Tomato Handling Policies and Practices in Restaurants

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Introduction

In recent years, at least 12 *Salmonella* outbreaks have been associated with tomatoes (MMWR, 2007). These outbreaks have caused approximately 1,990 reported illnesses, representing approximately 79,600 illnesses when accounting for the estimated proportion of unreported illness (MMWR, 2007). Additionally, these outbreaks have increased in frequency and magnitude over time, many of them have been multistate, and some of them have been recurrent (MMWR, 2007). These facts indicate that *Salmonella* outbreaks associated with tomatoes is a significant, ongoing problem.

Epidemiologic and environmental investigations of these tomato outbreaks have indicated that the contamination of the tomatoes likely occurred early in the distribution chain, such as at the farm or during processing (MMWR, 2007). However, the source of consumption in most of these outbreaks was restaurants. Researchers have hypothesized that tomato preparation and storage and holding practices in restaurants may contribute to cross contamination of pathogens from previously contaminated tomatoes to other tomatoes and proliferation of pathogens found on previously contaminated tomatoes. For example, Hedberg et al. suggested that cutting large batches of tomatoes could allow cross contamination from one tomato to others (and other foods), and holding these chopped tomatoes at room temperature could allow proliferation (Hedberg et al., 1999). Despite these concerns, little evidence of restaurants' tomato storage, preparation, and holding practices exists.

Purpose

The purpose of this study was to collect descriptive data on restaurants' tomato washing, cutting, and holding practices. These practices were chosen because previous research suggests that they may contribute to cross contamination and proliferation of pathogens on tomatoes.

Method

This study was conducted by the Environmental Health Specialists Network (EHS-Net), a network of environmental health specialists focused on the investigation of contributing factors to foodborne illness, including food preparation practices. EHS-Net is a collaborative project of the Centers for Disease Control and Prevention (CDC), the FDA, the U.S. Department of Agriculture, and nine states (California, Connecticut, Georgia, Iowa, Minnesota, New York, Oregon, Rhode Island, and Tennessee).

Method (Continued)

Restaurant sample

The sample for this study consisted of randomly selected restaurants that served raw fresh tomatoes in portions or all of eight EHS-Net states (California, Connecticut, Georgia, Iowa, Minnesota, New York, Rhode Island, and Tennessee). Fifty restaurants were selected from each state's catchment area. Only one restaurant from regional or national chains was included per catchment area.

Data collection

In each restaurant, EHS-Net environmental health specialists conducted the following:

- a manager interview about tomato preparation, including washing, cutting, and holding (n=453);
- observations of tomato washing (n=483) and cutting (n=455); and
- observations of previously cut held tomatoes (n=416).

Some interview questions were asked about each type of tomato received (round, Roma, grape/cherry); thus, *n*s are sometimes larger than the sample size of 453. Additionally, multiple observations of washing and cutting were often made in each restaurant; thus the *n*s are larger than the sample size of 453.

Results

Response rate

Of the 604 eligible restaurants (i.e., not a member of a chain with an already participating restaurant, and serving raw, fresh tomatoes) contacted about participation, 453 agreed to participate, yielding a response rate of 73%.

General preparation practices

- 50% (226 of 449) of managers reported that their restaurant had a separate produce preparation area, a practice in line with FDA recommendations (FDA, 2005).
- 74% (326 of 443) of managers reported that gloves were used during tomato preparation, a practice in line with FDA recommendations (FDA, 2005).

Washing practices

- 94% (578 of 614) of tomato types were washed before preparation (manager reports).
- Tomato washing was observed in 86% (390 of 453) of restaurants.
- Tomato washing was observed most often in multiuse sinks (64%), followed by produce-only sinks (31%) (Table 1).
- Tomato washing occurred in inappropriate sinks (hand, raw animal product only, and utility) in 5% of observations (Table 1).

Table 1. Sinks used to wash tomatoes (N=483)

	n	%
Produce-only sink	148	31
Multiuse sink	310	64
Container	30	6
Hand sink, raw animal product sink, or utility sink	26	5

Note: Percentages total to more than 100 as multiple sinks could be used in each observation.

- Tomatoes were most often rinsed or held under running water during washing (83%; 402 of 483).
- Tomatoes were soaked during washing in 18% (85 of 483) of observations; soaking of tomatoes is not recommended by the FDA (FDA, 2007).
- The tomato-water temperature differential met FDA guidelines (FDA, 2007; water 10°F warmer than the tomatoes) in only 7% (5 of 76) of tomato soaking observations.

Results (Continued)

Cutting practices

- 80% (490 of 615) of tomato types were cut in the restaurant (manager reports).
- Tomato cutting was observed in 90% (407 of 453) of restaurants.
- A knife and cutting board were used in 79% (360 of 455) of cutting observations.
- A produce-only cutting board was used in 50% (180 of 360) of cutting board observations.
- The temperature of tomatoes immediately after cutting was above the FDA recommended maximum temperature of 41°F (FDA, 2007) in 89% (403 of 455) of observations.

Holding practices (of previously cut tomatoes)

- Cut tomatoes were observed in holding (e.g., walk-in coolers, buffets) in 66% (299 of 453) of restaurants.
- Cut tomatoes were held above the FDA recommended maximum temperature of 41°F (FDA 2007) in 53% of observations (Table 2).
- The percentage of cut tomatoes held above 41°F varied from 32% to 100% by location (Table 2).
- Cut tomatoes were held for a median of 4 hours; median holding hours varied by location, from less than an hour to 10 hours (Table 2).

Table 2. Time and temperature at which previously cut tomatoes were held

		n, % held above 41		Median hours held		
Holding location	**N**	**n**	**%**	**Median**	**25th per-centile**	**75th per-centile**
Ready-to-eat	20	11	55	3	1	10
Made-to-order	240	143	60	4	2	15
Buffet or salad bar	7	6	86	1	1	3
Walk-in cooler	68	22	32	10	3	24
Reach-in cooler	100	44	44	5	2	24
Dry storage	8	8	100	<1	<1	1
Total	**443**	**234**	**53**	**4**	**2**	**18**

Note: Hours-held data were collected by manager interview.

Conclusions

Tomato washing, cutting and holding were prevalent in restaurants, and several opportunities for cross contamination and proliferation of *Salmonella* were seen in the implementation of these practices. These opportunities were more prevalent in cutting and holding, but were also seen in washing. They are summarized below.

Washing practices

- Some restaurants washed tomatoes in inappropriate sinks.
- Some restaurants soaked tomatoes, a practice not recommended by the FDA.
- When soaking occurred, the tomato-water temperature differential almost never met FDA guidelines.

Cutting practices

- Many restaurants did not take cross contamination prevention precautions, such as glove use and separate areas and cutting boards for produce.
- Tomatoes were rarely at appropriate temperatures immediately after cutting.

Holding practices

- Holding temperatures of cut tomatoes were frequently above the recommended maximum temperature.

The FDA guidelines concerning storage and handling of tomatoes were released after our data were collected—it is likely that the restaurants in our sample were not aware of these guidelines during data collection. Restaurants' tomato handling practices may have changed as a result of the release of these guidelines.

References

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