Evaluation of facilities and food safety practices in the North Carolina farmers' market sector

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Abstract

Food retail outlets, specifically farmers' markets, are potential sources of foodborne illness and have been responsible for foodborne illness events. Farmers' markets differ from other food retail outlets as guidelines on quality and method of food products sold differ based on individual market requirements and local regulations. Considering the increasing popularity of markets, a focus on safety of food products sold protects patrons and local economies. Improper holding temperatures, cross-contamination, and poor personal hygiene of food handlers are potential risks at farmers' markets. The objective of this study was to observe food handling and risk reduction practices at farmers' markets. Researchers, posing as secret shoppers, were trained to collect quantitative and qualitative observational data using a structured survey. During 2010, secret shoppers attended 37 farmers' markets across North Carolina and collected data on facilities and actions of 168 vendors. In addition to produce, food vendors sold baked goods, acidified and non-acidified canned foods, dairy products, eggs, frozen foods, plants, meats, and juices. During conversations with vendors selling produce, 85% reported they were unaware of Good Agricultural Practices (GAPs), or at least unresponsive when prompted. Those who understood its implications believe methods of GAPs irrelevant to the farmers' market sector. Only one thermometer was seen used, conveying the risk of improper holding temperatures. 49% of farmers' markets had handwashing facilities in the market, 19% had no access to handwashing facilities, and 87% of handwashing facilities did not display proper handwashing techniques. Samples were witnessed covered and uncovered, on ice and not on ice, cut with pocketknives and kitchen knives, given out on forks, toothpicks, and disposable cups, and handled with and without one-use gloves. This study provides evidence for the need to promote food safety efforts at farmers' markets and provides a foundation on areas vendors should be trained.

Introduction

Local farmers' markets provide opportunities and benefits to local communities that other food retail venues do not. Farmers' markets improve economic viability of local communities by capturing and retaining a greater portion of farm and food dollars in local economies. Farmers' markets are highly visible and intuitively obvious sites for food producers and patrons to find each other, while allowing producers to capture greater value for food products (2). Considering the increasing popularity of farmers' markets and the increasing number of produce outbreaks, a focus on safety of food products sold at farmers' markets protects farmers, patrons, and local economies (3). Documented farmers' market outbreaks include *E. coli* O157 linked to lettuce and pasteurized juices, *Salmonella* linked to melons, *Cryptosporidium* linked to berries, and *Listeria* linked to coleslaw (4). In order to better understand the current food safety practices and knowledge of farmers' market vendors at North Carolina farmers' markets, we observed food handling and risk reduction practices at farmers' markets.

References

1: www.istockphoto.com/stock-photo-4399118

2: Smithers et al. "Unpacking the Terms of Engagement with Local Food at the Farmers' Market: Insights from Ontario." *Journal of Rural Studies* 24(2008): 337-350.

3: Otto and Varner. "Consumers, Vendors, and the Economic Importance of Iowa Farmers' Markets: An Economic Impact Survey Analysis." Iowa State University (2005): 1-29.

4: Gast, Karen. Food Safety for Farmers' Markets. Kansas State

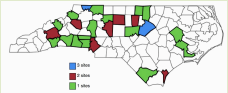

Figure 4: Counties of farmers markets observed in North Carolina

Handwashing

- **49% of farmers' markets provided handwashing facilities in the market**
- **19% of farmers' markets did not have access to handwashing facilities**
- **87% of available handwashing facilities did not display proper handwashing techniques**

Temperature Monitoring

- **One thermometer was observed used during food product storage**
- **Potentially hazardous foods such as fresh cheeses and cut melons were observed stored without ice and refrigeration**

Samples

- **Covered and uncovered**
- **On ice and not on ice**
- **Cut with pocketknives and kitchen knives**
- **Distributed with forks, toothpicks, and disposable cups**
- **Handled with one-use gloves and with bare hands**

Results

Materials & Methods

In the spring of 2010, 20 secret shoppers were trained to collect quantitative and qualitative observational data using a structured survey. The survey focused on gathering data on the overall facility (Figure 1) and individual vendors (Figure 2 & 3). During the 2010 season, trained secret shoppers attended 37 farmers' markets across North Carolina and collected data on the facilities and behaviors of 168 vendors.

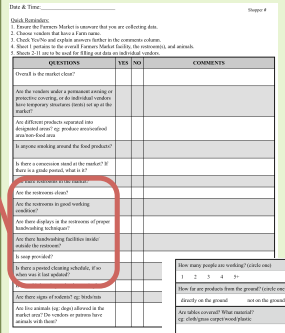

Figure 1: Data sheet on overall facility

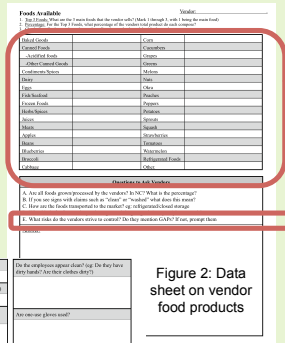

Figure 2: Data sheet on vendor food products

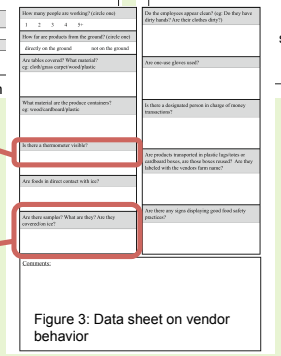

Figure 3: Data sheet on vendor behavior

Foods Available

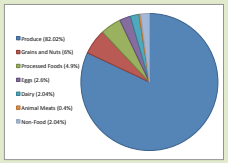

Figure 5: Food categories observed for sale by vendors

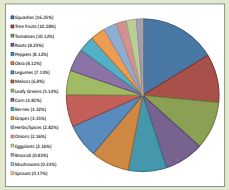

Figure 6: Produce category further expanded

Good Agricultural Practices (GAPs)

- **During conversations with vendors selling produce, 85% reported they were unaware of Good Agricultural Practices (GAPs), or at least unresponsive when prompted**
- **Those who understood its implications believe methods of GAPs irrelevant to the farmers' market sector**

Discussion

Results indicate risky practices occurring at North Carolina farmers' markets. Low availability of handwashing facilities, risky behaviors during sales of food products, temperature abuse of potentially hazardous food samples, and poor food handler hygiene were the main food safety risk actions observed by secret shoppers. Even though practices of handwashing were not recorded, based on the low availability and maintenance of handwashing facilities, a high risk for poor hygiene and low adherence to handwashing by food handlers was conveyed. Potentially hazardous foods served as samples were observed prepared, stored, and transported improperly, which provide an increased risk for cross-contamination, temperature abuse, and inadequate sanitation. Considering GAPs are the most relevant safe practice guidelines for vendors who sell produce at farmers' markets, relevant guidelines should be developed and communicated to members of farmers' markets in order to increase the safe food practices by vendors. New guidelines created specifically for risk management at farmers' markets will aid in the reduction of food safety risk actions.

Figure 7: QR code linked to additional materials

Conclusion

This study provides evidence for the need to promote education on food safety behaviors and best practices at farmers markets. The data collected provides a foundation on specific areas vendors should be trained.