



Introduction to Food Safety in Farm to School Programs

The U.S. Department of Agriculture Farm to School Initiative is gaining momentum due to efforts to improve school nutrition programs and support local farmers. Developing guidelines to address food safety is a critical part of making the farm to school program a success. Each year, foodborne diseases result in millions of illnesses and thousands of deaths. Young children are at greater risk for foodborne illnesses compared to healthy adults, due to their developing immune systems. Contrary to popular belief, most of these outbreak investigations occur locally (more than 1,000 cases annually) versus multi-state outbreaks (fewer than 150 cases annually) (Neil, 2012). Contamination of fresh produce with pathogens can occur anywhere in the supply chain, and once it occurs, it is difficult- if not impossible- to remove. Common sources of contamination for fresh produce include manure, soil, contaminated irrigation water, humans, and contaminated post-harvest washing water (Table 1). School nutrition personnel play an important role in ensuring the safety of the food they are procuring for the students they serve.

Produce in schools

School nutrition personnel have a twofold duty. First, they must ensure that the produce they are procuring through local growers is of the highest quality and safety. Secondly, they need to control for risks in their facilities once the produce is received. Figure 1 shows the common focus areas of food safety that are applied at the farm level as well as those specific to the school. When handling produce in schools, it is important to consider those who are handling the produce, facilities and equipment, and storage and handling, as well as the end consumer. Before delving into these topics, it is important for school nutrition personnel to understand some basics of on farm food safety and institutional food safety.

On farm food safety

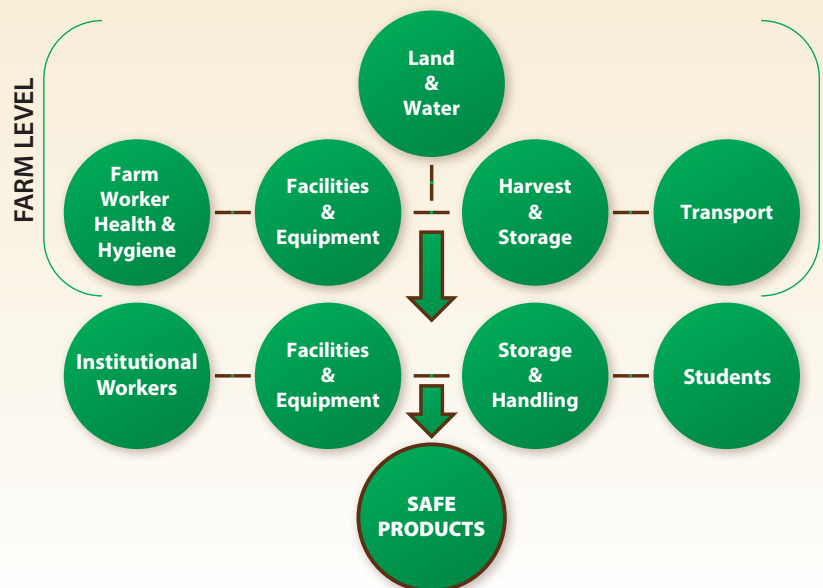
GAP stands for Good Agricultural Practices, and these are best practices for growing, harvesting, storing, packing, and transporting produce that will help minimize the risk of foodborne illness associated with fruits and vegetables. Some states may require a GAP audit as a term of sale for Farm to School. An audit is a means of verifying that the grower is complying with/following GAP practices and would be the best safeguard schools could employ for minimizing food safety risks. Currently, in Tennessee and Georgia, GAP audit requirements are at the discretion of the county school nutrition director.

Two primary events occur when a grower has a GAP audit: 1) a trained third-party representative comes to the farm and observes the practices on the farm and packinghouse, and 2) the auditor reviews the food safety plan and standard operating procedures (SOPs) and documentation of adherence to the food safety plan and SOPs.

If an institution elects not to require GAP audits, they still need to do everything possible to minimize risk. This can be accomplished in the following ways:

- ◆ Ask questions to farmers about how the product was grown and handled.
- ◆ Have specifications for products and how they are handled.
- ◆ Ask farmers if they have any food safety training or certifications.
- ◆ Ask the grower if they have a traceback system in place.

Figure 1. Model of food safety from the farm to the school cafeteria.



Institutional food safety

Once the produce has been received, it should be handled as specified in your Hazard Analysis and Critical Control Points (HACCP) Plan. General control points specified in the HACCP plan along with prerequisite programs, such as worker health and hygiene, should always be followed. However, an institution needs to make sure it takes the following points into account:

- ◆ Have a traceback system in place so the source can be determined if a problem arises.
- ◆ Evaluate the quality of the produce as it arrives.
- ◆ Have equipment and space to store fresh fruits and vegetables properly.
- ◆ Monitor fresh product storage temperature for safety and quality.
- ◆ Have the means to properly handle/process produce.

This series of factsheets will provide school nutrition personnel with information and resources needed to help ensure the safety of the food they purchase from local farmers from the farm to the lunch tray. These resources will provide information on evaluating incoming produce, properly storing produce, properly washing produce, what's in season, and questions to ask growers.

References: Neil, K. 2012. Produce-associated Outbreaks: Public Health Burden and Challenges. Presentation at the TN Food Safety Taskforce, May 2012.

Table 1. Microorganisms that cause foodborne illness.

Likely source of contamination	Pathogen	Type	Likely Produce Sources	Symptoms	Duration	Potential Impact	Documented Produce Outbreaks
Soil	<i>Clostridium botulinum</i>	Bacteria	Improperly canned low acid foods like vegetables or mixtures of acid and low acid ingredients	Double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth and muscle weakness	12-72 hours	If untreated, can lead to muscle paralysis and even death	Cabbage salad, chopped garlic in oil
	<i>Listeria monocytogenes</i>		Bean sprouts, Cabbage, Cantaloupe, Cucumber, Potatoes, Radish, Tomato	Fever, muscle aches, and sometimes GI symptoms	9-48 hours for GI symptoms, 2-6 weeks for invasive disease	Pregnant women and those with comprised immune systems are most susceptible. Illness may lead to death	Cantaloupe, celery, coleslaw mix, lettuce, tomato
Fecal matter from: improperly composted manure, contaminated water (irrigation or post-harvest), food handlers	<i>Salmonella</i> spp.	Bacteria	Artichokes, Bean sprouts, Beet leaves, Cabbage, Cantaloupe, Cauliflower, Chilies, Eggplant, Endive, Fennel, Lettuce, Mungbean, Parsley, Pepper, Spinach, Tomato, Watermelon	Diarrhea, fever, abdominal cramps, vomiting	6-48 hrs	Usually infections resolve within 5-7 days, but those with severe diarrhea may require rehydration with fluids intravenously	Cantaloupe, lettuce, sprouts, tomatoes, unpasteurized juice, watermelon
	<i>Shigella</i> spp.	Bacteria	Green onion, Parsley, Lettuce	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus	4-7 days	2% develop post-infectious arthritis	Green onions, Lettuce, Watermelon
	<i>E. coli</i> O157:H7	Bacteria	Most fruits and vegetables	Severe diarrhea (often bloody), abdominal cramps and vomiting	1-8 days	Children under 5 are at a greater risk of acute kidney failure	Cantaloupe, Coleslaw, Fruit salad, Lettuce, Sprouts, Unpasteurized juice
	<i>Cryptosporidium</i>	Parasite	Raw produce contaminated by water or an ill food handler	Dehydration, weight loss, stomach cramps or pain, fever, nausea, vomiting and respiratory symptoms	2-10 days but may last 1-2 weeks	Immune deficient infected individuals may experience secondary infection leading to more serious illness	Green onions, Unpasteurized juice
	<i>Cyclospora</i>	Parasite	Berries, Lettuce, Basil	Diarrhea, stomach cramps, upset stomach, slight fever	1-14 days	If symptoms persist, antibiotics may be required	Basil, Lettuce, Raspberries
	Hepatitis A Virus	Virus	Raw produce or contamination by food handler	Diarrhea, dark urine, jaundice, vomiting and flu-like symptoms	15-50 days, avg 28 days	Dehydration may occur as a result of vomiting	Diced tomatoes, Lettuce, Orange juice, Raspberries, Strawberries, Watercress
	Norovirus	Virus	Raw produce or contamination by food handler	Nausea, vomiting, abdominal cramping, diarrhea, fever, headache. Diarrhea is more common in adults, vomiting is more common in children.	12-48 hours	It is highly contagious and dehydration can become a problem, especially in the very young and older adults	Coleslaw, Fresh cut fruit, Melon, Tossed salad

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