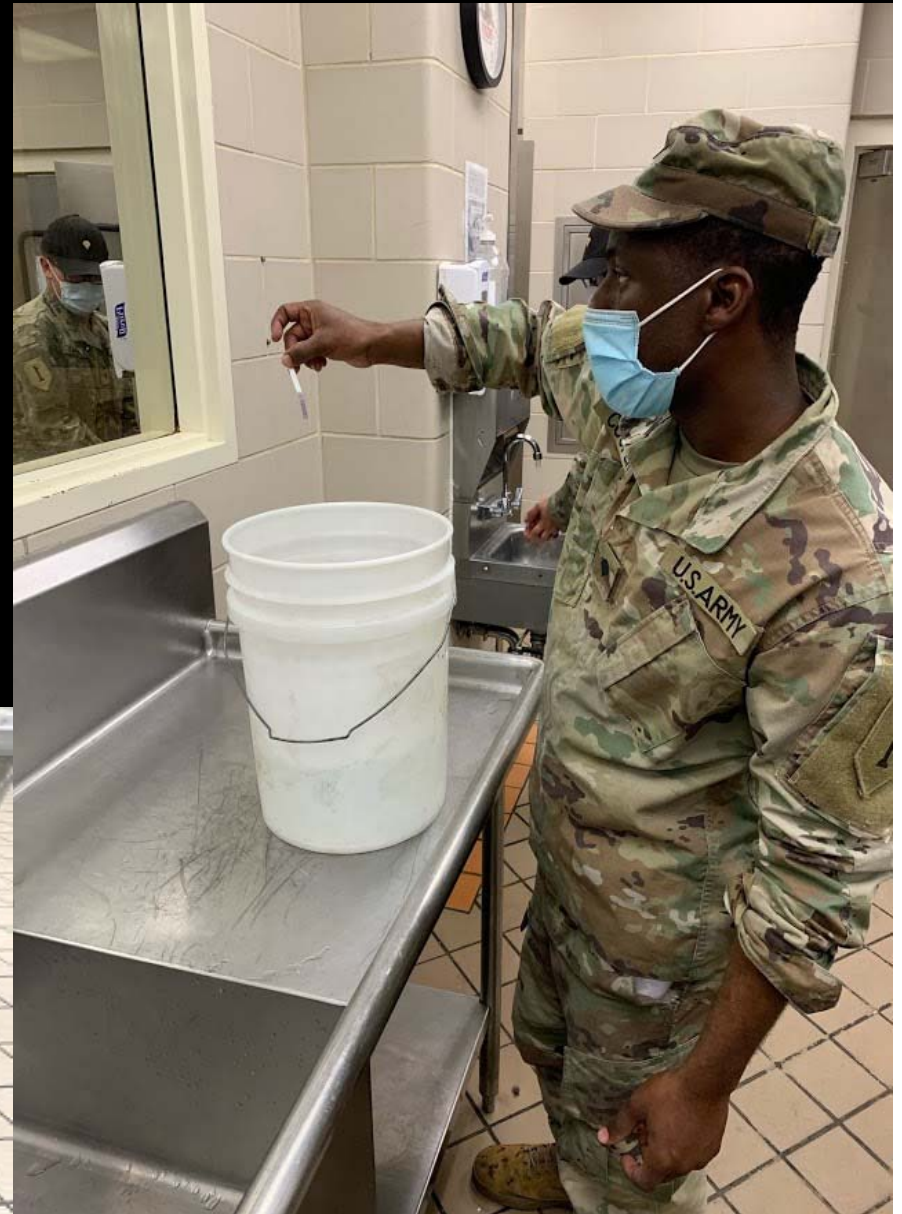
5. Food preparation

- Ensure food-contact surfaces are sanitized after each use or when handling different food.
- Avoid cross-contamination



Food preparation

- Check for proper labeling of sanitizers and soap, and ensure they are kept away from any food source.
- Test sanitizer concentration with a kit to ensure its efficiency (100 parts per million/PPM of chlorine)



Food preparation



- Check the ventilation hood systems for grease, dust, or condensation that may drip onto food.

Food preparation

- Check for sufficient access to potable water to support food preparation, sanitation, and hygiene activities.



Food preparation

Gloves used for handling food:

- Are no substitutes for handwashing hand washing
- Are for single use only
- Should be right for the task
- Must be safe (synthetic rubber, neoprene, nitrile, or vinyl are recommended)
- Natural Rubber Latex (NRL) gloves have been associated with allergic reactions.



6. Dishwashing station

Ensure:

- That utensils cleaned and placed in the racks are free from food debris.
- No wet stacking of pots and pans
- No cloth drying of dishes



Dishwashing station

Ensure:

- The dishwasher has a final rinse temperature of 180°F or higher.
- Inspect the pre-rinse faucet's tension spring to prevent nozzle contact with dirty sink water, avoiding cross-contamination.



7. Serving station

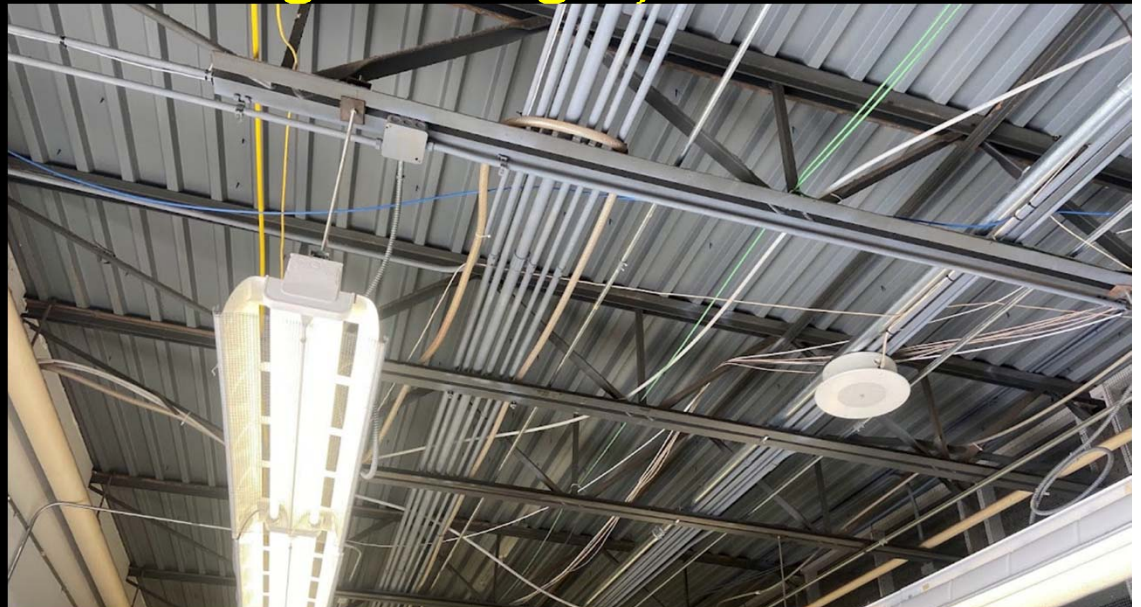


- Check food temperatures with a thermometer to ensure accuracy.
- Inspect the serving area for cleanliness.



Serving station

- Ensure the serving area is free from open ceilings or missing tiles, which could cause debris to fall onto food.
- Bulk dispensers' tubes must be designed in a way that diverts condensation and splashes (1" protruding at a 45-degree angle)



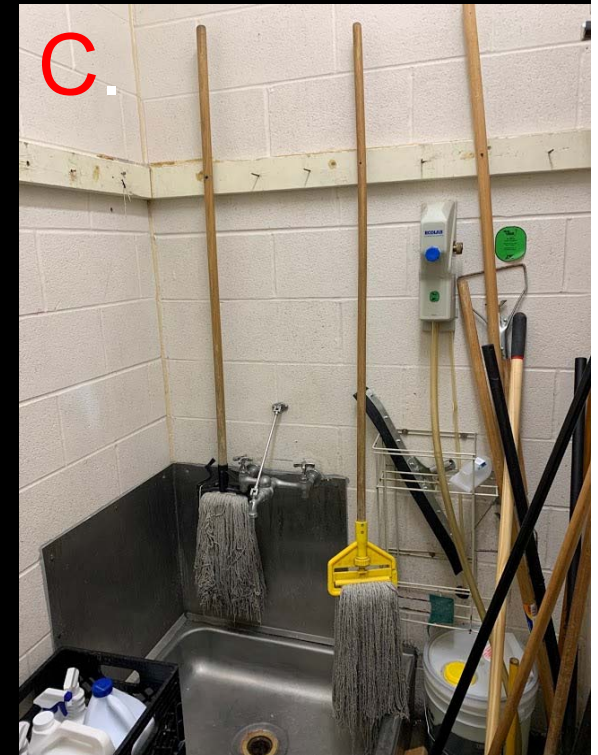
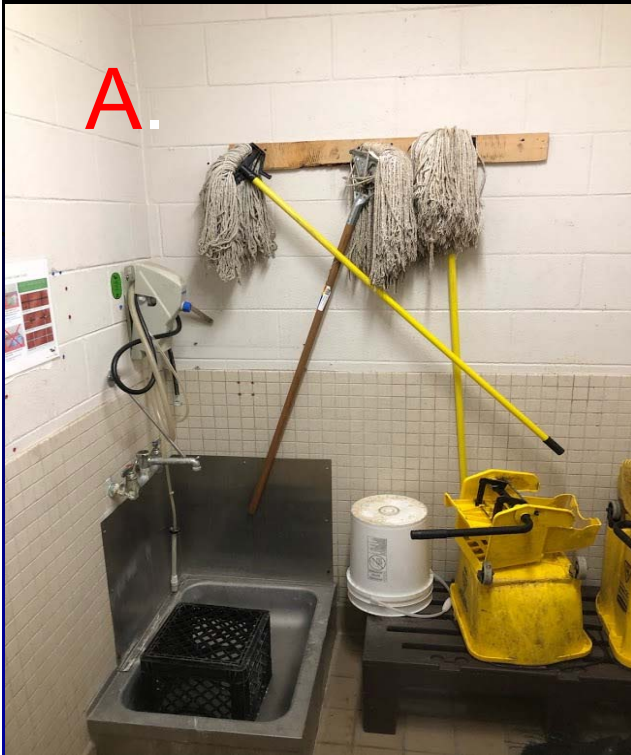
8. Dining station

- Check cleanliness, no open ceilings or missing tiles; assess chair and table serviceability.
- Avoid using sponges on furniture as they harbor pathogens when torn.



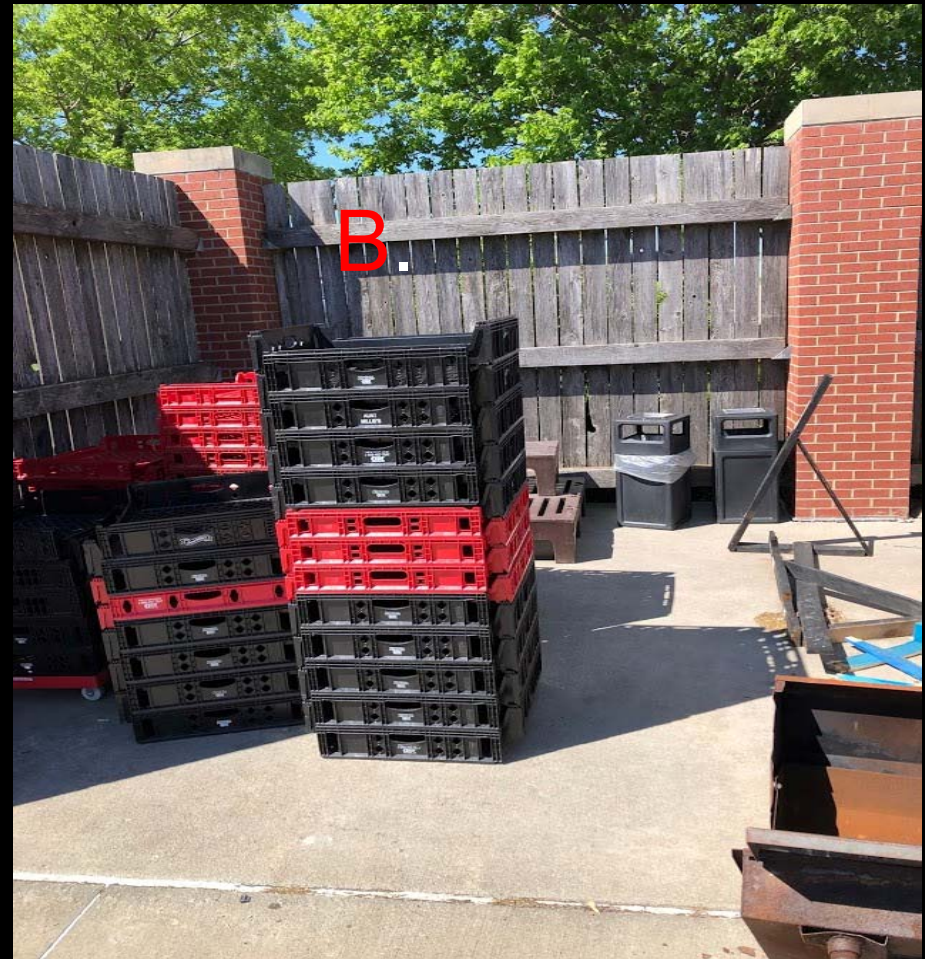
9. Utility closet

- Check cleanliness and proper storage of mops and brooms (air dry without soiling walls, handles, or supplies).
- Ensure good ventilation to prevent musty smells that could attract rodents and insects.



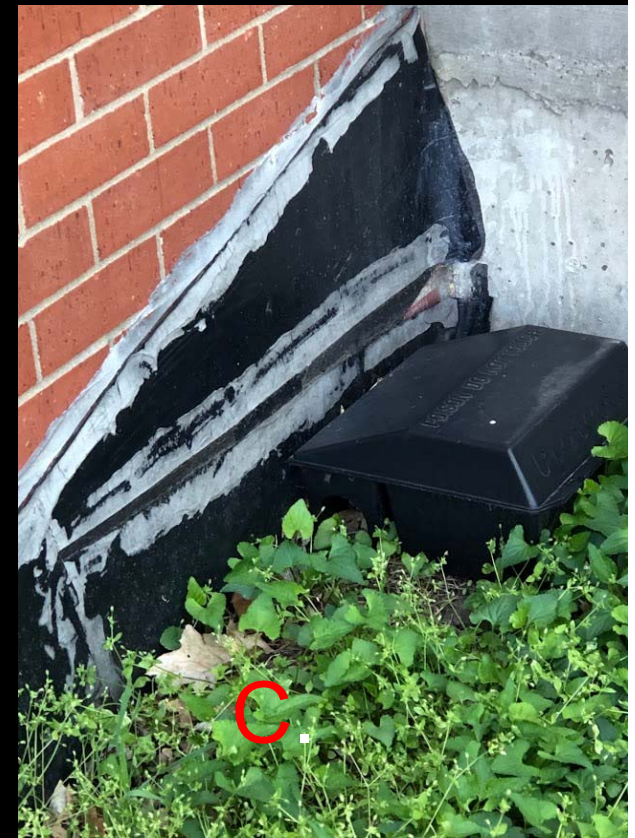
10. Dining facility exterior

- Check for cleanliness, well-manicured grass, and holes in the walls (which could serve as entry points and breeding grounds for pests).



Dining facility exterior

- Check for the installation of air curtains on entryways to prevent the entry of flying insects.
- Dumpsters with closed lids should be kept at least 50 feet from the dining facility.



11. Documentation and grading

- DD Form 2972, Food Facility Risk Assessment Survey
- DD Form 2973, Food Operation Inspection Report
- DD Form 2974, Tactical Kitchen Food Sanitation Inspection

