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An Analysis of restaurant food safety violations: human factors, non-human factors, and food-borne illness

Jai Choung

University of Nevada Las Vegas

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AN ANALYSIS OF RESTAURANT FOOD SAFETY VIOLATIONS:
HUMAN FACTORS, NON-HUMAN FACTORS,
AND FOOD-BORNE ILLNESS

by

Jai Choung

Bachelor of Science
University of Nevada, Las Vegas
2008

A thesis submitted in partial fulfillment of
the requirements for the

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William F. Harrah College of Hotel Administration

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THE GRADUATE COLLEGE

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William F. Harrah College of Hotel Administration

Yen-Soon Kim, Committee Co-chair

Billy Bai, Committee Co-chair

Carola Raab, Committee Member

Seung mook Choi, Graduate Faculty Representative

Ronald Smith, Ph. D., Vice President for Research and Graduate Studies
and Dean of the Graduate College

May 2010

ABSTRACT

An Analysis of Restaurant Food Safety Violations: Human Factors, Non-Human Factors, And Food-borne Illness

By

Jai Choung

Dr. Yen-Soon Kim, Examination Committee Chair
Assistant Professor of Food & Beverage
University of Nevada, Las Vegas

An estimated 76 million food-borne illnesses occur in the United States each year, causing 325,000 hospitalizations and 5,000 deaths, according to the U.S. Food and Drug Administration. Food safety is an increasingly important topic to governmental food regulators, not only in trying to reduce the number of illnesses from contaminated food. Governmental regulators also are becoming aware of the vulnerability of the food supply chain as a target for bioterrorism. Recommendations have been developed to protect the U. S. food supply from terrorism, but little of the research and recommendations relate to the food-service level.

Eighty percent of reported cases of food-borne disease occur in food-service establishments. The results of health inspections over six months in the Las Vegas, NV, area were analyzed to determine whether violations were due to human or non-human factors. Human factors were defined as cross-contamination, time and temperature abuse, and poor personal hygiene. The non-human factors were environmental violations, such as poor maintenance and lack of facilities. The human factors can be improved by developing proper training systems and monitoring food safety practices by supervisors.

The data show that human factors were responsible for 62.8% of violations cited by health inspectors. Upon reinspection, 97.4% of food-service establishments that had received a grade of less than A had corrected the violations and received an A grade. This shows that effective education can dramatically improve violations due to human factors. This establishes a significant foundation to establish proper food safety training systems to prevent food-borne illnesses in the food-service industry.

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CHAPTER 1

INTRODUCTION

In 2010, the U.S. restaurant industry is projected to generate \$580 billion in sales and operate 945,000 business locations with 13 million employees nationwide. U.S. restaurants will provide more than 70 billion meals and snacks to more than 130 million patrons spending \$1.6 billion on a typical day in 2010. Previous research found that 40% of adults said purchasing meals from restaurants, take-out and delivery services makes it easier for families with children to manage their daily lives (National Restaurant Association [NRA], 2010).

Restaurant and tourism industries are significant to the Las Vegas economy. They contributed \$25 billion to the economy, and 20% of all jobs were resort-casino-related (“Las Vegas: Economy,” 2009). Rossi Ralenkotter, president and chief executive officer of the Las Vegas Convention and Visitors Authority, said “Las Vegas hosts about 20,000 conventions and meetings, employing some 45,000 people and generating nearly \$7 billion in revenue” (Smith, 2010). A good portion of that convention revenue comes from people eating out.

As the restaurant industry grows, restaurant food sanitation procedures should be evaluated, updated, and inspected by the proper authorities to ensure public safety. Food-borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States annually (Mead et al., 1999). According to the *Journal of Environmental Health* (“Dramatic decline,” 2002), more than 200 diseases are transmitted through food, including the major bacterial food-borne illnesses of *Campylobacter*, *Salmonella*, *Listeria*, and *E. coli* O157.

There are significant societal costs arising from food-borne illness, including lost productivity, increased health-care costs, and even deaths. According to USA TODAY, food-borne illness costs the United States \$152 billion a year. Costs include medical services, deaths, lost work, and disability (Weise, 2010). Additionally, due to tarnished reputations and legal settlements, firms responsible for food-borne outbreaks often face devastating financial blows. In addition to these costs, Las Vegas has a reputation as a tourist destination to maintain, which could be severely damaged by a serious outbreak of food-borne illness. That has become a greater danger since the Sept. 11, 2001, attacks, after which Las Vegas was considered a major target. Usually, the public worries about attacks with guns and bombs, not attacks by bacteria. However, with 39 million tourists enjoying their meals in Las Vegas, the concern of the food-terrorism becomes apparent (Southern Nevada Intergard, n.d.).

Food-borne illness is largely preventable. Increased regulation, industry initiatives, and education throughout the marketing channel are largely responsible for a 21% cumulative decline across the four major sources between 1996 and 2002 (“Dramatic decline,” 2002). Inspections of food handling facilities are among the most important public health initiatives designed to reduce the incidence of food-borne illness. Through mechanisms such as public policy enforcement, education, and communication of risk by publicizing inspection scores, these inspections reduce incidents of food-borne illness (Seiver & Hatfield, 2000).

To assist consumers in understanding food-service establishment sanitary conditions, government officials, in connection with state restaurant associations and culinary professionals, have created restaurant inspection reports particular to states of the locality

represented (Southern Nevada Health District [SNHD], 1999). Most restaurant inspection reports contain a section pertaining to potential sources of food-borne illness and another section for other items for which sanitary concern is noted. Items listed within these two sections are the violations observed by the inspector at the establishment. In addition to the violations, most food-service inspections issue demerits, or points, which are based on the weight of the violation, with potential sources of food-borne illness being weighted higher than violations related to design and maintenance (SNHD, 1999). Although the public rarely sees the actual completed food-service inspection form, the results, which are either a grade or satisfactory/unsatisfactory rating, are normally posted near the entrance of the establishment, if such posting is required by law (Henson, et al., 2006). In Las Vegas, where this project is located, the Southern Nevada Health District (SNHD) does not post inspection results on its website. However, the local newspaper, *Las Vegas Review-Journal*, prints on a weekly basis excerpts and official grades from inspections of food-service organizations that received less than an “A” grade.

Purpose

The purpose of the paper is to analyze the causes of violations in terms of both human and non-human factors, recommend employee training in proper sanitation procedures, and establish the need for continuing education aimed at reducing food-borne illness.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Food safety has become a highly visible topic with the new Obama administration. Agriculture Secretary Tom Vilsack, in his first year in that office, emphasized the importance of food safety in this administration in releasing new guidelines from the U.S. Department of Agriculture intended to reduce salmonella contamination and E. coli outbreaks. “Improving food safety is at the forefront of President Obama’s agenda, and these Guidelines will help local, state and federal agencies to prioritize prevention, strengthen surveillance and enforcement, and improve response and recovery” (U.S. Department of Agriculture [USDA], 2009). Threats to the safety and security of the U.S. food supply are of greater concern than ever before (Bledsoe & Rasco, 2002).

Food safety has taken on a new importance not only because of the dangers of food-borne illness from unintended contamination, but also because of awareness that our food supply could be targeted by terrorists. Some \$4.3 billion has been allocated by the U.S. government to protect “America from a possible bioterrorist attack or other catastrophic public health emergency” (U. S. Department of Health and Human Service [USHHS], n.d. p. 106). As a result, several agriculture and food science studies have investigated food security and bioterrorism in the food supply chain, from farming to manufacturing (Berry, 2005). Thus far, no research has been done on the potential dangers of intentional contamination of food at the service level.

The U.S. government has long had an active interest in food safety. In the 19th century, threats associated with food safety were deemed by lawmakers as a “crime against society” (Lyon, 1998, p.745). Over the past 100 years, numerous changes have

been made in food-service procedure in order to protect against food-borne illness outbreaks, especially after a major outbreak has occurred. The federally regulated procedures have changed as technology of food production has evolved. The Hazard Analysis Critical Control Point (HACCP), for example, was a method created in the 1960s as a way to ensure the safety of food for NASA's space program (Goodrich, Schneider, & Schmidt, 2005).

American Food Safety History

The U.S. Pure Food and Drugs Act of 1906 was the first consumer protection act instituted in the United States. Although this act was designed to focus on food, "food provision" laws were lacking. On June 30, 1906, the day President Theodore Roosevelt signed the U.S. Pure Food and Drugs Act, he also signed the Meat Inspections Act, which was brought about after the discovery of unsanitary conditions at meat-packing plants (Janssen, 2009). Chemical preservatives started to appear on the market during this time, and the Act primarily dealt with "Distinctive name provisions" and food standards, rather than focusing on any form of sanitation. Revised during the Great Depression, the U.S. Pure Food and Drugs Act was responding to situations where companies were jelling sugar and water and selling it as "preserves." Ultimately, the demands of food safety brought forth the 1938 Food, Drug, and Cosmetic Act that established standards of identity, standards of quality, and standards regarding the fill-of-the-container. Essentially, this new act was meant to ensure food value for the consumer, but did not provide for issues relating to food sanitation (Junod, 2000).

The United States Public Health Service for Regulating Operations Providing Food Directly to the Consumer has proposed numerous regulations since 1934 and has gone

through many manifestations throughout these years. In 1976, these regulations were presented as “Recommendations of the Food and Drug Administration” instead of the previously used “Recommendations of the Public Health Service.” From 1934 until 1993, food-service sanitation recommendations changed 17 times. In 1993, the U.S. Food and Drug Administration published its first edition of the new FDA Model Food Code and revised it every two years until 2001, when it was decided to revise the code on a four-year basis. Designed as a model for local, state, tribal, and federal regulators, the FDA Model Food Code currently has six different editions (U.S. Food and Drug Administration [USFDA], 2005). With this progress, the ways and methods in which food-borne illnesses are found and evaluated have gone through many changes. In addition to the invention of new technology for heating, cooling, and storing potentially hazardous foods, scientific advances such as pulsed-field gel electrophoresis (PFGE), a method of determining the DNA of different bacteria, have necessitated ongoing updates of the federal food code (Barrett, Gerner-Smidt, & Swaminathan, 2006). With major changes issued every two years until 2001, some localities may have been resistant to updating to a newer food code, knowing that changes, additions, and deletions could occur again at any moment. Through additions and changes such as new definitions, adjustments to the temperature range at which food-borne microorganisms grow, referred to as the “Temperature Danger Zone,” and changes to the amount of time that food can remain in the “Temperature Danger Zone,” the FDA Model Food Code, while trying to set the standards by which food should be controlled, is attempting to reflect the latest science related to the control of food-borne illnesses. Fifty-one states and territories have adopted FDA food codes since 1976. (USFDA, 2009).

Food-Borne Illness

Despite the fact that the U.S. food supply is commonly believed to be one of the safest in the world, 15,800 laboratory-diagnosed food-borne infections were reported in 2004 (Environmental Health Updater, 2005). That year, 58% of reported food-borne illnesses were associated with restaurant meals, amounting to an estimated 75 million cases (Centers for Disease Control and Prevention [CDC], 2005). Another report in 2004 stated that there were approximately 325,000 hospitalizations and 5,000 deaths related to food-borne sources (Mead et al, 2006). In still an earlier study, an estimated 60,854 hospitalizations and over 1,800 deaths were caused by food-borne illnesses (Bryan, 2002).

As people eat out more, the risk of food-borne illness increases, and Americans are becoming more dependent on food prepared for them. It is reported that 945,000 food establishments in the United States serve approximately 70 billion meals or snacks each year. Approximately 130 million people in the United States take meals from food-service facilities every day, and about half of every food dollar is spent on meals prepared outside the home (NRA, 2009). This is indeed significant as the majority of reported food-borne illnesses can be traced back to public eating establishments (Bean & Griffith, 1990; Olsen, MacKinon, Goulding, Bean & Slutsker, 2000; Collins, 1997). In fact, estimates show that 50% of outbreaks reported from 1993 to 1997 were traced back to food consumed in restaurants and other commercial food establishments (Olsen et al., 2000). From 1973 to 1987, of the 7,219 cases of reported food-borne illness, 79% were linked to commercial or institutional kitchens (Bean & Griffith, 1990). Likewise, Collins

(1997) reported that 80% of food-borne illness outbreaks were associated with food establishments, while 20% occurred from home-prepared meals.

The three most common factors that lead to food-borne illness in reported cases were time/temperature abuse (improper holding), poor personal hygiene of the food preparer, and cross contamination (Collins, 1997). These factors are directly related to the food safety practices of food-service employees and are preventable if proper practices are followed. With approximately 12.7 million individuals employed in the food-service industry in 2010, the potential for food-borne illness outbreaks is significant (NRA, 2010).

Food Contamination

Because we live in a microbial world, there are many opportunities for food to become contaminated as it is produced and prepared. Although animals that are raised for human consumption may be healthy, they often host food-borne microbes (typically in their intestines), which can be especially dangerous during slaughter, when meat and poultry carcasses risk contamination by contact with even small amounts of intestinal content. Similarly, fresh fruits and vegetables can be contaminated if they are washed with irrigation water that is contaminated with animal manure or human sewage. Contamination can also occur by Salmonella infecting a hen's ovary even before the shell is formed. Oysters and other filter-feeding shellfish are another potential source of contamination, as they can concentrate Vibrio bacteria that are naturally present in sea water or other microbes that are present in human sewage dumped into the sea (CDC, 2005).

Contamination is also highly possible during food processing, where other food-borne microbes can be introduced from infected humans who handle the food or by cross-contamination from some other raw agricultural product. For example, *Shigella* bacteria, hepatitis A virus and Norwalk virus can be introduced by the unwashed hands of infected food handlers. In the kitchen, microbes can be transferred from one food to another by means such as using the same knife, cutting board, or other utensil to prepare both without washing the surface or the utensil in between. Additionally, food that is fully cooked can become recontaminated if it touches other raw foods or drippings from raw foods that contain pathogens (CDC, 2005).

The way that food is handled after it is contaminated can also make a difference in whether or not an outbreak occurs. Many bacterial microbes need to multiply to a larger number before enough are present in food to cause disease. Given warm, moist conditions and an ample supply of nutrients, one bacterium that reproduces by dividing itself every half hour can produce 17 million progeny in 12 hours. As a result, lightly contaminated food left out overnight can be highly infectious by the next day. If the food were refrigerated promptly, the bacteria would not multiply at all. In general, refrigeration or freezing prevents virtually all bacteria from growing but basically maintains them in a state of suspended animation. The two exceptions to this rule are the food-borne bacteria *Listeria Monocytogenes* and *Yersinia enterocolitica*, which can actually grow at refrigerator temperatures. High salt, high sugar, or high acid levels keep bacteria from growing, which is why salted meats, jam, and pickled vegetables are traditional preserved foods (CDC, 2005).

Microbes are killed by heat. Heating food to an internal temperature above 160 degrees F, or 78C, for even a few seconds is sufficient to kill parasites, viruses, and bacteria. An exception to this, however, is the Clostridium bacteria, which produce a heat-resistant form called a spore. Clostridium spores are killed only at temperatures above boiling, which is why canned foods must be cooked to a high temperature under pressure as part of the canning process (CDC, 2005). The toxins produced by bacteria vary in heat sensitivity. The staphylococcal toxin, for example, which causes vomiting, is not affected by boiling. Conversely, boiling completely inactivates the potent toxin that causes botulism (CDC, 2005).

Raw foods of animal origin, such as raw meat and poultry, raw eggs, unpasteurized milk, and raw shellfish, are the most likely to be contaminated. Filter-feeding shellfish are particularly likely to be contaminated if there are any pathogens in the seawater, as they strain microbes from the sea over many months. Especially hazardous are foods that mingle the products of individual animals, including bulk raw milk, pooled raw eggs, or ground beef, because pathogens present in any one of the animals could contaminate the whole batch (CDC, 2005). A single hamburger patty may contain meat from hundreds of animals. A restaurant omelet may contain eggs from hundreds of chickens. A glass of milk may contain milk from hundreds of cows. A poultry carcass can be exposed to the drippings and juices of many thousands of other birds that went through the same cold water tank after slaughter (CDC, 2005).

Fruits and vegetables consumed raw are particularly of concern. Although washing can decrease contamination, it cannot eliminate it, and thus consumers can do little to protect themselves. Recently, a number of outbreaks have been traced to fresh fruits and

vegetables that were processed under less-than-sanitary conditions. Outbreaks such as the Taco Bell lettuce and Natural Selection Foods spinach incidents show that the quality of the water used for washing and chilling the produce after it is harvested is critical. Using water that is not clean can contaminate many boxes of produce (“List of food-borne,” 2010).

Fresh manure used to fertilize vegetables can also contaminate them. Alfalfa sprouts and other raw sprouts pose a particular challenge, as the conditions under which they are sprouted are ideal for growing microbes, and because they are eaten without being cooked. That means that small amounts of bacteria found on the seeds have the ability to grow to high numbers of pathogens on the sprouts. Unpasteurized fruit juice is also a risk, as it can become contaminated if there are pathogens in or on the fruit that is used to make it (CDC, 2005).

Outbreaks

In 2006, there were 1,270 reported food-borne disease outbreaks that resulted in 27,634 illnesses and 11 deaths. Of the outbreaks, 624 had a confirmed cause. About 54% of the time, the outbreaks were a result of norovirus, according to the CDC, and 18% were Salmonella outbreaks. Although most illnesses, hospitalizations, and deaths caused by food-borne illnesses are not recorded, the CDC estimates that such diseases sicken 76 million Americans per year, cause 300,000 hospitalizations, and cause 5,000 deaths (CDC, 2005).

An outbreak of food-borne illness occurs when two or more people who consume the same contaminated food come down with the same illness. It may be a group that ate a meal together at a certain place, or it may be a group of people who do not know each

other at all, but who by coincidence happened to buy and eat the same contaminated item from a grocery store or restaurant. In order for an outbreak to occur, something had to have happened to contaminate a batch of food that was eaten by the group of people. Typically a combination of events contributes to the outbreak, such as a contaminated food being left out at room temperature for many hours, allowing the bacteria to multiply to high numbers, and then being insufficiently cooked to kill the bacteria (CDC, 2005).

Many outbreaks are local in nature. They are typically recognized when a group of people realize that they all became ill after sharing a meal, and someone calls the local health department. This classic local outbreak might follow a catered meal at a reception, a potluck community dinner, or a meal at a popular restaurant. Whatever the situation, outbreaks are increasingly being recognized as being more widespread, in that they can affect people in many different places and be spread out over several weeks. As an example, a recent outbreak of Salmonellosis was traced to people eating a breakfast cereal that was produced at a certain factory in Minnesota but marketed under several different brand names in many different states (CDC, 2005). No one jurisdiction had very many cases, and the infected people did not know each other. The outbreak was recognized only because it was caused by an unusual strain of Salmonella, and because state public health laboratories that type Salmonella strains noticed a sudden increase in this one rare strain (CDC, 2005).

While outbreaks of food-borne illnesses often appear to be local, the problem is a broader one that is affected by a changing world. Other challenges to food safety protocols include globalization of trade in food, urbanization, changes in lifestyles, international travel, environmental pollution, deliberate contamination, and natural and

manmade disasters. The food production chain has become more complex, thereby providing greater opportunities for contamination and growth of pathogens. Many outbreaks of food-borne diseases that were once contained within small communities are now able take on global dimensions (World Health Organization [WHO], 2007).

The World Health Organization (WHO), in partnership with other stakeholders, is developing policies utilizing different types of expertise that will further promote the safety of food by covering the entire food chain, from production to consumption. The work of the WHO Department of Food Safety and other WHO programs and departments includes strengthening food safety systems, promoting good manufacturing practices, and educating retailers and consumers about proper food handling procedures. Education of consumers and training of food handlers in safe food handling are the most critical interventions in the prevention of food-borne illness (WHO, 2007).

Food Terrorism

One of the most recent concerns about the safety and security of the food supply is the possibility of food terrorism (Bledsoe & Rasco, 2002). Terrorists can attack America with not only guns and bombs, but also with bacteria. After the Sept. 11, 2001, attack, food terrorism became recognized as a real threat that the FBI has been working hard to prevent (Southern Nevada InfraGard, 2007). The U.S. government allocated \$4.3 billion to protect “America from a possible bioterrorist attack or other catastrophic public health emergency” (USHHS, n.d., p. 106). As a result, several research studies in the agriculture and food science disciplines have investigated food security or bioterrorism in the different areas of food supply, from farming to manufacturing (Berry, 2005). However, empirical studies investigating end-user preparedness and readiness against this

threat, such as in the food-service industry, have yet to be conducted (Yoon & Shanklin 2007a, 2007b).

The development and implementation of a food biosecurity/defense management plan is the best way to reduce the risks of food terrorism and its consequences (Bledsoe & Rasco, 2002; USDA, 2004). In fact, a number of government agencies and private organizations and associations have published guidelines for developing and implementing such a plan (e.g. Reeve, Stevenson, & Wooten, 2006; National Restaurant Association Educational Foundation [NRAEF], 2004; USFDA, 2007; USDA, 2004). Despite this, these agencies have yet to identify effective ways to motivate food-service directors to implement these guidelines. Furthermore, awareness of these guidelines by food-service operators may be minimal (Yoon & Shanklin, 2007b).

The U.S. has been more aware of terrorist attacks using biological or chemical agents since the high-profile anthrax attacks in 2001 (Federal Emergency Management Agency [FEMA], 2009). Some of these agents can have an immediate effect and are odorless and tasteless, and thus are difficult to detect with current technologies. Terrorists could develop and use biological or chemical agents to covertly contaminate the food or water supply system (Hall, Norwood, Fullerton, Gifford, & Ursano, 2004; FEMA, 2009). As a result, food has received increased attention for its potential as a bioterrorism vehicle (Yoon & Shanklin, 2007b).

The U.S. government allocated \$4.3 billion toward terrorism preparedness in the Fiscal Year (FY) 2008 (USHHS, n.d.). This amounted to 78% of the total budget allocated to Emergency Preparedness. According to the USHHS (n.d.), the National Institutes of Health had a budget of \$1.7 billion for FY 2008 to spend on biodefense

research, which supported the nation's ability to detect and counter bioterrorism, and \$496 million on research to develop medical counter-measures against nuclear, radiological, and chemical threats (Yoon & Shanklin, 2007b). The Centers for Disease Control and Prevention (CDC) received even more funding to maintain a "Strategic National Stockpile" (\$581 million), critical surveillance systems (e.g., BioSense) (\$88 million), upgrade state and local preparedness efforts (\$698 million), and upgrade CDC capacity (\$137 million) (Yoon & Shanklin, 2007b).

The FDA regulates 80% of the U.S. food supply safety. The agency is responsible for providing regulatory reviews of medical products, inspecting domestic food producers, and enhancing food import inspections to protect the national food supply and prevent food-borne illness. Although the U.S. government spends a tremendous amount of money to tackle bioterrorism issues and there have been reported food terrorism cases, the preparedness for a food terrorism attack within the food-service industry has not been investigated to date. Food terrorism research in the food-service industry should not be neglected. Because they are the last control point in the food chain, food-service operators need to be aware of the risks they face and prepare for any possible threats. Food-service professionals are strongly encouraged to institute customized management plans to protect their customers, clients, and employees from potential acts of bioterrorism (USDA, 2004; Bledsoe & Rasco, 2002).

The federal government has taken one small step in this direction. A biosecurity checklist guideline for school food-service directors was published by the Food and Nutrition Service of the USDA in order to assist them with improving the safety and security of their operations and protect not only children but also adults in their school

district (USDA, 2004). This guideline (Yoon & Shanklin, 2007b) was prepared to help school food-service operations:

1. Form a school food-service biosecurity management team;
2. Check and prioritize preventive measures appropriate to a facility, and ultimately;
3. Develop and implement a customized biosecurity-management plan in a school food-service operation.

This guideline explains how to develop and implement a food biosecurity and defense plan. Using this guideline, school food-service operations can audit their food biosecurity/defense practices. While this guideline is not mandatory, the Food and Nutrition Service strongly advises schools to develop a biosecurity management plan (Yoon & Shanklin, 2007b).

The National Restaurant Association also has developed an introductory food security resource with input from the FDA, the USDA, and the Department of Homeland Security (DHS) (NREAF, 2003). This 20-page booklet briefly explains why the food-service industry should address food security issues, why different methods of approach are needed for food defense than for food safety, the profile of a potential attacker, and how to prevent attacks. The NRA suggested a TEAM (Threat Evaluation, Assessment, and Management) approach to developing a food security plan. The TEAM consists of six sequential stages:

1. Identify Potential Food Security Threats.
2. Assess Risk Levels.
3. Analyze and Establish Control Measures.

4. Implement Control Measures and Monitor Critical Exposure Points
5. Take Corrective Actions.
6. Supervise and Review.

This booklet also includes a food-security checklist to help food-service operators perform initial evaluations of their security practices (Yoon & Shanklin, 2007b).

The American Institute of Baking (AIB) International has also developed guidelines for internal and external use: the *AIB International Guide to Food Defense for Food Retail and Food Service Operations* (Reeve et al., 2006). This publication describes the food defense program, its importance, the security measures that are needed, and how to develop and implement a food defense program. Food terrorism threats are categorized as internal and external, with attackers grouped into five categories: criminals, protesters, terrorists, subversives, and rogue or disgruntled insiders. Internal threats involve employees and vendors who have access to the facility, while external threats refer to threats caused by outside attackers with no facility access. Even though internal threats are more common, external threats should not be discounted, because different approaches are needed to prevent external attacks (Reeve et al., 2006). As with all the other guidelines, the AIB International protocol lists specific preventive measures for food-service operations to use in the development of a food biosecurity/defense management plan (Yoon & Shanklin, 2007b).

Although government agencies and many food-service organizations and associations are aware of the importance of preventive measures, little is understood about food-service operators' perceptions of the importance of these preventive measures and how frequently these preventive measures are actually practiced in operations. Therefore, in

order to increase the level of security against food terrorism, academia and government should develop effective materials to enhance food-service operators' perception of risk. Additionally, these materials should present effective preventive and proactive approaches for significantly decreasing or eliminating risks associated with bioterrorism attacks (Yoon & Shanklin, 2007b).

Operational Definitions

Potential Hazards to Food Safety: Unsafe food usually results from contamination, which is the presence of harmful substances in the food. Some food safety hazards are introduced by humans or by the environment, while others occur naturally.

1. Biological hazards include certain bacteria, viruses, parasites, and fungi, as well as certain plant, mushroom, and seafood toxins.
2. Chemical hazards include pesticides, food additives and preservatives, cleaning supplies, and toxic metals leached from non food-grade cookware and equipment.
3. Physical hazards consist of foreign objects that accidentally get into the food, such as hair, dirt, metal staples, and broken glass, as well as naturally occurring objects, such as bones in fillets (NRAEF, 2006).

A food-borne illness (FBI) is a disease carried or transmitted to people by food.

The Center for Disease Control and Prevention (CDC) defines a food-borne illness outbreak as an incident in which two or more people experience the same illness after eating the same food.

Food-borne illnesses are classified as infections, intoxications, or toxin-mediated infections.

1. Food-borne infections result when a person eats food containing pathogens, which then grow in the intestines and cause illness. Typically, symptoms of a food-borne infection do not appear immediately.
2. Food-borne intoxications result when a person eats food containing toxins that cause illness. The toxin may have been produced by pathogens found in the food or may be the result of a chemical contamination. The toxin might also be a natural part of a plant or animal consumed. Typically, symptoms of food-borne intoxication appear quickly, within a few hours.
3. Food-borne toxin-mediated infections result when a person eats food containing pathogens, which then produce illness-causing toxins in the intestines (NREAF, 2006).

For the purposes of this thesis, violation reports will refer to the reports on restaurants that received less than an “A” grade during an inspection by the Southern Nevada Health District, as reported in the daily newspaper, the *Las Vegas Review-Journal*. Violations will refer to each infraction cited by Southern Nevada Health District inspectors in giving the restaurant the less-than-satisfactory grade.

CHAPTER 3
METHODOLOGY

Data Collection

A total of 734 restaurant first time inspection reports and 681 reinspection reports, totaling 1,416 reports, were collected from the *Las Vegas Review-Journal*, which publishes restaurant inspection results each Wednesday in the Food section. These reports state the name of establishment, address, inspection date, demerits grade, and major violations. Only reports on restaurants that received less than the highest “A” grade are published in the newspaper. For the purpose of this project, the restaurant inspection reports were selected for the six-month period from June 24, 2009 to December 23, 2009.

The newspaper precedes every weekly report with this explanation of the grading system: “The Southern Nevada Health District conducts random inspections of local restaurants. An establishment receives an A grade if it has received no more than 10 demerits. A B grade is given to those establishments that receive 11 to 20 demerits, and a C grade is given to any establishment that receives 21 to 40 demerits. If an establishment receives more than 40 demerits, it is closed immediately. The grades are posted at the time of the inspection. The establishment has the option of requesting a reinspection before its next scheduled inspection” (Hynes, 2009a). This summarizes the SNHD’s grades that result from the violation reports.

Restaurant inspection forms from the SNHD consist of two parts. Part 1 contains critical violations and is colored red. The form states, “These items relate directly to the protection of the public from food-borne illness. These items are NOT NEGOTIABLE

AND MUST BE CORRECTED. Repeated violations of any RED ITEM may lead to the enforcement actions being initiated or permit suspension” (SNHD, 1999, p. 45). This part lists 22 violations with demerits ranging from 2 to 10 points each. There are 15 violations within this section that can be directly related to human factors. Part 2 of the form includes items relating to the sanitation, design, and maintenance of the establishment and is colored blue. The form states that “These items relate to maintenance of food service operations and cleanliness. Violations of these items should be corrected by the next regular inspection or a compliance schedule may be established by the Health Authority. Repeated violations may lead to enforcement actions” (SNHD, 1999, p. 45). There are 24 violations within this section, with a demerit range of one to three points per violation. A total of nine of these items can be affected by human factors. Examples of violations affected by human factors include holding times and temperatures of food items within Part 1, and proper cleaning and sanitation of food, utensils, and work spaces in Part 2 (McKeown, 2008).

It is the purpose of this paper to evaluate human factors and non-human factors of violations to establish proper training manual and effective education system. Once a pattern of the cause of violations is established, then a solution can be proposed to reduce the frequency of food-borne illness at restaurants. If the causes are primarily related to human factors, then training modules can be created to address those factors. If they are non-human factors, then design and maintenance changes can be recommended to reduce violations.

Human Versus Non-human Factors

A total of 734 violations from first-time health inspection were categorized into human causes and non-human causes. Furthermore, the human factors were divided into three sub-categories: cross-contamination, personal hygiene, and time-temperature abuse. Only, environmental causes belong to non-human factors. The major violations that were cited are listed below within the sub-categories in which they were counted.

Human Factors

Cross-Contamination

- Black residue inside ice machine (Hynes, 2009e)
- Dirty pans stored on top of food areas (Hynes, 2009e)
- Meat slicer and can opener dirty (Hynes, 2009f)
- Pink slime growth on interior of ice machine (Hynes, 2009f)
- Ice scoop stored in dirty standing water (Hynes, 2009f)
- Single-service plastic foam bowls used as scoops (Hynes, 2009f)
- Unlabeled repackaged food in reach-in freezer (Hynes, 2009f)
- Two soda guns dirty with syrup residue (Hynes, 2009f)
- Chemicals stored over bin of spices (Hynes, 2009f)
- Employee food stored on top of bottled beverages (Hynes, 2009f)
- Raw chicken and beef stored above and beside vegetables (Hynes, 2009f)
- Tomatoes spoiled with moldlike substance (Hynes, 2009f)
- Expired bread and moldlike growth on fried chicken (Hynes, 2009g)
- Tomato juice and pineapple juice stored in open cans (Hynes, 2009g)
- Reusing single-service cups as scoops (Hynes, 2009h)

- Numerous food items improperly covered (Hynes, 2009h)
- Uncovered pan of ham stored in beer refrigerator (Hynes, 2009h)
- Soda nozzles dirty with moldlike growth (Hynes, 2009h)
- Ice scoop container dirty (Hynes, 2009h; Hynes, 2009l)
- Ready to eat vegetables stored uncovered and on the floor in the walk-in cooler (Hynes, 2009h)
- Several uncovered food products (Hynes, 2009h)
- Produce and raw meat prepped on the same table (Hynes, 2009h)
- Clean glassware stacked wet (Hynes, 2009h)
- Ice machine unsanitary with areas of mineral deposits and rust on interior (Hynes, 2009h)
- Spoiled tomatoes with mold growth (Hynes, 2009h)
- Chemicals in food area (Hynes, 2009h)
- Three rice containers of sushi rice sitting out uncovered (Hynes, 2009h)
- Clean dishware left on sink next to defrosting raw chicken (Hynes, 2009h)
- A bowl of putrid apples on prep table (Hynes, 2009h)
- Dump sink used to store bottled beer in ice (Hynes, 2009h)
- Unlabeled cut meats in refrigerators (Hynes, 2009i)
- Scoop handle touching food product (Hynes, 2009b; Hynes, 2009e; Hynes, 2009i; Hynes, 2009k; Hynes, 2009m)
- Fish stored over other food (Hynes, 2009i)
- Food stored uncovered (Hynes, 2009c; Hynes, 2009i)

- Chemicals not stored properly (Hynes, 2009e; Hynes, 2009i; Hynes, 2009k; Hynes, 2009l; Hynes, 2009q; Hynes, 2009r; Hynes, 2009u)
- Dirty tumblers (Hynes, 2009i)
- Raw eggs stored improperly (Hynes, 2009i)
- Soda gun had slimy buildup (Hynes, 2009i)
- Uncovered drinks in kitchen (Hynes, 2009i)
- Dough mixer dirty (Hynes, 2009i)
- Food handler rinsed cutting board in hand sink (Hynes, 2009i)
- Clean dishware stored under back hand sink (Hynes, 2009i)
- Bags of chicken and pork stored in the same container (Hynes, 2009i)
- Pink and slimy growth on soda gun nozzles and holsters (Hynes, 2009i)
- Sauce-making table not clean (Hynes, 2009i)
- Wet wiping cloths stored on counter (Hynes, 2009i)
- Double-stacking bowls without a barrier (Hynes, 2009i)
- Ice scoop handle touching ice in bin (Hynes, 2009j)
- Ice machine chute slimy (Hynes, 2009j, Hynes, 2009k)
- Dirty glassware stored above clean glassware (Hynes, 2009j)
- Black moldlike growth in ice machine (Hynes, 2009j)
- Metal pans stacked while wet (Hynes, 2009j)
- Unlabeled bulk bins and food in freezer (Hynes, 2009j)
- Raw meat stored over onions (Hynes, 2009j)
- Spoiled green chilies (Hynes, 2009j)
- Food and sauces stored uncovered (Hynes, 2009j)

- Utensils stored in dirty container (Hynes, 2009j)
- Ducks hanging from three-compartment sink (Hynes, 2009j)
- Milk crates used as shelving (Hynes, 2009j)
- Uncovered food stored in dry storage area (Hynes, 2009j)
- Chemical bottle not stored properly (Hynes, 2009j; Hynes, 2009x)
- Dirty pans and plastic food containers stored as clean (Hynes, 2009j)
- Cup used as scoop in spice container (Hynes, 2009j)
- Ice scoop not stored properly (Hynes, 2009e; Hynes, 2009j)
- Dirty wiping cloths on prep table (Hynes, 2009j)
- Ice machine had a slimy moldlike substance/reinspected 08/25/09, received 5 demerits (Hynes, 2009j)
- Food stored uncovered and stacked in reach-in freezer (Hynes, 2009j)
- Glassware shelves had excessive dust buildup (Hynes, 2009j)
- Employee used bulk rice barrel to prep raw shrimp (Hynes, 2009k)
- Eggs stored over ready-to-eat food (Hynes, 2009k; Hynes, 2009l)
- Raw food stored next to cooked and ready-to-eat food (Hynes, 2009k; Hynes, 2009r)
- Moldlike growth in ice machine (Hynes, 2009k; Hynes, 2009n; Hynes, 2009r; Hynes, 2009t; Rinella, 2009)
- Salad scoop handle was stored in product (Hynes, 2009k)
- A high level of sanitizer at three-compartment sink (Hynes, 2009k)
- Interior surfaces of ice machine dirty (Hynes, 2009k; Hynes, 2009j)
- Scoop handles touching food in several bins (Hynes, 2009k; Hynes, 2009m)

- Raw meat stored over vegetables (Hynes, 2009k; Hynes, 2009n)
- Slime accumulation inside beer taps (Hynes, 2009k)
- Glasses wet-nested (Hynes, 2009k)
- Dirty soda nozzles and ice machine (Hynes, 2009k)
- Dirty knives stored as clean (Hynes, 2009k; Hynes, 2009m)
- Raw eggs stored over ready-to-eat foods (Hynes, 2009d; Hynes, 2009l)
- Pans of food stacked without a proper barrier (Hynes, 2009l)
- Scoop handles stored in food product (Hynes, 2009l; Hynes, 2009v)
- Uncovered food in walk-in freezer (Hynes, 2009l)
- Glasses stored on dirty shelves (Hynes, 2009l)
- Bowls used as scoops (Hynes, 2009l; Hynes, 2009o)
- Slimy and spoiled mushrooms (Hynes, 2009l)
- Opened bags of food stored in dry storage (Hynes, 2009m)
- Cut broccoli stored improperly (Hynes, 2009m)
- Slime accumulation in soda gun nozzle (Hynes, 2009m)
- Milk in reach-in cooler past its "use by" date (Hynes, 2009m)
- Tray of eggs stored next to ready-to-eat food (Hynes, 2009m)
- Uncovered food in walk-in refrigerator (Hynes, 2009m)
- Sanitizer level too high (Hynes, 2009m)
- Scoop handles touching product in bulk containers of spices (Hynes, 2009n)
- Food prepped in dirty three-compartment sink (Hynes, 2009n)
- Food stored uncovered on dry storage rack (Hynes, 2009n)
- Double-stacking uncovered food without a barrier (Hynes, 2009n)

- Measuring cup used as scoop (Hynes, 2009n)
- Wet nesting pans at three-compartment sink (Hynes, 2009n)
- Raw shelled eggs stored over sauces (Hynes, 2009n)
- French fry unit improperly setting over sauces contaminating food underneath it (Hynes, 2009o)
- Sanitizer level too high in wiping cloth bucket (Hynes, 2009o)
- Bowls used as scoops in bulk food containers (Hynes, 2009o)
- Soda gun holder had slime buildup (Hynes, 2009o)
- Uncovered can of sauce stored in walk-in cooler (Hynes, 2009o)
- Raw chicken stored over cooked chicken in cooler drawers (Hynes, 2009o; Hynes, 2009r)
- Dirty pots stored as clean (Hynes, 2009o)
- Dump sink used as a hand sink (Hynes, 2009p)
- Chemical spray can stored improperly (Hynes, 2009p)
- Numerous uncovered food items (Hynes, 2009p)
- Pink slime buildup in chute of ice machine (Hynes, 2009p)
- Bowl used to scoop cooked rice (Hynes, 2009p)
- In-use and unclean knives lying on unclean work surface (Hynes, 2009p)
- Uncovered drinks on prep table (Hynes, 2009p)
- Prep table stored in front of hand sink (Hynes, 2009p)
- Scoop handle touching consumable ice (Hynes, 2009p)
- Food stored on floor of walk-in cooler (Hynes, 2009p)
- Raw meat stored over ready-to-eat food (Hynes, 2009p; Hynes, 2009q)

- Several uncovered bottles of beverages (Hynes, 2009p)
- Dried food debris on knives stored on clean rack (Hynes, 2009p)
- Soda gun holster not draining properly (Hynes, 2009p)
- Opened bulk dry goods stored on dry storage shelf (Hynes, 2009q)
- Raw meat stored next to ready-to-eat food (Hynes, 2009q)
- Uncovered food in storage areas (Hynes, 2009q)
- Moldy lettuce (Hynes, 2009q)
- Wiping cloths stored on prep surfaces (Hynes, 2009q)
- Chlorine level too high in sanitizer bucket (Hynes, 2009q; Rinella, 2009)
- Raw shell eggs stored over ready-to-eat food (Hynes, 2009q; Hynes, 2009u)
- Bowl stored in container of sauce (Hynes, 2009q)
- Bread trays stored on clean plates (Hynes, 2009q)
- Can opener dirty (Hynes, 2009e; Hynes, 2009n)
- Uncovered bulk container of bread in back prep area (Hynes, 2009q)
- Numerous food items spoiled and/or outdated (Hynes, 2009r)
- Ice scoop handle stored inside customer ice bin (Hynes, 2009r)
- Lids and liquor pours inside hand sink (Hynes, 2009r)
- Personal food items stored on shelf with food and beverages intended for the pub (Hynes, 2009r)
- Sanitizer bucket stored next to a food preparation area (Hynes, 2009r)
- Souffle cups used as scoops for spices (Hynes, 2009r)
- Dirty food contact surfaces, slicer and pans (Hynes, 2009r)
- Dirty glasses (Hynes, 2009r)

- Wiping cloth stored on prep table next to food (Hynes, 2009r)
- Hand sink used to wash produce (Hynes, 2009r)
- Uncovered salads and condiments (Hynes, 2009s)
- Soda guns had blackish deposits and soda buildup (Hynes, 2009s)
- Uncovered containers of bulk foods and open ingredient bags in backroom (Hynes, 2009s)
- Portion cups used as scoops and stored in food products (Hynes, 2009s)
- Dirty food prep table and make table (Hynes, 2009s)
- Milk and whipping cream in use past expiration date (Hynes, 2009s)
- Dishes washed at three-compartment sink while food product was thawing in one section (Hynes, 2009s)
- Multi-use utensils not washed and sanitized properly (Hynes, 2009s)
- Open bag of rice not stored properly (Hynes, 2009s)
- Dried-on, built-up food debris on can-opener blade (Rinella, 2009)
- Pans stored on floor (Rinella, 2009)
- Sanitizer solution too strong (Rinella, 2009)
- Dirty cloth on cutting board (Rinella, 2009)
- Wiping cloth used to cover sushi rice (Rinella, 2009)
- Container of nacho chips stored on floor (Rinella, 2009)
- Containers and pallets with sticky buildup (Rinella, 2009)
- Mold growing at back of prep sink (Rinella, 2009)
- Too much chlorine in sanitizer bucket (Rinella, 2009)
- Food stored on floor of walk-in freezer (Hynes, 2009t)

- Pink slime in ice machine (Hynes, 2009t)
- Bottled drinks stored in drink ice (Hynes, 2009t)
- Hand sink used as dump sink (Hynes, 2009c; Hynes, 2009t; Hynes, 2009x)
- Brown residue in ice bin (Hynes, 2009t)
- Uncovered food in back of reach-in cooler (Hynes, 2009t)
- Dirty equipment stacked as clean (Hynes, 2009t)
- Uncovered noodles at cook line (Hynes, 2009t)
- Food stored next to dirty dishes in three-compartment sink (Hynes, 2009u)
- Several uncovered foods stored in cooler (Hynes, 2009u)
- Dirty ice machine and ice scoops (Hynes, 2009u)
- Steam table used to reheat food (Hynes, 2009o; Hynes, 2009u)
- Stored food falling out of containers (Hynes, 2009v)
- Raw seafood stored next to and above ready-to-eat food (Hynes, 2009v)
- Unlabeled bulk food containers (Hynes, 2009f; Hynes, 2009w)
- Microwave and cutting boards dirty (Hynes, 2009w)
- Chemical sanitizer bucket stored over food area (Hynes, 2009w)
- Can opener and prep cutting boards dirty (Hynes, 2009w)
- Dirty meat slicer, mixer and cutting board (Hynes, 2009x)
- Uncovered food in freezer (Hynes, 2009x)
- Uncovered drink ice stored in reach-in cooler (Hynes, 2009x)
- Dirty soda gun holster (Hynes, 2009x)
- Moldlike substance on lettuce in walk-in refrigerator (Hynes, 2009x)

Personal Hygiene

- Employee's uncovered drink stored on counter (Hynes, 2009b)
- Employees did not follow proper hand-washing procedures (Hynes, 2009c)
- Employee items not stored properly (Hynes, 2009j)
- An uncovered employee beverage stored on the prep counter (Hynes, 2009e)
- Employee beverage stored with food service items (Hynes, 2009c)
- Several employee beverages stored uncovered on prep surface (Hynes, 2009d)
- Employee eating and drinking in food prep area (Hynes, 2009d)
- Food handler did not follow proper hand-washing procedures (Hynes, 2009d)
- Several employee personal items not stored properly (Hynes, 2009d; Hynes, 2009f)
- Employee eating in kitchen (Hynes, 2009e)
- Employees filling drinking water containers at hand sink (Hynes, 2009e)
- Uncovered employee beverage next to uncovered food (Hynes, 2009e)
- Uncovered employee drink on food prep table (Hynes, 2009e)
- Chef did not follow proper hand-washing procedures (Hynes, 2009f)
- Uncovered employee drink on prep surface (Hynes, 2009f)
- Cook eating sushi while working in kitchen (Hynes, 2009f)
- Employee put gloves on without washing hands first (Hynes, 2009g)
- Employees not following proper hand-washing procedures (Hynes, 2009h)
- Cooks washing hands at three-compartment sink (Hynes, 2009h)
- Uncovered employee drinks stored on prep table (Hynes, 2009h)
- Employee food items stored alongside customer items (Hynes, 2009h)

- Cook not following proper hand-washing procedures (Hynes, 2009h)
- Food handlers eating in prep area (Hynes, 2009h)
- Improper hand-washing (Hynes, 2009i)
- Employee water bottle stored improperly (Hynes, 2009i)
- Employee drinks on prep surface (Hynes, 2009j)
- Food handler not using proper hair restraint (Hynes, 2009j)
- Employee items not stored properly (Hynes, 2009j)
- Employee beverages stored on prep tables (Hynes, 2009k)
- Open employee drinks stored over uncovered food (Hynes, 2009k)
- Personal items not stored properly (Hynes, 2009l)
- Food handler did not follow proper hand-washing procedures when changing tasks (Hynes, 2009l)
- Employee beverages stored on food prep surfaces (Hynes, 2009l)
- Employee food stored near food served for public (Hynes, 2009m)
- Cook did not wash hands between changing tasks (Hynes, 2009o)
- Open employee beverage on cutting board (Hynes, 2009n)
- Personal items stored throughout prep area (Hynes, 2009n)
- Personal drinks stored improperly (Hynes, 2009n)
- Cooks changed gloves without washing hands (Hynes, 2009n)
- Employee drink stored improperly (Hynes, 2009n)
- Two food handlers did not dry hands properly (Hynes, 2009n)
- Employees' personal items not stored properly (Hynes, 2009n)
- Cooks washing hands at three-compartment sink (Hynes, 2009h)

- Uncovered employee drinks stored on prep table (Hynes, 2009h)
- Cook not following proper hand-washing procedures (Hynes, 2009h)
- Food handlers eating in prep area (Hynes, 2009h)
- Employee water bottle stored improperly (Hynes, 2009i)
- Employee drinks on prep surface(Hynes, 2009j; Hynes, 2009h)
- Employee did not follow proper hand-washing procedures (Hynes, 2009h)
- Open employee drinks stored over uncovered food (Hynes, 2009k)
- Food handler did not follow proper hand-washing procedures when changing tasks (Hynes, 2009l)
- Employee beverages stored on food prep surfaces (Hynes, 2009l)
- Employee food stored near food served for public (Hynes, 2009m)
- Cook did not wash hands between changing tasks (Hynes, 2009n)
- Personal items stored throughout prep area (Hynes, 2009n)
- Cooks changed gloves without washing hands (Hynes, 2009o)
- Two food handlers did not dry hands properly (Hynes, 2009p)
- Employee drinking an open beverage behind bar (Hynes, 2009q)
- Food handler changed tasks without changing gloves or washing hands (Hynes, 2009q)
- Employee food stored on surface for food preparation (Hynes, 2009o)
- Improper hand-washing procedures (Rinella, 2009)
- Employee food stored on top of customer food (Hynes, 2009t)
- Employee beverage not stored properly (Hynes, 2009u)
- Employee personal beverages and items not stored properly (Hynes, 2009w)

- Food handler did not follow proper hand-washing procedures when changing tasks (Hynes, 2009w)

Time and Temperature Abuse

- Food not cooled by approved methods (Hynes, 2009g)
- Food held at improper temperatures (Hynes, 2009h)
- Chicken being thawed in standing water (Hynes, 2009a)
- Several milk containers past their “best buy” date (Hynes, 2009c)
- Food held in improper temperatures (Hynes, 2009i)
- Frozen chicken thawing on counter (Hynes, 2009b)
- Food held in improper temperatures (Hynes, 2009b)
- Half & half, fruit juices, and drinks mixes not at proper temperature (Hynes, 2009c)
- Meat thawing in sink without running water (Hynes, 2009c)
- Several cartons of expired buttermilk (Hynes, 2009e)
- Using milk past the use-by date (Hynes, 2009f)
- Food not cooled by approved methods (Hynes, 2009g)
- Vegetables stores at room temperature (Hynes, 2009h)
- Buttermilk expired (Hynes, 2009i)
- Food held at improper temperatures (Hynes, 2009j)
- Expired milk jugs (Hynes, 2009k)
- A gallon container of expired milk (Hynes, 2009o)
- Shrimp not thawed properly (Hynes, 2009e)
- Milk was past use by date (Hynes, 2009p)

- Double stacking containers of lettuce (Hynes, 2009e)
- Two gallons of milk past expiration date (Hynes, 2009q)
- Fish thawing in standing water (Hynes, 2009e)
- Expired container of buttermilk (Hynes, 2009r)
- Chicken not cooled by approved methods (Hynes, 2009e)
- Meat and fish in freezer past sell date (Rinella, 2009)
- Milk and milk products not held at proper temperature (Hynes, 2009e)
- Rice not cooled by approved methods (Hynes, 2009f)
- Expired cheddar cheese and buttermilk (Hynes, 2009u)
- Cut lemon slices stored at room temperature (Hynes, 2009f)
- Milk past expiration date (Hynes, 2009q)
- Ground beef not cooked to proper temperature (Hynes, 2009f)
- Expired sour cream (Hynes, 2009x)
- Walk-in refrigerator not maintaining proper temperature (Hynes, 2009g)
- Fish not thawed properly (Hynes, 2009h)
- Large pieces of chicken on top rack in pressure fryer not cooked to proper temperature (Hynes, 2009h)
- Seafood and chicken not thawed properly (Hynes, 2009h)
- Chicken not cooled by approved methods (Hynes, 2009h)
- Food held at improper temperature (Hynes, 2009i)
- Shellfish stored improperly (Hynes, 2009i)
- Numerous foods out of temperature (Hynes, 2009i)
- Raw and prepared foods stored at room temperature (Hynes, 2009i)

- Shrimp thawed improperly (Hynes, 2009i)
- Chicken and beef thawed at room temperature (Hynes, 2009i)
- Food not cooled properly (Hynes, 2009j)
- Perishable food stored at room temperature (Hynes, 2009j)
- Food not thawed properly (Hynes, 2009j; Hynes, 2009k)
- Rice scoop stored in standing water (Hynes, 2009k)
- Food not cooled properly (Hynes, 2009k)
- Chicken wings thawed at room temperature (Hynes, 2009k)
- Perishable foods not stored at proper temperature (Hynes, 2009l)
- Chicken thawing at room temperature (Hynes, 2009m)
- Milk stored in bucket with ice (Hynes, 2009m)
- Food thawed improperly (Hynes, 2009m)
- Chicken not thawed properly (Hynes, 2009n)
- Food thawing at room temperature (Hynes, 2009n)
- Steam table used to reheat food (Hynes, 2009o)
- Raw meat stored at room temperature (Hynes, 2009o)
- Chicken thawing in standing water (Hynes, 2009o)
- Utensils stored in standing water in several areas (Hynes, 2009p)
- Frozen food thawing on top shelf of prep table (Hynes, 2009p)
- Soybean beverages not cooled by approved methods (Hynes, 2009p)
- Pizza out of temperature throughout kitchen (Hynes, 2009p)
- Pastrami not reheated properly (Hynes, 2009q)
- Food not thawed properly (Hynes, 2009q)

- Hot holding unit not maintaining proper temperature (Hynes, 2009q)
- Rice paddles stored in standing water (Hynes, 2009q)
- Tuna not made with pre-chilled ingredients (Hynes, 2009r)
- Hot sauce was cooling at room temperature (Hynes, 2009r)
- Eggs stored on shelf at room temperature (Hynes, 2009s)
- Meat being thawed at room temperature (Rinella, 2009)
- Milk held at improper temperature (Rinella, 2009)
- Soups and sauces held at improper temperatures (Rinella, 2009)
- Beef and chicken not thawed properly (Hynes, 2009t)
- Cut vegetables stored at room temperature all day (Hynes, 2009u)
- Open containers of lime juice, jalapenos and caramel stored at room temperature (Hynes, 2009u)
- Egg rolls improperly double stacked in the refrigerator (Hynes, 2009w)
- Improperly thawing food in three-compartment sink (Hynes, 2009x)

Non-human Factors

Environmental Violations

- Glass machine not dispensing sanitizer (Hynes, 2009s)
- No stem thermometer available at facility (Hynes, 2009s)
- Unlabeled containers of food (Hynes, 2009s)
- Hand sink blocked by onions and sanitizer bucket in hand sink (Hynes, 2009s)
- Steam table not maintaining temperature (Rinella, 2009)
- Employees with expired or no health cards (Rinella, 2009)
- Dishwashing machine not sanitizing properly (Rinella, 2009)

- No soap at only hand sink (Rinella, 2009)
- No hot water at hand sink/substantial health hazard (Rinella, 2009)
- No hot water at rear hand sink (Rinella, 2009)
- Dust and fuzz on ceiling tiles (Rinella, 2009)
- No soap or paper towels at hand sink. Repeat critical violations. (Rinella, 2009)
- Domestic microwave in use (Rinella, 2009)
- Roaches in ice machine (Rinella, 2009)
- Food not from approved sources (Rinella, 2009)
- Moldlike substance on ice machine (Rinella, 2009)
- Improper level of sanitizer solution for wiping cloths (Hynes, 2009t)
- Food containers unlabeled (Hynes, 2009t)
- Cooler not maintaining proper temperature (Hynes, 2009t)
- No thermometer in small refrigerator next to grill (Hynes, 2009t)
- A food handler did not have a valid health card (Hynes, 2009t)
- No soap dispenser at hand sink, only sanitizer (Hynes, 2009t)
- Dishwasher not dispensing proper amount of sanitizer (Hynes, 2009t)
- Access to hand sink blocked (Hynes, 2009u)
- No stem thermometer available (Hynes, 2009u)
- Unlabeled food in reach-in cooler (Hynes, 2009v)
- Incorrect hot water temperature at three-compartment sink (Hynes, 2009v)
- Coolers did not have thermometers (Hynes, 2009w)
- Unapproved household freezer in use (Hynes, 2009w)
- No soap or paper towels at hand sinks (Hynes, 2009w)

- Make table not maintaining proper temperature (Hynes, 2009w)
- Plastic crate used as shelf (Hynes, 2009w)
- Walk-in refrigerator not maintaining proper temperature (Hynes, 2009w)
- No cold water available at kitchen hand sink (Hynes, 2009w)
- Refrigerator not maintaining proper temperature (Hynes, 2009x)
- Food not labeled properly (Hynes, 2009x)
- Containers with old labels stacked as clean (Hynes, 2009x)

The breakdown of the violations cited in each inspection was processed using MINITAB to test for statistical inferences within the gathered data. Tests looked at grade, demerits, type of violations and city where the restaurant is located for the 734 individual violation reports. For the purpose of this project, the dependent variables include the grade and demerits, while the type of violations is an independent variable. In order to determine the statistical inferences within the gathered data, the variables associated with the data must be distinguished. The grade and city of each establishment are each categorical variables (CV) in that they each have a limited number of distinct values (Zikmund, 2003).

CHAPTER 4

DATA ANALYSIS

Restaurant Health Inspection

A total of 734 usable violation reports from the restaurant health inspections were collected from the *Las Vegas Review-Journal*. Each report listed the most important major violation cited by SNHD. There are 46 possible violations listed on the SNHD restaurant health inspection form, of which 25 have been determined to be controlled by human factors. During data entry, these violations were divided into the four most common factors that lead to food-borne illness in reported cases, which were time and temperature abuse (improper holding), poor personal hygiene of the food preparers, cross contamination, and environmental factors. The first three of those factors are directly related to human actions. Only environmental factors are non-human factors.

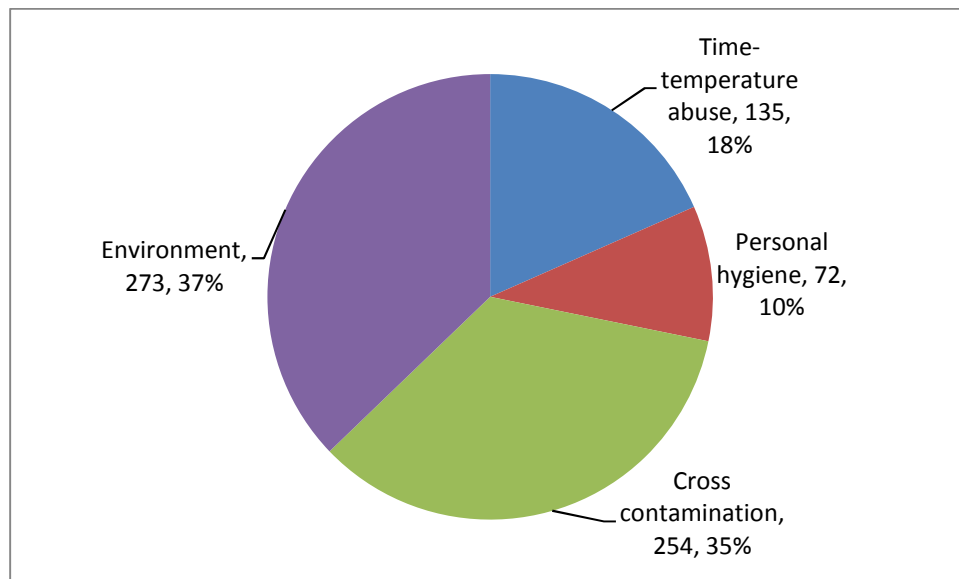


Figure 1: Types of violations.

The results show that 461 out of 734 violations (62.8%) are related to human factors (time/temperature abuse, personal hygiene or cross-contamination) and 273 out of 734 violations (37.2%) were related to the non-human factors (environmental). It is clear that the human factors are more significant than non-human factors in food safety practices.

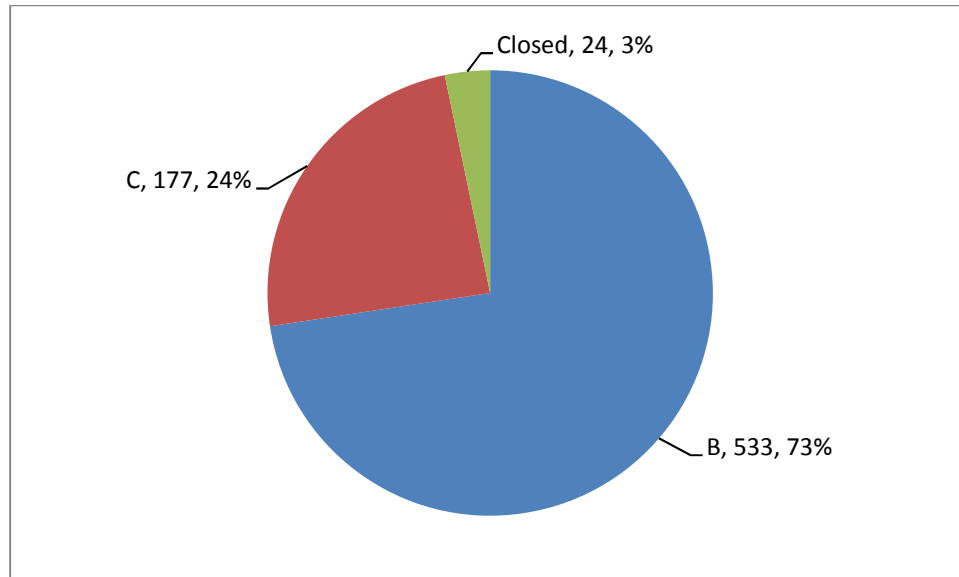


Figure 2: Grade.

Twenty-four establishments out of 734 restaurants in Las Vegas were immediately closed for serious violations. However, 177 out of 734 establishments (24.1%) were given 30-day notices to correct their violations. The other 533 establishments received B grades, which they can upgrade to an A grade by requesting reinspection.

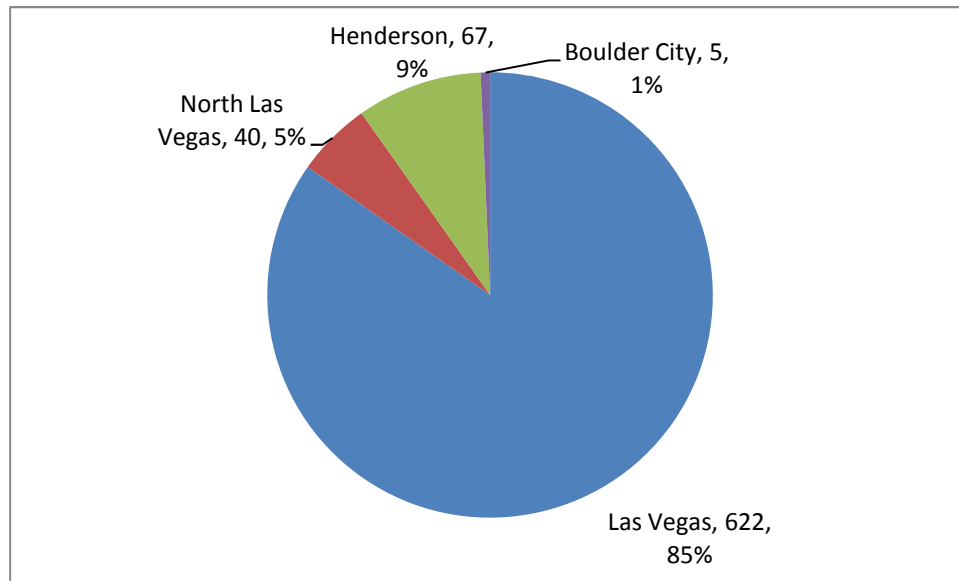


Figure 3: City where restaurant is located.

Tourism is the main engine of the Las Vegas economy, with 37 million people visiting the city each year. According to the University of Nevada Las Vegas’ Center for Business and Economic Research Center, the figure for visitor spending in 2004 was \$33.7 billion (“Las Vegas: Economy,” 2009). In 2004, 20 percent of all jobs were related the gaming resorts that draw tourists to Las Vegas (“Las Vegas: Economy,” 2009). However, of the 734 establishments that received lower than an A grade in this timeframe, 622 (84.7%) were in Las Vegas. The economic costs of a food-borne illness in Las Vegas would be magnified by the potential bad publicity that could keep tourists away. This result shows that there is a potential risk of a food-borne illness outbreak in Las Vegas.

Table 1

Analysis by Demerits

Variable	N	N*	Mean	SE Mean	StDev	Min	Q1	Median	Q3	Max
Demerits	734	0	21.338	0.302	8.176	1.000	16.000	19.000	23.000	68.000

The statistical data show the mean figure of 21.338 and median figure of 19, which tells us their mean is worse than their median. It is very important to bring down their violations by analyzing its causes to prevent potential food-borne illness and outbreak.

Table 2

Analysis by Reinspection

Variable	N	N*	Mean	SE Mean	StDev	Min	Q1	Median	Q3	Max
Demerits	681	0	4.209	0.152	3.978	0.000	1.000	3.000	6.000	36.000

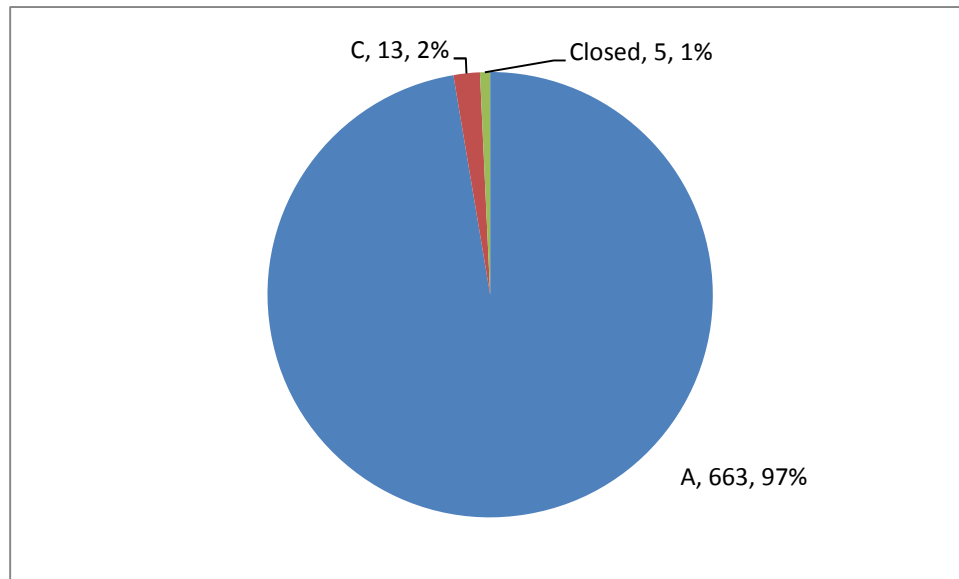


Figure 4: Grade upon reinspection.

Six hundred sixty three (97.4%) establishments were received grade A upon their re-inspection. Only 13 establishments (1.9%) remained at a grade C, and five establishments (0.7%) were closed down.

Result of Research Question

As was stated at the beginning of this paper, the purpose of the paper is to determine whether human factors or non-human factors have a more significant effect on health inspection grades given by the Southern Nevada Health District. It is clear that this data confirm that human factors have greater impact on health inspection grades than non-human factors. Especially significant in these results is the fact that 663 out of 681 establishments (97.4%) received grade A, improved from their former grade C and grade B, when they were reinspected by the Southern Nevada Health District. Their mean (4.209 demerits) was much better than the mean (21.338) of their first inspection. This improvement shows clearly that education, in the form of the SNHD inspections, was very effective in changing the behaviors of the restaurant personnel. It is clear that establishing effective training systems can help bring down health violations and prevent potential food-borne illnesses and outbreaks.

CHAPTER 5

DISCUSSION

An estimated 76 million cases of food-borne disease occur each year in the United States. The great majority of these cases are mild and cause symptoms for only a day or two. Some cases are more serious, and the CDC estimates that there are 325,000 hospitalizations and 5,000 deaths related to food-borne diseases each year. The most severe cases tend to occur in the very old, the very young, those who have an illness that reduces their immune system function, and healthy people who are exposed to a very high dose of an organism (CDC, 2005).

The World Health Organization reported that the global incidence of food-borne disease is difficult to estimate, but it has been reported that in 2005 alone 1.8 million people died from diarrheal diseases. A great proportion of these cases can be attributed to contamination of food and drinking water. Additionally, diarrhea is a major cause of malnutrition among infants and young children. And also, food contamination creates an enormous social and economic burden on communities and their health systems. In the USA, diseases caused by the major pathogens alone are estimated to cost up to US \$35 billion annually in medical costs and lost productivity (WHO, 2007).

However, food-borne diseases are largely preventable, though there is no simple one-step prevention measure like a vaccine. Instead, measures are needed to prevent or limit contamination from farm to table. A variety of good agricultural and manufacturing practices can reduce the spread of microbes among animals and prevent the contamination of foods. Careful review of the whole food production process can

identify the principal hazard and the control points where contamination can be prevented, limited, or eliminated (CDC, 2005).

A total of 734 violation reports were collected from the *Las Vegas Review-Journal* for a six-month period. Each inspection was randomly performed by the inspectors of the Southern Nevada Health District without consideration of name, location, type of ownership, and who performed the inspection. The purpose of this paper is to examine and analyze the restaurant health violations that could cause food-borne illness in the food-service industry and recommend solutions. Given that most of the violations were due to human factors, training would be an appropriate approach. SNHD, through its inspections, provides training that proved to be effective in getting establishments to correct problems that could cause food-borne illnesses. However, restaurant owners can do much to educate their employees before health inspectors find these violations. Effective training programs and continuing education for employees of food-service establishments are the key.

Summary of Finding

A look at the standards of Southern Nevada Health District restaurant inspections in Las Vegas can show just how lax restaurant owners can allow their employees to become before SNHD takes action. The regulations state:

1. Grades of establishments shall be as follows:
 - a. Grade A. An establishment having a demerit score of not more than 10.
 - b. Grade B. An establishment having a demerit score of more than 10 but not more than 20.

c. Grade C. An establishment having a demerit score of more than 20 but not more than 40.

2. A food establishment that has received Grade C may, in accordance with the provision of Subsection 3 of NRS 444.880, be closed.

3. Notwithstanding the grade criteria established in Subsection 1a., whenever a second consecutive violation of any item of two or more demerit points is discovered, the permit for such establishment shall be downgraded to the next lower grade.

4. Immediately following each inspection, the health authority shall post the appropriate grade based upon the inspection findings and the condition of the facility at the time of inspection.

5. Removal of a grade card by individuals other than the health authority could result in suspension of the health permit (SNHD, 1999, pp. 40-41).

Twenty-four out of 734 establishments (0.303%) in Las Vegas were immediately closed for serious violations. Another 177 out of 734 establishments (24.1%) were grade C, and 533 establishments (72.6%) were grade B.

A total of 734 violations of the restaurant health inspections were divided into the four most common factors that lead to food-borne illness in reported cases.

1. Cross Contamination (CC): 254 establishments, 34.6%
2. Environment factor (EV): 273 establishments, 37.2 %
3. Time and Temperature abuse: 135 establishments, 18.4%
4. Personal Hygiene (PH): 72 establishments, 9.8%

There are more violations by human factors (62.8%) than non-human factors (37.2%). Therefore, if the food-service industries improve on human factors that cause violations using proper training and continuing education programs, they can contribute greatly to food safety.

Implications

This paper shows that human factors caused food safety violations more than non-human factors. These results have important implications to many stakeholders, particularly operators of the independent restaurants, state and local public health officials, and customers. Since human factors are more significant in causing violations, the restaurant operators themselves have the most direct role in improving their food safety performance. They must be active in ensuring their restaurants implement and follow proper food safety procedures. This requires that they disseminate critical information to their employees and be active monitors.

Food safety policies should be clear and easy to implement. All employees must be properly trained. Finally, restaurant operators need to create a culture that focuses on food safety, even to the point of implementing incentive programs to reward performance in this area (Burkink, Hughner & Marquardt, 2004).

A comprehensive food safety program requires a major commitment of time, labor, and resources. As Knychalska and Shaw (2002, p. 108) note, "A typical independent restaurant establishment lacks the sophistication of large fast-food chain or major corporation, where resources, in terms of money, time, and personnel, are allocated and easily devoted to strategic marketing planning. The independent entrepreneur often gets entrenched in day-to-day operations and the planning process gets put on the sidelines."

A strong food safety program, much like strategic planning, often gets placed on the back burner as owner-operators deal with the myriad of issues of running a restaurant. Because food safety is critical to the success of each and every restaurant and food-service operation, the challenge is for independent operators to develop effective and affordable food safety training programs (Burkink et al., 2004).

The following discussion (Hernandez, 2001, as cited by Burkink, et al., 2004) highlights some essential components to an effective food safety training program:

1. **Commitment to Creation of a Food Safety Culture.** Management must support and believe in the importance of food safety to the success and survival of the restaurant. Operators need to appreciate the benefits of a comprehensive food safety program, such as avoidance of potential costs associated with an outbreak of food-borne illness (e.g., loss of reputation and revenue) and the potential of increased customer satisfaction. Customers tend to be more satisfied when they can see that a restaurant is clearly committed to offering safe food, and thus management needs to look at food safety as a long-term investment, rather than a short-term expense (Collis, 2002). Additionally, if managers show a commitment to food safety through their attitude and behavior, employees are more likely to follow suit.
2. **Clearly Defined and Measurable Objectives.** Management needs to assess and compare what employees are required to know to perform their jobs versus what they actually know and do. To identify food safety training gaps, managers can observe employee job performance; question employees to identify areas of

weakness; review past health inspection reports for violation related to employee performance; and test employees' food safety knowledge.

3. Training that Supports the Objectives. As soon as training needs have been identified, objectives of the training program must be defined. Restaurant employees are the first lines of defense when it comes to ensuring proper food safety guidelines are met. There are many methods to deliver food safety content to employees, including demonstration, role-play, group training and technology-based training. The choice should depend upon: language proficiency of the employees; types of food handling that occur, the number of people being taught, the cost, and how the trainees will learn best (Hernandez, 2001, as cited by Burkink, et al., 2004; Berta, 2001). To cater to employees with little or no English language ability or a broad range of education levels, simplified training on food-safety issues is the best. Some operators are realizing making these lessons fun and interesting helps employees retain what they learn (Burkink, et al., 2004).
4. Food Safety Training Needs to be On-Going. An effective food safety program needs to incorporate continuous evaluation and on-going food safety training as part of its operating procedures (Hernandez, 2001, as cited by Burkink, et al., 2004; Berta, 2001).

It is believed that franchise restaurants perform better on food safety due to the superior channel coordination that exists in these closely controlled marketing channels. This is because enhanced channel coordination should lead to more seamless transfer of knowledge and monitoring of proper food-handling procedures. The franchisor, as the

large and sophisticated overseeing organization, is able to provide information about food safety and monitor franchisees to ensure proper implementation of programs. This vital role is missing in conventional marketing channels available to independent restaurants. Independent restaurant owners need help and should be targeted by local agencies and professional educators with more ongoing education on proper food handling techniques (Burkink, et al., 2004).

Technology is another important component of food safety. Restaurateurs can benefit by employing the latest technology to monitor critical food safety variables.

Technological advances from common food preparation utensils to sophisticated equipment are constantly being introduced. Examples include utensils made of a stainless steel that inhibits the growth of bacteria, mold, and mildew; “intelligent” plastic that can warn if food is being spoiled by detecting common bacteria; and thermometers that can collect and record thousands of temperature and humidity readings with accompanying locations and times. Fortunately for smaller operations, manufacturers have maintained affordability for end-users (Norton, 1988).

After undergoing an effective food safety training program, a continuing education system is needed to follow up on employee performance and make sure employees practice effective food safety procedures. Following are the procedures that need to be taught and reemphasized in continuing education to ensure safe food preparation:

1. **CLEAN:** Wash produce. Rinse fresh fruits and vegetables in running tap water to remove visible dirt and grime. Remove and discard the outermost leaves of a head of lettuce or cabbage. Because bacteria can grow on the cut surface of fruit or vegetable, be careful not to contaminate these foods while slicing them up on

the cutting board, and avoid leaving cut produce at room temperature for many hours. Don't be a source of food-borne illness yourself. Wash your hands with soap and water before preparing food. Avoid preparing food for others if you yourself have the diarrheal illness. Changing a baby's diaper while preparing food is a bad idea that can easily spread illness (CDC, 2005).

2. **COOK:** Meat, poultry and eggs should be cooked thoroughly. Using a thermometer to measure the internal temperature of meat is a good way to ensure that it is cooked sufficiently to kill bacteria. For example, ground beef should be cooked to an internal temperature of 160F, whereas eggs should be cooked until the yolk is firm (CDC, 2005).
3. **SEPARATE:** Do not cross-contaminate one food with another. Avoid cross-contamination of foods by thoroughly washing hands, utensils, and cutting boards after they have been in contact with raw meat or poultry and before they touch another food. Place cooked meat on a clean plate or surface, rather back on the raw meat (CDC, 2005).
4. **CHILL:** Refrigerate leftovers promptly. Because bacteria can grow quickly at room temperature, leftover food should be refrigerated promptly if they are not going to be eaten within 4 hours. Dividing large amounts of food into several shallow containers will help the food cool more quickly during refrigeration (CDC, 2005).
5. **REPORT:** Report suspected food-borne illnesses to your local health department. The local public health department is a vital part of the food safety system. Outbreaks are often first detected due to calls from concerned citizens.

Additionally, if a public health official contacts you to find out more about an illness you had, your cooperation is important as with public health investigations it can be as important to talk to healthy people as to ill people. (CDC, 2005).

Limitations

There are several limitations with this study:

- Limited sample size. Only 734 violation reports of restaurant inspection were collected from the restaurant report section of the *Las Vegas Review-Journal*.
- Limited available information. Those reports showed only the name and address of the establishment, total demerits received, inspection date, and a description of one major violation.
- Limited time period. A total of 734 violations were collected from June 24, 2009, to December 23, 2009.
- Lack of randomness. The sample of food-service establishments represents restaurants which have received a grade of less than grade A. Therefore, these 734 food-service establishments do not represent the total population of restaurants in Las Vegas.

Future Research

The limitations of the current study identify issues that should be investigated in future research. First, future research should seek to gain more complete information on the violations. It should utilize all natures of violations not just the major violation and the demerits given. It should also evaluate and analyze all restaurant inspection reports, not only those which received grades of less than A, thereby representing the whole population of restaurants in Las Vegas. Future research should also collect samples over

a longer period of time than the six months that was done in this study in order to see any potential patterns or trends. As an example, the current economic downturn and an unemployment rate of greater than 13.8% (U.S. Bureau of Labor Statistics, 2010) were not considered in this study but might prove to be a factor in a study conducted over a longer period of time.

This study did show that effective education, in this case education that carries the threat of restaurant closure, improved safety practices in restaurants. It was not within the scope of this study to look at the impact of employee behavior, motivation, recognition, and rewards in reducing food-borne illness outbreaks. However, the literature shows that employees believe it would be easier to perform good food safety practices if they had more resources, such as knowledge from training, more time, more equipment, etc.; conveniently located resources; and managers who monitored, encouraged, and recognized their activities (York, Brannon, Roberts, Shanklin, Howells, 2009). Future studies could examine the effectiveness of employee training at various establishments.

CHAPTER 6

CONCLUSION

This study takes an initial step toward understanding the relationship between food-service health inspections and food-service establishments. Both the human and non-human factors of the violations were separated and analyzed over a six-month period. Restaurant health inspection grades and the power health inspectors have to close restaurants that do not comply with food safety practices proved in this research to be an effective educational tool. An overwhelmingly majority of restaurants that received a grade of B or less upon reinspection brought that grade up to an A.

In the literature review, this paper provided an overview of food safety, including the food safety history in the United States, food-borne illnesses (FBI), food contaminations, and food-borne illnesses outbreaks. The newest area of concern and research in this field is food terrorism. However, all of the research thus far is concentrated on the food supply chain from farm to manufacturer. Little attention has been given thus far to the potential of food terrorism at the service, or restaurant, level. Some guidelines have been issued, but there is no effort toward effective education that would induce restaurant owners to take measures to prevent food terrorism.

It was hypothesized that violations based on human factors would be a greater cause than non-human factors on the resulting grades and demerits. The data analysis of the violations which concentrated on the resulting grade and demerits, processed through MINITAB, confirmed the hypothesis. Through this study, it can be concluded that violations related to human factors significantly impact the grade and demerits of a restaurant's health inspection. Operators of food-service establishments can do much to

improve their food safety grades through engaging employees in proper food safety practices, providing effective training, observation, and feedback under a continuing education system.

It is clear that owners, employees, and inspectors should work closely together. Inspectors provide guidelines and assure that managers and operators have resources in places for employees to perform proper food sanitation practices. Certainly, owners and operators should create proper sanitation environments by encouraging and recognizing their employees. Finally, employees will have the ability to perform proper sanitation practices actively whenever they are required.

This is an environment where food-borne illnesses will not thrive. As the dangers to the U.S. food supply increase with the prospect of food terrorism, it will be important to encourage environments where food safety is a high priority. Achieving food safety is not one person's job, and it cannot be done overnight. Ultimately, it can only be reached through a balance of cooperation, communication, and the maintenance of proper standards and requirements.

APPENDIX 1

COLLECTED DATA

Name	Grade	Major violation	Type of violation
Aruba Hotel Café	C	No paper towels available at any hand sink	Environment
Excalibur tower coffe bar	C	At least 12 bottles of expired chocolate milk in back of counter refrigerator	Environment
Firelight Buffet expo station Sam's Town	B	An employee did not follow hand washing procedures	Personal hygiene
Firelight Buffet kitchen Sam's Town	B	Food not cooled by approved methods	Time-temperature abuse
Kady's coffee Shop Riviera Hotel & Casino	C	Rotten Strawberries observed in five locations in facility	Environment
Orchids Garden dim sum/ prep/storage	C	A container of food stored on the floor	Cross contamination
Orchids Garden dim sum cookline	C	No sanitizer available in dish machine	Environment
Vegas Express Sushi Smith's	B	Dishes washed in prep sink	Cross contamination
Denny's Restaurant, Wild fire Casino	B	Dish machine interior dirty	Environment
Embassy suites restaurant	C	Food held at improper temperatures	Time-temperature abuse
Jack in the Box	B	Foods were stored uncovered	Cross contamination
Lou's Diner	B	No soap in dispenser at hand sink next steam table	Environment
Que Mar mexican Café	C	Chicken being thawed in standing water	Time-temperature abuse
Surf city Bar & Grill, Bar	B	Dirty soda nozzle and holder	Environment
Wingstop, Santa Fe Station	B	Uncovered food in freezer	Cross contamination
Da Lat	C	Unlabeled spray bottle	Environment
Don Ricardo's Pizzeria	B	Child observed in the food prep area	Environment
Sandai Sushi restaurant	C	Raw food not stored separately from cooked and ready-to-eat food	Cross contamination
Anna's Garden	C	Raw eggs stored over ready- to- eat food	Cross contamination
Java Detour	B	An expired gallon of milk in prep cooler	Environment
Mi family Mexican Food	C	Raw meat being thawed in the hand sink	Cross contamination
Moon doggies Bar & Grill	B	Employee did not follow proper hand washing procedures while prepping food	Personal hygiene
Pepe's Tacos	B	Bowl used in flour	Environment
port of Subs	B	Moldlike growth in ice machine	Cross contamination
Jack in the Box	B	Ice bean near drive through left open and unattended	Cross contamination
Scotty Beans snack bar	C	Food held at improper temperatures	Time-temperature abuse
Asia Buffet	Closed	Expired roast turkey and chicken thawed in walk-in freezer	Environment
Avi's	B	Food held in improper temperatures	Time-temperature abuse
Chicago Hot Dogs	B	Chemical bottle not stored properly	Environment
Dairy Queen	C	Food stored uncovered in the refrigerator, freezer and dry good storage area	Cross contamination
HK Star Cantonese Restaurant	B	Employee's uncovered drink stored on counter	Personal hygiene
Jamba Juice	B	Food stored on the floor in walk-in freezer	Cross contamination
China Joe's	B	Hand sink used as dump sink	Environment
KFC	B	No sanitizer detected at three-compartment sink	Environment
Aloha Kitchen	B	Frozen chicken thawing on counter	Time-temperature abuse
Cookie's BBQ & Southern Cooking	C	Freezer not maintaining proper temperature	Environment

Excalibur outdoor pool bar	B	Black and Brown accumulation inside soda gun nozzle.	Cross contamination
Excalibur indoor pool bar	B	Insects observed in six liquor bottles	Environment
Sushi Ko	B	Cook line not configured correctly to maintain proper food temperatures	Environment
Viva El Taco	C	Walk-in cooler not maintaining proper temperature	Environment
Carl's Donuts processing	B	Dough stored uncovered in walk-in cooler	Cross contamination
Divebar restaurany	B	Food held in improper temperatures	Time-temperature abuse
Palace Grand Lounge, Arizona Charlie's Boulder	B	Fruit fries observed in vermouth bottles	Environment
Tropicana pizza	B	Unoperable themometer in reach cooler	Environment
Cannery sports book bar	B	Half & Half, fruit juices, and drinks mixes not at proper temperature.	Time-temperature abuse
Del Taco	B	Unlabeled squirt containers	Environment
Great Steak and Potato Co, Meadows mall	B	Employees did not follow proper hand-washing procedures	Personal hygiene
Ruby Tuesday Restaurant	B	Scoop handles touching food product	Cross contamination
El Pulgarcito restaurant	B	Employee items not stored properly	Personal hygiene
Traditional Pizza	B	Several milk containers past their "best buy" date	Environment
Café Verdi West	B	Three employees with expired health cards.	Environment
Cook On Wok	B	An uncovered employee beverage stored on the prep counter	Personal hygiene
Dippin Dots II, Galleria at Sunset	Closed	Hand sink inoperable	Environment
Egg Works	B	Unlabeled chemical bottles hanging over food and food counters	Cross contamination
El Jalisquilo restaurant	B	Meat thawing in sink without running water	Time-temperature abuse
Ethio café & bakery	B	Expired half and half	Environment
Kmart Eatery express	B	Popcorn scoop stored with handle touching product	Cross contamination
Unique Pizza and subs	B	Themometer in cooler inaccurate	Environment
Verona Pizza	C	Cutting board dirty	Cross contamination
El Choncho	Closed	Walk-in cooler not maintaining proper temperature	Environment
McDonald's	B	No themometer avaiable indrive-thru reach-in refrigerator	Environment
Mint Indian bistro	C	Soda nozzles dirty with built-up debris	Environment
Napoli Pizzeria	B	Food held at improper temperatures	Time-temperature abuse
Original Pancake House, aliante Station	B	Ice bin left open and unattended	Cross contamination
Regal Sunset Cinemas sunset station	B	One employee with an expired health card	Environment
Streets of New York	B	Employee beverage stored with food service items	Personal hygiene
Bells Market Restaurant	B	No themometer in reach-in refrigerator	Environment
Burger Palace, Imperial Palace	B	Food held at improper temperatures	Time-temperature abuse
El triunfo Restaurant III	C	Scoop handles buried in bulk product	Cross contamination
Hilton Garden Inn Restaurant	C	Dish machine not holding proper temperature	Environment
Itoy sariling Atin fast Food	C	Several flies observed in facility	Environment
Jin Mee Restaurant	B	Food not cooled by approved methods	Time-temperature abuse
Mix Zone Café	B	Microwave interior dirty	Environment
Mulligan's Bar & Grill	B	Uncovered food in reach-in freezer	Cross contamination
Pick Up Stix	B	Raw eggs stores over prepared food drawer cooler on cookline not maintaining proper temperature	Cross contamination
Red Hawk Tavern Restaurant	C		Environment

Thai Basil Asian Diner	B	Vegetables stores at room temperature	Time-temperature abuse
Tony's Place	B	Food containers not labeled properly	Environment
U-Swirl Yogurt	B	Cups for service stored on the floor Dirty dishes stored on prep table next to thawing meat	Cross contamination
Osaka Japanese Bistro	C		Cross contamination
Roberto's taco shop	B	Tomato sauce stored in original metal container Employees did not follow proper hand-washing procedures	Environment Personal hygiene
Barbecue King Chinese Restaurant	C		Personal hygiene
El Pollo Loco	B	Food held at improper temperatures	Time-temperature abuse
Pamplemousse	B	Food and food products not covered properly Front make table not maintaining proper temperature	Cross contamination Environment
Capriotti's Sandwich Shop, Aliante	B		Environment
China Joe's Express	C	Food stored uncovered and unlabeled Caramel sauce with food debris on surface and hair	Cross contamination Cross contamination
Dairy Queen	B		Cross contamination
La cotorra Restaurant	C	No sanitizer bucket set up in food prep area several employee beverages stored uncovered on prep surface	Environment Personal hygiene
Little Bangkok	C		Personal hygiene
Sam Woo BBQ Restaurant	B	Dried food debris on prep table One employee w/ a fake health card & another employee w/expired health card	Cross contamination Environment
Santa Rosa Taco Shop	B		Environment
Valerio's tropical Bake Shop	B	Employee eating and drinking in food prep area	Personal hygiene
Vegas Hot Dogs, Hawaiian Marketplace	Closed	No hand sink available Employee's food stored over food for sale in reach-in cooler	Environment Cross contamination
China star	C		Cross contamination
Hooters exhibition kitchen, sunset station	B	Food held at improper temperatures	Time-temperature abuse
Hooters Prep kitchen, sunset station	B	Paper towels not available at back hand sinks Box of ground beef stored on floor of walk-in freezer	Environment Cross contamination
Mountainside Restaurant	B		Cross contamination
Pizza Patron	B	Hand sink faucet needed repair	Environment
Rum Runner Desert Inn Bar	B	Fruit flies observed in liquor bottle Pizza make table refrigerator not maintaining proper temperature	Environment Environment
Texas Splitz snack bar Texas station	B		Environment
El Chamizal Restaurant	B	Fried nachos stored in paper towel box	Cross contamination
L & L Hawaiian Barbecue estaurant	B	Food not cooled by approved method food handler did not follow proper hand-washing procedures	Time-temperature abuse Personal hygiene
Red Robin Restaurant	B		Personal hygiene
Rio main kitchen	B	Food not cooled by approved method Several employee personal items not stored properly	Time-temperature abuse Personal hygiene
Rio main Sushi Prep	B		Personal hygiene
Roberto's Taco Shop	B	Black substance in ice machine	Cross contamination
Starbucks, Smith's	B	Utensils stored improperly Rice scoop and ice cream scoop stored in tepid dirty water	Cross contamination Cross contamination
Sushi Mon/Sushi Tachi restaurant	C		Cross contamination
Vegas Express Sushi, smith's	B	No food thermometer available	Environment
Knights Inn Airport lounge	B	Access to hand sink blocked	Environment
Silver Nugget Casino main Bar	B	Hose for soda gun resting in ice for service	Cross contamination
Jody Maroni's Sausage Kingdom, Mc carran airport	B	Clean pans stacked while still wet	Environment
Wedy's McCarran Airport	B	Food not cooled by approved method tuna cans stored in dry storage area instead of cooler for prechilled tuna.	Time-temperature abuse Environment
Anthony's Coal Fired Pizza	B		Environment
Auld Dubliner	B	employee eating in kitchen.	Personal hygiene
Banana Leaf Asian Cuisine snack bar,	C	employees filling drinking water containers at	Personal hygiene

Riviera		hand sink.	
Bilbo's Bar & Grill restaurant	B	dishwasher not dispensing sanitizer.	Environment
Caravan coffee shop, Sahara	B	refrigerators leaking throughout kitchen	Environment
Carl's Jr.	B	excessive ice buildup in reach-in freezers	Environment
China A Go Go	C	shrimp not thawed properly.	Time-temperature abuse
Chinese Gourmet Express	B	unlabeled chemical bottle.	Environment
Claim Jumper Restaurant	B	food held at improper temperatures.	Time-temperature abuse
Clarion. Hotel & Suites Emerald Springs lounge	B	four bottles of alcohol had fruit flies	Environment
Clarion Hotel & Suites Emerald Springs restaurant	B	scoop handles touching food products uncovered employee beverage next to uncovered food	Cross contamination
Dae Jang Keum Korean BBQ	B	base of soda nozzles and nozzles had layers of black debris	Personal hygiene
Denny's Restaurant	B		Cross contamination
Dimas Tacos	B	Can opener dirty	Environment
Dona Maria Tamales service bar	B	no hot water at service bar hand sink	Environment
Einstein Bros. Bagels	B	hand sink used as dump sink	Environment
Eldorado Casino snack bar restaurant	B	hand sink did not have a hot water handle	Environment
Ellis Island Casino & Brewery	C	Cooks did not have thermometers. ready-to-eat food prepared and stored near raw chicken	Environment
Excalibur pool kitchen	B		Cross contamination
Farm Basket	B	chemicals not stored properly	Environment
Fatburger	B	milk cooler in need of repairs	Environment
IHOP	C	inside of ice machine and waffle iron soiled	Cross contamination
Lucky's Lounge II, grill	C	several cartons of expired buttermilk	Environment
Mandalay Bay Convention Center, Level 1 Food Court BBQ	B	hot holding unit not operating properly	Environment
Mandalay Bay Convention Center, Level 1 Food Court deli	B	food handlers not following proper hand-washing procedures	Personal hygiene
Mandalay Bay service bar No. 2	B	ice scoop not stored properly.	Cross contamination
Mariana's Cantina, Eldorado Casino	B	no splash guard at hand sink.	Environment
McDonald's	B	ice machine interior had moldlike growth	Cross contamination
McDonald's	B	double stacking containers of lettuce	Time-temperature abuse
Mt. Everest India's Cuisine	B	open bag of flour not stored properly	Environment
Nathan's Famous Hot Dog cart, MGM Grand	B	food held at improper temperatures	Time-temperature abuse
New Shanghai Restaurant	C	fish thawing in standing water	Time-temperature abuse
The Palm Restaurant, Forum Shops at Caesars	C	ice cream freezer had ice buildup and broken lid	Environment
Pit Boss Grill	B	food held at improper temperatures	Time-temperature abuse
Pit Boss Grill, barbecue	B	no hand soap or paper towels were available	Environment
Regal Cinemas, Aliante Station	B	ice bin lids stored on floor	Cross contamination
Roberto's Taco Shop	B	chicken not cooled by approved methods	Time-temperature abuse
Santa Fe Mining Co. restaurant	B	unlabeled spray bottles	Environment
Silver Nugget Casino Bowling Center snack bar	B	black residue inside ice machine	Cross contamination
Sourdough Cafe, Arizona Charlie's Boulder	C	cheese double stacked at prep cooler at cookline milk and milk products not held at proper temperature	Time-temperature abuse
Starbucks, MGM Grand Studio Walk	B	display cooler not maintaining proper temperature	Time-temperature abuse
Starbucks	C		Environment

Thai Food To Go	B	unapproved can of pesticide in facility	Environment
Wok Express, Riviera	C	dirty pans stored on top of food areas	Cross contamination
X.O. Chinese Food	B	unlabeled food throughout facility	Environment
Yogurt Cup	B	employee without a valid health card	Environment
Anthony's Pizza 'N' Subs	B	two -door Refrigerator not maintaining proper temperature	Environment
Cafe Ba Ba Reebea kitchen	B	meat slicer and can opener dirty	Cross contamination
Cafe Ba Ba Reebea kitchen	B	plastic pans stacked while wet	Environment
Cafe Mita	B	uncovered employee drink on food prep table	Personal hygiene
Camacho's Cantina lounge, Aliante Station	B	glass washer not sanitizing	Environment
Cheesecake Factory prep kitchen	B	rice not cooled by approved methods	Time-temperature abuse
Chicken Now, Meadows mall	B	food not labeled properly	Environment
China Joe's	C	food held at improper temperatures	Time-temperature abuse
Chow Mein Express	C	ants throughout facility including on floor, food containers and in food on rack	Environment
Craftsteak, MGM Grand	B	under-counter cooler not maintaining proper temperature	Environment
Denny 's Restaurant, Wildfire Casino	B	cut lemon slices stored at room temperature	Time-temperature abuse
Destefanos	B	pink slime growth on interior of ice machine	Cross contamination
El Mexicano	B	unlabeled bulk food containers	Environment
El Polio Loco	B	back hand sink inoperable	Environment
Great Harvest Bread Co	B	several unlabeled packaged products	Environment
Hikari Japanese Steakhouse	B	ice scoop stored in dirty standing water	Cross contamination
Holiday Inn restaurant	C	chef did not follow proper hand-washing procedures	Personal hygiene
Little Caesars Pizza	B	pizza dough mix prepared at dirty three-compartment sink	Cross contamination
Luciano's, Silverton	B	food held at improper temperatures	Time-temperature abuse
Mama Maria's Mexican Food Bakery	C	improper sanitizer concentration level in two sanitizer buckets	Environment
Mandalay Bay Men's Spa Lounge	C	food handlers did not follow proper hand-washing procedures	Personal hygiene
Mi Casita	B	no stem thermometer available for use	Environment
Mi Pueblo Taco Shop restaurant	B	uncovered employee drink on prep surface	Personal hygiene
Mini Melts Ice Cream, Adventuredome at Circus Circus	B	no sanitizer available at facility	Environment
Molcasala Mexican Food	B	single-service plastic foam bowls used as scoops	Cross contamination
N&N Oriental	B	unlabeled repackaged food in reach-in freezer	Cross contamination
O' Sheas entertainment bar	B	two soda guns dirty with syrup residue	Cross contamination
Pampas Churrascaria prep kitchen, Miracle Mile Shops at Planet Hollywood Resort	C	chemicals stored over bin of spices	Cross contamination
Pampas Churrascaria restaurant, Miracle Mile Shops at Planet Hollywood Resort,	B	dishwasher did not reach proper wash and rinse temperature	Environment
Port of Subs	B	ice buildup in walk-in freezer	Environment
Sand Dollar Blues bar	B	employee food stored on top of bottled beverages	Cross contamination
Slots-A-Fun Casino bar	B	using milk past the use-by date	Environment
Subway	B	employee personal items not stored properly	Personal hygiene
Sushi Tachi restaurant	C	cook eating sushi while working in kitchen	Personal hygiene
Sushi Tachi sushi bar	C	access to hand sinks blocked	Environment
T.G.I. Friday's kitchen, Aliante Station	B	ground beef not cooked to proper temperature	Time-temperature abuse

Friday's lounge bar, Aliante Station	B	fruit fly found in liquor bottle raw chicken and beef stored above and beside	Environment
Tacos El Compita	B	vegetables	Cross contamination
Thai Original BBQ	B	two coolers not maintaining proper temperatures	Environment
Yeshi Mart restaurant	C	tomatoes spoiled with moldlike substance	Cross contamination
Yoshidaya Restaurant	B	no paper towels available at hand sink	Environment
Camiceria La Bonita Taco Shop	B	food not cooled by approved methods	Time-temperature abuse
Chinese Village Restaurant	C	walk-in refrigerator not maintaining proper temp expired bread and moldlike growth on fried	Time-temperature abuse
La Guannaquita Restaurant	Closed	chicken tomato juice and pineapple juice stored in open	Cross contamination
Las Vegas Eagle	C	cans	Cross contamination
Las Vegas Eagle bar No. 2	B	no soap or paper towels at hand sink employee put gloves on without washing hands	Environment
Wendy's	C	first	Personal hygiene
Aces & Ales restaurant	B	microwave dirty	Environment
Angelina's Pizzeria	B	reusing single-service cups as scoops	Cross contamination
ARA Gourmet Grill No. 2, Las Vegas Convention Center	B	access to hand sink blocked	Environment
Arandas Taqueria	Closed	flies observed in raw shrimp being prepared employees not following proper hand-washing	Environment
Baskin-Robbins Ice Cream	C	procedures	Personal hygiene
Beijing Noodle, Caesars Palace	C	numerous food items improperly covered	Cross contamination
Beijing Noodle production kitchen, Caesars Palace	B	dirty Food container	Environment
Blondie's Sports Bar & Grill restaurant	B	uncovered pan of ham stored in beer refrigerator	Cross contamination
Blueberry Hill Family Restaurant	B	soda nozzles dirty with moldlike growth	Cross contamination
Carl's Jr	B	ice scoop container dirty	Cross contamination
Cheeseburger Las Vegas	B	dented cans stored on the shelves for use	Environment
China Star kitchen	B	fish not thawed properly	Time-temperature abuse
Chop Chop Wok	B	cooks washing hands at three-compartment sink	Personal hygiene
Dal Italia	C	sanitizer used to supplement three coolers not maintaining proper	Environment
Doc Holliday's Saloon restaurant	Closed	temperatures.	Environment
El Borrego De Gro	B	uncovered employee drinks stored on prep table ready to eat vegetables stored uncovered and on	Personal hygiene
Ginseng 3, Imperial Palace	C	the floor in the walk -in coole	Cross contamination
Gourmet Wok	B	chicken thawing in standing water wilted lettuce and unwholesome tomatoes in	Time-temperature abuse
Great Las Vegas Auto Auction restaurant	C	back reach-in cooler	Environment
Hilton Grand Vacations pool bar kitchen	C	several uncovered food products	Cross contamination
Imperial Palace Main kitchen roast room	B	food not cooled by approval methods	Time-temperature abuse
Inka Chicken	B	chemicals not stored properly	Environment
International Bakery No. 2,	B	unlabeled food containers	Environment
Joseph's Restaurant	B	no sanitizer available at final rinse of dishwasher large pieces of chicken on top rack in pressure	Environment
KFC	B	fryer not cooked to proper tempe	Time-temperature abuse
Kwong Yet Lung BB King Express	C	food held at improper temperatures	Time-temperature abuse
La Costa Grill Restaurant	B	produce and raw meat prepped on the same table	Cross contamination
Long Life Vegetarian Restaurant	B	grooved and discolored cutting boards	Environment
Mai Tai Lounge bar	B	clean glassware stacked wet	Cross contamination

Mandalay Bay pool service bar No. 1	C	ice machine unsanitary with areas of mineral deposits and rust on interior	Cross contamination
Mi Familia Mexican Food	C	spoiled tomatoes with mold growth	Cross contamination
Papa John's Pizza	C	chemicals in food area	Cross contamination
Paradise Cafe, The Mirage	B	refrigerated drawers not working properly on grill line or under prep makeup tab	Environment
Pug's Pub	B	employee food items stored alongside customer items	Personal hygiene
Ra Sushi sushi bar, Fashion Show mall	B	three rice containers of sushi rice sitting out uncovered	Cross contamination
Restaurant and Pupuseria Cabanas	B	seafood and chicken not thawed properly	Time-temperature abuse
Restaurant Playas De Sinaloa	B	unapproved cans of pesticide observed in facility	Environment
Rincon Catracho	C	cook not following proper hand-washing procedures.	Personal hygiene
Roberto's Taco Shop	B	chicken not cooled by approved methods	Time-temperature abuse
Roberto's Taco Shop	B	food held at improper temperatures	Time-temperature abuse
Sam's Town Race and Sports Book Deli	B	access to hand sink blocked	Environment
Sands Expo & Convention Center kitchen	B	heavy frost buildup on door and boxed foods in freezer	Environment
Sarfino's Pizza	B	clean dishware left on sink next to defrosting raw chicken	Cross contamination
Sherwood Forest Cafe, Excalibur	C	no sanitizer buckets available at prep areas	Environment
Sherwood Forest Café pantry, Excalibur	C	refrigerators not maintaining proper temperature	Environment
Shilla restaurant	C	a bowl of putrid apples on prep table	Cross contamination
Stagecoach bar	B	dump sink used to store bottled beer in ice	Cross contamination
Subway	B	food handlers eating in prep area.	Personal hygiene
Surajung buffet	C	employee not following proper hand-washing procedures	Personal hygiene
Surajung restaurant	C	food not cooled by approved methods	Time-temperature abuse
Thai Original BBQ Restaurant	B	flies in kitchen	Environment
Tintoretto Bakery	B	dishwasher inoperable	Environment
Villa Pizza, Ellis Island Casino & Brewery	B	employee had expired health card	Environment
Aces Bar & Grill	B	food held at improper temperature	Time-temperature abuse
Al's Donuts	B	dirty equipment	Environment
Amigos Tacos	B	unlabeled cut meats in refrigerators	Cross contamination
Archi's Thai Bistro	B	expired health card	Environment
Bootlegger Bistro restaurant	B	scoop handle touching food product	Cross contamination
Boulder Cafe, Boulder Station	C	fish stored over other food	Cross contamination
Bugsy's Supper Club	B	no paper towels	Environment
Casino Cafe, Circus Circus	B	improper hand-washing	Personal hygiene
Cheers Bar & Grill	B	dirty ice machine	Environment
Coco's Bakery Restaurant, Santa Fe Station	B	cooler drawers not holding proper temperature	Environment
Dairy Queen	B	food stored uncovered	Cross contamination
Denny's Restaurant, Fiesta Henderson	C	no sanitizer bucket at cookline	Environment
Don Beto Restaurant	B	employee water bottle stored improperly	Personal hygiene
E-String Bar & Grill restaurant	B	no sanitizer detected at dish machine	Environment
Eat 'Em Sandwiches	B	chemicals not stored properly	Cross contamination
Esmeralda's Cafe	Closed	shellfish stored improperly	Time-temperature abuse
Four Seasons pool bar	C	dirty tumblers	Cross contamination

Gallo's Famous Pizza Co	B	hand sink not working	Environment
IHOP	B	raw eggs stored improperly	Cross contamination
Jasmine Thai Gourment express	B	no soap at handsink	Environment
Jasmine Thai Gourment lounge	B	soda gun had slimy buildup	Cross contamination
Jasmine Thai Gourment Restaurant	C	numerous foods out of temperature	Time-temperature abuse
Joey's Pizza	Closed	no hot water/substantial health hazard	Environment
Kabuki Japanese Restaurant	B	uncovered drinks in kitchen	Cross contamination
Los Antojos Mexican Restaurant	B	access to hand sink blocked by steam table	Environment
Mama Cimino's Pizza	B	dough mixer dirty	Cross contamination
Mandarin Express	C	improper handwashing raw and prepared foods stored at room temperature	Personal hygiene
McDonald's	B	temperature	Time-temperature abuse
Mexicans Restaurant	B	shrimp thawed improperly none of the employees had a valid health card/substantial health hazard	Time-temperature abuse
Pho 87, sushi bar	Closed	card/substantial health hazard	Environment
Pho Saigon 8	B	Food handler rinsed cutting board in hand sink	Cross contamination
Rebel's Pizza	B	clean dishware stored under back hand sink bags of chicken and pork stored in the same container	Cross contamination
Rice N Noodle	B	chicken and beef thawed at room temperature	Cross contamination
Roberto's Taco Shop	B	chicken and beef thawed at room temperature	Time-temperature abuse
Subway, Monte Carlo	B	food held at improper temperatures pink and slimy growth on soda gun nozzles and holsters	Time-temperature abuse
Tequila Cantina	B	holsters	Cross contamination
Texas Star Oyster Bar food, Texas Station	B	Sauce make table not clean	Cross contamination
Thai Original BBQ Restaurant	B	wet wiping cloths stored on counter	Cross contamination
3 Tomatoes & A Mozzarella	B	double-stacking bowls without a barrier	Cross contamination
Torino's Sports Pub Restaurant	B	coolers not maintaining proper temperature	Environment
Wings Restaurant	B	buttermilk expired	Environment
iHOP	B	raw eggs stored improperly	Cross contamination
Bear's Best Las Vegas bar	C	employee drinks on prep surface	Personal hygiene
Bear's Best Las Vegas barbecue	B	food handler not using proper hair restraint	Personal hygiene
Bear's Best Las Vegas restaurant	C	no sanitizer at dish machine	Environment
Black Label Bar & Restaurant	B	hand sink blocked	Environment
Boulder Creek Grill	B	unlabeled spray bottles	Cross contamination
C Bar, Stratosphere	B	ice scoop handle Jching ice in bin	Cross contamination
Cafe at Harrah's service bar, irrah's Las Vegas	B	ice machine chute slimy	Cross contamination
Carniceria Guadalajara kitchen	C	food not cooled properly	Time-temperature abuse
Casa Don Juan bar	B	dirty glassware stored above clean glassware	Cross contamination
Casa Don Juan restaurant	B	black moldlike growth in ice machine	Cross contamination
ClubSport Green Valley Club Cafe	B	refrigerator not maintaining proper temperature	Environment
Denny's Restaurant, Casino Royale	B	metal pans stacked while wet	Cross contamination
El Santaneco	B	unlabeled bulk bins and food in freezer	Cross contamination
Famous Uncle Al's Hot Dogs & Grill	B	food held at improper temperatures	Time-temperature abuse
Fatburger, Red Rock Resort	B	raw meat stored over onions	Cross contamination
Flying R Bar, Riviera	C	no sanitizer dispensing at glasswasher	Environment
Gilligan's Hideaway	B	spoiled green chilies	Cross contamination

Grand China	B	food and sauces stored uncovered	Cross contamination
Hound Doggies snack bar, Riviera	B	utensils stored in dirty container	Cross contamination
Hush Puppy	C	employee items not stored properly	Personal hygiene
Jacky Chan's Chinese Restaurant	B	ducks hanging from three-compartment sink	Cross contamination
KFC	B	two employees had expired health cards	Environment
Kountry Kafe	B	ice machine in disrepair	Environment
Meat Amigo deli-restaurant	C	food not cooled properly numerous cooling units not maintaining proper temperature/ substantial health hazard	Time-temperature abuse Environment
Milano's Pizza	Closed		
Nieves De Michoacan Jugos Y Licuado	B	perishable food stored at room temperature.	Time-temperature abuse
Party Time Bar, Harrah's Las Vegas	B	milk crates used as shelving	Cross contamination
Peppermill Restaurant	C	uncovered food stored in dry storage area	Cross contamination
Pizza Hut	B	chemical bottle not stored properly dirty pans and plastic food containers stored as clean	Cross contamination Cross contamination
Pizza Hut, Excalibur	B		Cross contamination
Planet Dailies, Planet Hollywood Resort	C	cup used as scoop in spice container	Cross contamination
Planet Hollywood Resort main kitchen	B	food held at improper temperatures	Time-temperature abuse
Planet Hollywood Resort pool snack bar	B	ice scoop not stored properly	Cross contamination
Rincon Latino No. 2 snack bar	C	dirtywiping cloths on prep table	Cross contamination
Rose Garden Restaurant	Closed	roaches observed throughout facility	Environment
Spice Market Buffet, Italian station, Planet Hollywood Resort	B	thermometers missing in reach-in refrigerator	Environment
Spice Market Buffet, North/South salad station, Planet Hollywood Resort	B	reach-in refrigerator doors in disrepair	Environment
Studio 54 bar No. 2, MGM Grand	B	five bottles of alcohol contained insects ice machine had a slimy moldlike substance/reinspected 08/25/09, received 5 demerits	Environment Cross contamination
Studio 54 bar No. 3, MGM Grand	B		Cross contamination
Tacos El Compita	B	food not thawed properly	Time-temperature abuse
Terrible's buffet	B	food held at improper temperatures	Time-temperature abuse
Terrible's bulk prep kitchen	B	refrigerator not maintaining proper temperature food stored uncovered and stacked in reach-in freezer	Environment Cross contamination
Thai Room Restaurant	B		Cross contamination
Village Steakhouse	B	glassware shelves had excessive dust buildup	Cross contamination
Wendy's	B	no paper towels at hand sink employee used bulk rice barrel to prep raw shrimp.	Environment Cross contamination
Aloha Hawaiian BBQ	B		Cross contamination
Angelina's Pizzeria	B	employee beverages stored on prep tables	Personal hygiene
Antojitos El Cejas	B	eggs stored over ready-to-eat food employee did not follow proper hand-washing procedures	Cross contamination Personal hygiene
Auntie Anne's	B		Personal hygiene
Banana Leaf Asian Cuisine, Riviera	C	food not cooled properly	Time-temperature abuse
Burger King	B	ice machine chute slimy	Cross contamination
Cafe at Harrah's kitchen, Harrah's Las Vegas	B	raw food stored next to cooked and ready-to-eat food	Cross contamination
Carmen's Kitchen	C	food held at improper temperatures	Time-temperature abuse
Cefiore	B	moldlike growth in ice machine	Cross contamination
Chubbys Pub	B	several fruit flies observed in bottles of vermouth	Environment
Del Taco	B	no thermometer in reach-in prep cooler	Environment
Del Taco	B	no sanitizer at three-compartment sink	Environment

Double Play Sports Bar & Lounge kitchen	B	food warmers used for soup/ beans not working	Environment
Dragon Express	B	rice scoop stored in standing water	Time-temperature abuse
Dylan's Dance Hall & Saloon service bar	B	walk-in cooler not maintainin	Environment
L&L Hawaiian Barbecue	B	salad scoop handle was stored in product	Cross contamination
La Torta Loca	B	chemicals not stored properly	Cross contamination
McDonald's, Wal-Mart	C	expired milk jugs	Environment
Nathan's Famous Hot Dogs, Las Vegas Convention Center	B	a high level of sanitizer at three-compartment sink	Cross contamination
Residence Inn kitchen	B	interior surfaces of ice machine dirty	Cross contamination
Roberto's Taco Shop	B	scoop handles touching food in several bins	Cross contamination
Rosati's Pizza	B	freezer not maintaining proper temperature	Environment
Salo-Salo Grill	B	raw meat stored over vegetables hot water heater was not set at proper temperature	Cross contamination
Sam's Club cafe	C	one hand sink was blocked and another did not have soap or paper towels	Environment
Satay Restaurant	C		Environment
Sbarro, Monte Carlo	B	food not cooled properly	Time-temperature abuse
Sherwood Forest bar, Excalibur	B	slime accumulation inside beer taps	Cross contamination
Sofia's Pizza	C	Chicken wings thawed at room temperature	Time-temperature abuse
Spearmint Rhino sidebar	B	glasses wet-nested	Cross contamination
Subway	C	open employee drinks stored over uncoverd food	Personal hygiene
Tropical Smoothie Cafe	B	dirty soda nozzles and ice machine	Cross contamination
Ventano Restaurant	B	no thermometer in reach-in refrigerator food handlers did not follow proper hand-washing	Environment
Yard House restaurant	C		Personal hygiene
Yummy Grill & sushi	B	no sanitizer at three compartment sink	Environment
Yummy Grill & sushi, sushi bar	B	dirty knives stored as clean	Cross contamination
Best Western Lighthouse Inn snack bar	B	raw eggs stored over ready-to-eat foods	Cross contamination
Cafe Verdi	B	condensate leak at prep table	Environment
Capo's Italian Cuisine bar	B	personal items not stored properly	Personal hygiene
Capo's Italian Cuisine restaurant	C	food held at improper temperatures food handler did not follow proper hand-washing procedures when changing tasks	Time-temperature abuse
Earl of Sandwich, Planet Hollywood Resort	C		Personal hygiene
El Cochinito Contento	B	dirty ice scoop container	Cross contamination
Flavors Buffet kitchen, Harrah's Las Vegas	B	pans of food stacked without a proper barrier	Cross contamination
Ginza Sushi	C	food held at improper temperatures	Time-temperature abuse
Ginza Sushi, sushi bar	B	a domestic container of pesticide in facility	Environment
Inaka Sushi restaurant	B	scoop handles stored in food product	Cross contamination
International House of Pancakes	C	floor drain and two floor sinks clogged	Environment
King Se-Jong Chong Restaurant	B	three-compartment sink not set up properly	Environment
King Taco Express	C	hand sink blocked	Environment
Krispy Kreme Doughnuts	B	ice scoops stored in dirty container	Cross contamination
Mad Greek Cafe	C	chemicals not stored properly	Cross contamination
McDonald's	C	uncovered food in walk-in freezer	Cross contamination
Napoli Pizzeria	C	employee beverages stored on food prep surfaces	Personal hygiene
Piero's Italian Cuisine restaurant	C	three-compartment sink operated improperly	Environment
Ra Sushi, Fashion Show mall	Closed	facility without hot water because of broken	Environment

		water heater/ Closed because of sub	
Roxy's Diner, Stratosphere	B	perishable foods not stored at proper temperature	Time-temperature abuse
Shady Grove Lounge, Silverton	B	glasses stored on dirty shelves	Cross contamination
Shuseki Japanese Restaurant	C	food held at improper temperatures	Time-temperature abuse
Shuseki Japanese Restaurant sushi bar	B	no sanitizer bucket	Environment
Sushi Wa Restaurant	B	no sanitizer at dish machine	Environment
Swish	B	bowls used as scoops labels and dates missing on frozen and cooked meats	Cross contamination Environment
Tacos Y Tortas El Panzon	B	eggs left out at room temperature	Time-temperature abuse
Taxi Stop One Coffee Shop	B	eggs left out at room temperature	Time-temperature abuse
Tommy Rucker's Cantina & Grill, grill	B	slimy and spoiled mushrooms walk-in cooler not maintaining proper temperature	Cross contamination Environment
Village Pub Cannery Restaurant	B	dirty cutting board and prep board	Cross contamination
Village Pub & Poker — Airport	B	dirty cutting board and prep board	Cross contamination
Bollywood Grill	C	food not cooled by approved methods produce and cheese cooler not maintaining proper temperature	Time-temperature abuse Environment
Buffalo Wild Wings Grill & Bar, grill California Pizza Kitchen support kitchen, Fashion Show mall	B	scoop handles touching food	Cross contamination
China Joe's	B	food not labeled properly	Environment
Chuck E Cheese's	B	ice buildup in reach-in freezer	Environment
Doc's Place	B	no soap or paper towels at hotline hand sink	Environment
El Steak Burrito	B	chicken thawing at room temperature employee not following proper hand-washing procedures	Time-temperature abuse Personal hygiene
Estefany's Cafe Pizza & Mexican ° Food	B	opened bags of food stored in dry storage	Cross contamination
Ginseng Korean BBQ	B	opened bags of food stored in dry storage	Cross contamination
Grand China Restaurant	C	cut broccoli stored improperly open employee drinks on cutting board at cook line	Cross contamination Personal hygiene
Harbor House Cafe	B	open employee drinks on cutting board at cook line	Personal hygiene
Harrah's Las Vegas Showroom bar	B	slime accumulation in soda gun nozzle	Cross contamination
Kabob N Curry	Closed	ants in condiment container	Environment
L&L Hawaiian Barbecue	C	no sanitizer at three compartment sink	Environment
La Salsa Mexican Restaurant, Riviera	B	two employees had expired health cards	Environment
Las Vegas Hilton casino service bar	B	milk stored in bucket with ice	Time-temperature abuse
Lone Star Steakhouse	C	food held at improper temperatures	Time-temperature abuse
Luciano Pizzeria, Fashion Show mall	C	one hand sink inoperable	Environment
Marnee Thai Restaurant	B	cooler not maintaining proper temperature	Environment
Mr. Beijing	B	unlabeled and undated food bins	Environment
Panera Bread	B	food held at improper temperatures	Time-temperature abuse
Quiznos Subs	B	dirty knives stored as clean	Cross contamination
Rampart Casino buffet, Chinese food station	B	raw shelled eggs stored over vegetables	Cross contamination
Rao's hot line, Caesars Palace	B	salad refrigerator in need of repairs	Environment
Rosati's Pizza	B	employee without a health card	Environment
Roxy's, Sam's Town	B	milk in reach-in cooler past its "use by" date	Cross contamination
Samurai Sam's Teriyaki Grill	B	tray of eggs stored next to ready-to-eat food	Cross contamination
Strings Italian Cafe	B	food thawed improperly	Time-temperature abuse
Sushi Boy Desu, sushi bar	B	food held at improper temperatures	Time-temperature abuse

Tacos Mexico	C	uncovered food in walk-in refrigerator.	Cross contamination
Tea Station	C	employee food stored near food served for public	Personal hygiene
Terra Verde, pizza/saute station, Green Valley Ranch	B	sanitizer level too high	Cross contamination
Willy & Jose's Cantina bar, Sam's Town, Yolos Mexican Restaurant, Planet Hollywood Resort	Closed	only hand sink inoperable/substantial hazard	Environment
Abesha Cafe	B	no thermometer in reach-in refrigerator	Environment
All Star Donuts/Chinese Food	C	food not cooled by approved methods	Time-temperature abuse
China A Go Go	C	access to hand sinks blocked	Environment
Chopstick Express	B	cook did not wash hands between changing tasks	Personal hygiene
Chowking Restaurant	C	raw meat stored above vegetables	Cross contamination
D&B Chinese Food	B	three-compartment sink not set up for dish washing	Environment
Dean's Den	Closed	fryers and woks not properly maintained	Environment
Diamond Club lounge, Harrah's Las Vegas	B	walk-in cooler not maintaining proper temperature	Environment
Geisha Steakhouse	B	no soap or paper towels available for hand-washing	Environment
The Graperestaurant	B	all sanitizer buckets had a low concentration level	Environment
India Ovenrestaurant	B	food held at improper temperatures	Time-temperature abuse
Kapuso Kapamilya Karaoke Bar & Restaurant, restaurant	B	scoop handles touching product in bulk containers of spices	Cross contamination
Kaya Sushi Bar	C	food prepped in dirty three-compartment sink	Cross contamination
Krazy Buffetrestaurant	B	open employee beverage on cutting board	Personal hygiene
Las Pupusas Restaurant	B	personal items stored throughout prep area	Personal hygiene
Little Dumpling	B	chicken not thawed properly	Time-temperature abuse
Lotus Garden Cuisine	C	food stored uncovered on dry storage rack	Cross contamination
Musashi Japanese Steakhouse	B	double-stacking uncovered food without a barrier	Cross contamination
Oasis Cafe, Wyndham Vacation Resorts -- Grand Desert	B	unlabeled food containers in reach-in cooler	Environment
Ocha Cuisine restaurant, Holiday House Motel	B	measuring cup used as scoop	Cross contamination
Ohana Hawaiian Barbecue	C	food thawing at room temperature	Time-temperature abuse
Palazzo service bar No. 1	C	personal drinks stored improperly	Personal hygiene
Pho Huong Saigon Restaurant	B	moldlike deposits in ice machine	Cross contamination
Pit Boss Grill	B	live roaches in facility	Environment
Port of Subs	B	food held at improper temperatures	Time-temperature abuse
Sonrisa Grill restaurant	B	wet nesting pans at three-compartment sink	Cross contamination
Texas BBQ Shack	B	food not cooled by approved methods	Time-temperature abuse
The Whale Island	B	prepared foods missing date labels	Environment
Yolie's Brazilian Steakhouse	C	expired milk	Environment
Aurelio's Pizza	B	raw shelled eggs stored over sauces	Cross contamination
Big Daddy's Pizza	B	steam table used to reheat food	Time-temperature abuse
Boston Pizza	C	no thermometer in reach-in refrigerator	Environment
Brio Tuscan Grille pizza/warehouse	C	food held at improper temperatures	Time-temperature abuse
Brio Tuscan Grille restaurant	B	cooler not maintaining proper temperature	Environment
Cafe Rio	B	cooks changed gloves without washing hands	Personal hygiene
	B	a gallon container of expired milk	Environment

Cheesecake Factory downstairs restaurant, Forum Shops at Caesars	C	french fry unit improperly setting over sauces contaminating food underneath it	Cross contamination
Dragon Noodle Co. & Sushi Bar prep kitchen, Monte Carlo	B	food stored in unlabeled containers	Environment
Dragon Noodle Co. & Sushi Bar restaurant, Monte Carlo	B	refrigerator not maintaining proper temperature	Environment
El Camaron Pelado	B	sanitizer level too high in wiping cloth bucket	Cross contamination
EllaEm's Soul Food	B	raw meat stored at room temperature	Time-temperature abuse
Food Express	B	bowls used as scoops in bulk food containers	Cross contamination
Half Shell Seafood & Gaming, upper bar	B	soda gun holder had slime buildup.	Cross contamination
Island Style BBQ	B	chicken thawing in standing water	Time-temperature abuse
King's Garden Chinese Restaurant	B	uncovered can of sauce stored in walk-in cooler	Cross contamination
La Sirena Mexican Seafood	B	hand sink blocked	Environment
Las Pupusas Restaurant	B	employee drink stored improperly	Personal hygiene
Los Burrito	C	raw chicken stored over cooked chicken in cooler drawers	Cross contamination
N&N Oriental	C	dirty pots stored as clean	Cross contamination
Que Huong Restaurant	B	no sanitizer in dishwasher	Environment
Tropical Smoothie Cafe	B	interior of ice machine dirty	Cross contamination
Viva Michoacan Restaurant	B	food held at improper temperatures	Time-temperature abuse
Antojos DF Authentic Mexican Food	B	three-door cooler not maintaining proper temperature	Environment
Bellagio main kitchen	B	two food handlers did not dry hands properly	Personal hygiene
Buca Di Beppo	B	dump sink used as a hand sink	Cross contamination
Buffalo Wild Wings Grill & Bar	B	chemical spray can not stored properly	Cross contamination
Cafe Lago Buffet, Caesars Palace	C	numerous uncovered food items	Cross contamination
California Pizza Kitchen, The Mirage	B	no thermometer at pizza prep table	Environment
Casa Di Amore	B	unapproved plastic containers reused to store food	Environment
Champs Lounge	C	pink slime buildup in chute of ice machine	Cross contamination
Chinatown Cuisine	B	bowl used to scoop cooked rice	Cross contamination
Cozymel's Mexican Grill	B	in-use and unclean knives lying on unclean work surface	Cross contamination
Dairy Queen, Galleria at Sunset mall	B	sanitizer dispenser at three-compartment sink not operating properly	Environment
Dairy Queen	B	no soap or paper towels available at back hand sink	Environment
Dean's Place	B	uncovered drinks on prep table	Cross contamination
Diamond China Restaurant	B	utensils stored in standing water in several areas	Time-temperature abuse
E Jo Korean Restaurant	C	frozen food thawing on top shelf of prep table	Time-temperature abuse
East Side Pizza	B	prep table stored in front of hand sink	Cross contamination
Emperor's Garden Restaurant	C	soybean beverages not cooled by approved methods	Time-temperature abuse
Gandhi India's Cuisine	C	severely dented cans stored on shelf for use	Environment
Harrah's Las Vegas casino service bar no. 1	B	scoop handle touching consumable ice	Cross contamination
Ilopango Restaurant	B	food stored on floor of walk-in cooler	Cross contamination
The Improv bar, Harrah's Las Vegas	B	employees' personal items not stored properly	Personal hygiene
Island Style Restaurant	B	food held at improper temperatures	Time-temperature abuse
Lombardi's Romagna Mia prep kitchens, Miracle Mile Shops at Planet Hollywood	B	raw meat stored over ready-to-eat food	Cross contamination
Mandalay Bay arena service bar	C	several uncovered bottles of beverages	Cross contamination

Mariscos El Pargo	B	unlabeled food stored in reach-in and walk-in coolers	Environment
McDonald's	B	milk was past use-by date	Environment
Olympic Garden main bar	B	scoop handle touching consumable ice	Cross contamination
Pearl Wok to Go	B	an employee had an expired health card	Environment
Pho Saigon 8	B	dried food debris on knives stored on clean rack	Cross contamination
The Piano Bar at Harrah's Las Vegas	B	soda gun holster not draining properly	Cross contamination
Play It Again Sam restaurant	B	food held at improper temperatures	Time-temperature abuse
Sbarro, Las Vegas Convention Center	B	pizza out of temperature throughout kitchen	Time-temperature abuse
Siri Thai Restaurant	B	dish machine not sanitizing	Environment
Aloha Kitchen	B	no sanitizer in dish machine	Environment
Bagel Restaurant Cafe	C	opened bulk dry goods stored on dry storage shelf	Cross contamination
Bangkok Orchid	B	raw meat stored next to ready-to-eat food	Cross contamination
Cafe Derbi restaurant	C	No soap at hand sink	Environment
China A Go Go II	C	Uncovered food in storage areas	Cross contamination
China Star Super Buffet kitchen	C	cooler not maintaining temperature	Environment
China Star Super Buffet sushi bar	B	food held at improper temperatures	Time-temperature abuse
Chinese Village Restaurant	C	moldy lettuce	Cross contamination
Desert Princess restaurant, Lake Mead Cruises	B	Food not cooled by approved methods	Time-temperature abuse
Domino's Pizza	B	Multiple food spills on floor	Environment
El Paraiso	B	no stem thermometers available	Environment
El Torito Cafe	B	food held at improper temperatures	Time-temperature abuse
Gaylord India Restaurant bar, Rio	B	household pesticide in facility	Environment
Gaylord India Restaurant, Rio	C	food not cooled by approved methods	Time-temperature abuse
Hachi prep kitchen, Red Rock Resort	B	food not cooled by approved methods	Time-temperature abuse
Hachi restaurant, Red Rock Resort	B	wiping cloths stored on prep surfaces	Cross contamination
Harbor Palace Seafood Restaurant cold/dry storage	B	Chemicals not stored properly	Cross contamination
Harbor Palace Seafood Restaurant cook line/wok	B	Chlorine level too high in sanitizer bucket	Cross contamination
Harbor Palace Seafood Restaurant	B	raw shell eggs stored over ready-to-eat food	Cross contamination
Imperial Palace bakery	B	Walk-in cooler in need of repairs	Environment
Kentucky Fried Chicken	B	dirty microwave and ice machine	Environment
Kimchi Restaurant	Closed	no detergent at dish washing machine	Environment
Kimchi Restaurant sushi bar	B	bowl stored in container of sauce	Cross contamination
Marrakech Moroccan Restaurant	B	bread trays stored on clean plates	Cross contamination
The Mirage main kitchen	B	Pastrami not reheated properly	Time-temperature abuse
Namaste Indian Cuisine	Closed	no sanitizer buckets in use throughout facility	Environment
Pacific Buffet, buffet	B	two gallons of milk past expiration date	Environment
Pacific Buffet, restaurant	B	food not thawed properly	Time-temperature abuse
Palace Station casino service bar No. 2	B	employee drinking an open beverage behind bar	Personal hygiene
Pink Taco, Hard Rock Hotel	B	Food held at improper temperatures	Time-temperature abuse
Regal Cinemas Red Rock Stadium 16 snack bar, Red Rock Resort	C	hot holding unit not maintaining proper temperature	Time-temperature abuse
Ruth's Chris Steakhouse	B	can opener dirty	Cross contamination

Silverstone Golf Clubhouse Restaurant	B	soap not available at several hand sinks	Environment
Starbucks, Carnaval Court at Harrah's Las Vegas	B	employee did not follow proper hand-washing procedures	Personal hygiene
The Steak House kitchen, Circus Circus	B	raw meat stored over ready-to-eat food	Cross contamination
Sushi Factory East	B	rice paddles stored in standing water	Time-temperature abuse
Taqueria El Tizon Grill	B	kitchen hand sinks missing soap and paper towels	Environment
Tastee Dogs	B	Food not properly labeled and dated	Environment
Triq Ultra Lounge snack bar, Miracle Mile Shops at Planet Hollywood	B	food handler changed tasks without changing gloves or washing hands	Personal hygiene
Tuscany Steakhouse restaurant	C	Uncovered bulk container of bread in back prep area	Cross contamination
Almaza restaurant	C	raw food stored over cooked and ready-to-eat food	Cross contamination
Aloha Kitchen	B	employee food stored on surface for food preparation	Personal hygiene
Artisan Hotel and Spa cafe lounge	C	insects inside bottles of liquor	Environment
Artisan Hotel and Spa restaurant	Closed	numerous food items spoiled and/or outdated	Cross contamination
Beach Cafe	C	tuna not made with prechilled ingredients	Time-temperature abuse
Blue Martini bar No. 2	B	ice scoop handle stored inside customer ice bin	Cross contamination
Blue Martini main bar	B	lids and liquor pours inside hand sink	Cross contamination
Blue Martini outside bar	B	undercounter cooler not maintaining proper temperature	Environment
Blue Martini VIP bar	B	no hot water at hand sink	Environment
Brazil Brazil restaurant	B	employees did not follow proper hand-washing procedures	Personal hygiene
Chang's Hong Kong Cuisine	C	shellfish did not have proper tags	Environment
Club Paradise snack bar	B	food held at improper temperatures	Time-temperature abuse
Dealer's Choice Lounge	B	personal food items stored on shelf with food and beverages intended for the pub	Cross contamination
Del Taco	B	low sanitizer level in three-compartment sink	Environment
International Pizza	B	expired container of buttermilk	Environment
JJ's Boulangerie Restaurant, Paris Las Vegas	C	sanitizer bucket stored next to a food preparation area	Cross contamination
Jamba Juice	B	small cooler had a broken thermometer	Environment
Kabob Grill	B	unlabeled preportioned meats in freezer	Environment
Kabob Palace	B	no hot water or paper towels at back hand sink	Environment
Klondike Sunset Casino bar	B	glass cleaner not dispensing sanitizer	Environment
Krung Siam Thai Restaurant	C	chemicals not stored properly	Cross contamination
Lucky Joe's Saloon	C	food held at improper temperatures	Time-temperature abuse
McFadden's Restaurant and Saloon, Rio	B	souffle cups used as scoops for spices	Cross contamination
O'Aces Bar & Grill, grill	C	dirty food contact surfaces, slicer and pans	Cross contamination
PT's Pub	B	dirty glasses	Cross contamination
Pretzel Time, the Boulevard mall	B	moldlike growth in ice machine	Cross contamination
Roberto's Taco Shop	B	wiping cloth stored on prep table next to food	Cross contamination
Screwballs Sports Lounge & Restaurant	B	no sanitizer in dish machine	Environment
Super B Super Burrito Taqueria	B	food not cooled by approved methods	Time-temperature abuse
Sushi Bay Japanese Cuisine sushi bar	B	hand sink used to wash produce	Cross contamination
Sushi Bay Japanese Cuisine	B	three employees not carrying health cards	Environment
Thai House Restaurant	B	raw chicken stored over cooked chicken	Cross contamination

Tropical Breeze Cafe hot line, Flamingo Las Vegas	B	hot sauce was cooling at room temperature	Time-temperature abuse
Bear's Best Las Vegas	B	uncovered salads and condiments	Cross contamination
Canaletto bar downstairs, Grand Canal Shoppes at The Venetian	C	soda guns had blackish deposits and soda buildup	Cross contamination
Capital Seafood Restaurant	C	dead fish in fish tank	Environment
The Coffee Cup Cafe	C	food not cooled by approved methods	Time-temperature abuse
Dara Thai Restaurant	B	eggs stored on shelf at room temperature	Time-temperature abuse
Diamond Bakery	C	food held at improper temperatures	Time-temperature abuse
Great Harvest Bread Co	B	uncovered containers of bulk foods and open ingredient bags in backroom	Cross contamination
International House of Pancakes	B	portion cups used as scoops and stored in food products	Cross contamination
Kapit Bahay Filipino Fast Food	B	inadequate sanitizer level in sanitizer bucket	Environment
Krazy Krust Pizza	B	dirty food prep table and make table	Cross contamination
Market Grille Cafe	B	milk and whipping cream in use past expiration date	Cross contamination
Marnee Thai Restaurant	C	dishes washed at three-compartment sink while food product was thawing in one se	Cross contamination
Mr. Deli	B	multi-use utensils not washed and sanitized properly	Cross contamination
New York-New York High Society service bar	B	glass machine not dispensing sanitizer	Environment
Roberto's Taco Shop	C	no stem thermometer available at facility	Environment
Rounders II restaurant	B	open bag of rice not stored properly	Cross contamination
Tacos El Compta	C	employee beverages stored on prep table	Personal hygiene
Yo Fresco, Fashion Show mall	B	unlabeled containers of food	Environment
Abyssinia Restaurant and Market	C	hand sink blocked by onions and sanitizer bucket in hand sink	Environment
Abyssinia Restaurant and Market bar	B	improper hand-washing procedures	Personal hygiene
Archi's Thai Cuisine	B	improper hand-washing procedures	Personal hygiene
Arturo's Mexican	B	steam table not maintaining temperature	Environment
Carluccio's Restaurant	B	dried-on, built-up food debris on can-opener blade	Cross contamination
Coco's Restaurant	B	employees with expired or no health cards	Environment
Crown & Anchor Pub Restaurant	B	dishwashing machine not sanitizing properly	Environment
Cue Club Snack Bar	C	no soap at only hand sink	Environment
El Tenampa	B	food held at improper temperatures	Time-temperature abuse
Essence of Thai Restaurant	C	meat and fish in freezer past sell date	Environment
Hot and Juicy Crawfish	C	food held at improper temperatures	Time-temperature abuse
Ichiban Restaurant, Bally's	C	pans stored on floor	Cross contamination
L&L Hawaiian Barbecue	B	sanitizer solution too strong	Cross contamination
Las Vegas Convention Center coffee cart No. 2	Closed	no hot water at hand sink/Substantial health hazard.	Environment
Marie's Gourmet Bakery	B	no hot water at rear hand sink	Environment
Marie's Gourmet Bakery restaurant	B	dust and fuzz on ceiling tiles	Environment
New Day Cafe	B	dirty cloth on cutting board	Cross contamination
Northern China Restaurant	B	meat being thawed at room temperature	Time-temperature abuse
Osaka Restaurant, Bar and Sushi Bar lounge	B	no soap or paper towels at hand sink. because of repeat critical violations.	Environment
Osaka Restaurant, Bar and Sushi Bar restaurant	B	domestic microwave in use	Environment
Osaka Restaurant, Bar and Sushi Bar, sushi bar	B	wiping cloth used to cover sushi rice	Cross contamination

Outlaws Backyard BBQ	B	food held at improper temperatures	Time-temperature abuse
Platinum Hotel & Spa restaurant	B	food held at improper temperatures	Time-temperature abuse
Popeyes Louisiana Kitchen	C	roaches in ice machine	Environment
Qdoba Mexican Grill	B	container of nacho chips stored on floor	Cross contamination
Queens Yogurt & Tea	B	food not from approved sources	Environment
Rockhouse Main Bar, Imperial Palace	C	containers and pallets with sticky buildup	Cross contamination
Starbucks, Sunset Station	B	milk held at improper temperature	Time-temperature abuse
Sunset Station garde manger	B	mold growing at back of prep sink	Cross contamination
Sunset Station main kitchen	B	soups and sauces held at improper temperatures	Time-temperature abuse
Thai Spice Restaurant	C	moldlike substance on ice machine	Environment
Thai Style Noodle House	C	too much chlorine in sanitizer bucket	Cross contamination
Tommy Bahama's restaurant, Town Square	B	improper hand-washing procedures	Personal hygiene
Apache Joe's Bar & Grill restaurant	B	beef and chicken not thawed properly improper level of sanitizer solution for wiping cloths	Time-temperature abuse Environment
Basil'n Lime Authentic Thai Cuisine	C		Environment
Black Mountain Grill	B	food stored on floor of walk-in freezer	Cross contamination
Cathay House Restaurant	B	pink slime in ice machine	Cross contamination
Coco's Restaurant, Boulder Station	C	food held at improper temperatures	Time-temperature abuse
Geisha Bar, Imperial Palace	B	bottled drinks stored in drink ice	Cross contamination
Golden Kitchen	B	hand sink used as dump sink	Cross contamination
Golden Spoon Frozen Yogurt	B	employee food stored on top of customer food	Personal hygiene
Grind Burger Bar & Lounge	B	food containers unlabeled	Environment
Inn Zone Flamingo	B	brown residue in ice bin	Cross contamination
Jason's Deli	C	food not cooled by approved methods	Time-temperature abuse
Kan's Kitchen	C	cooler not maintaining proper temperature	Environment
McDonald's	B	no thermometer in small refrigerator next to grill	Environment
Nhu Y Food to Go	C	food held at improper temperatures	Time-temperature abuse
Philly Steak & Pizza Express	B	uncovered food in back reach-in cooler	Cross contamination
Pizza Hut	B	dirty equipment stacked as clean	Cross contamination
President's Pizza	B	a food handler did not have a valid health card	Environment
Rave Motion Pictures Town Square 18 snack bar No. 3	B	no soap dispenser at hand sink, only sanitizer	Environment
Roberto's Taco Shop	B	food held at improper temperatures	Time-temperature abuse
Steak & Spud Factory, Boulevard Mall	B	moldlike growth in ice machine	Cross contamination
Subway	B	employee personal items not stored properly	Personal hygiene
Super Mex Restaurant & Cantina	C	food not cooled by approved methods dishwasher not dispensing proper amount of sanitizer	Time-temperature abuse Environment
Sushi Wow Restaurant	B		Environment
Yummy Grill & Sushi, sushi bar	B	food held at improper temperatures	Time-temperature abuse
Yummy Grill & Sushi, restaurant	C	uncovered noodles at cook line	Cross contamination
Broadway Pizzeria	B	employee beverage not stored properly food stored next to dirty dishes in three- compartment sink	Personal hygiene Cross contamination
China A Go Go	B		Cross contamination
China Joe's	B	cut vegetables stored at room temperature all day	Time-temperature abuse
Club Fortune Casino restaurant	B	food held at improper temperatures	Time-temperature abuse
Epoy's Philippine Fast Food	C	several uncovered foods stored in cooler	Cross contamination

Felipito's Mexican Food	C	employees did not follow proper hand-washing procedures	Personal hygiene
Hooters restaurant	C	cartons of raw shelled eggs were stored above ready-to-eat foods in walk-in cool	Cross contamination
Jugos y Licuados, Charleston Swapmeet	B	open containers of lime juice, jalapenos and caramel stored at room temperature	Time-temperature abuse
New China Cuisine	C	dirty ice machine and ice scoops	Cross contamination
Original Pancake House	B	steam table used to reheat food	Cross contamination
SouthShore Yacht & Beach Club restaurant	C	expired cheddar cheese and buttermilk	Environment
Taqueria Victor	Closed	food not cooled by approved methods	Time-temperature abuse
Teavana	B	chemicals not stored properly	Cross contamination
AA Hawaiian BBQ	B	access to hand sink blocked	Environment
Capriotti's Sandwich Shop	B	no stem thermometer available	Environment
Coco's Bakery & Restaurant cafe kitchen, Palace Station	C	scoop handles stored in food products	Cross contamination
Dairy Queen, Boulder Station	B	unlabeled food in reach-in cooler	Environment
Don Alejandro's Texan Grill, McCarran International Airport	B	food not cooled by approved methods	Time-temperature abuse
Jack in the Box	B	stored food falling out of containers	Cross contamination
La Palapa Restaurant	C	raw seafood stored next to and above ready-to-eat food	Cross contamination
Metro Pizza, Boulder Station	B	food not cooled by approved methods	Time-temperature abuse
Port of Subs	C	incorrect hot water temperature at three-compartment sink	Environment
Ciao Ciao Apizza Angelato	B	employee personal beverages and items not stored properly	Personal hygiene
Dee's Donuts	C	food handler did not follow proper hand-washing procedures when changing tasks	Personal hygiene
Great Wall Restaurant	B	egg rolls improperly double stacked in the refrigerator	Time-temperature abuse
India Palace	B	unlabeled bulk food containers	Cross contamination
Ka Japanese Bistro sushi bar	Closed	coolers did not have thermometers	Environment
Kentucky Fried Chicken	B	food held at improper temperatures	Time-temperature abuse
Mix Zone Cafe	B	microwave and cutting boards dirty	Cross contamination
Park Grill	B	unapproved household freezer in use	Environment
Pete's Dueling Piano Bar, Town Square	B	no soap or paper towels at hand sinks	Environment
Quiznos Subs	B	make table not maintaining proper temperature	Environment
Riviera main kitchen	C	chemical sanitizer bucket stored over food area	Cross contamination
Seattle's Best Coffee, Suncoast	B	plastic crate used as shelf	Environment
Sofia's Pizza	Closed	employee food items not stored separately from customer food	Personal hygiene
Sushi 21 restaurant	C	walk-in refrigerator not maintaining proper temperature	Environment
The Sushi restaurant	B	food held at improper temperatures	Time-temperature abuse
Tailspin Bar and Grill	B	no cold water available at kitchen hand sink	Environment
Tinocos Kitchen snack bar, Vegas Club	B	milk past expiration date	Environment
Tortas El Rey	B	food handlers did not follow proper hand-washing procedures	Personal hygiene
Verona Pizza	B	can opener and prep cutting boards dirty	Cross contamination
Abyssinia Restaurant and Market, restaurant	C	food not cooled by approved methods	Time-temperature abuse
Arturo's Mexican	B	refrigerator not maintaining proper temperature	Environment
B.B. King's Blues Club pantry, The Mirage	C	improperly thawing food in three-compartment sink	Time-temperature abuse

Del Taco	B	hand sink used as dump sink	Cross contamination
Deluxe Pizza	B	expired sour cream	Environment
El Birotazo	B	food not labeled properly	Environment
Feast Buffet dishroom, Boulder Station	B	containers with old labels stacked as clean	Environment
Korean Garden Restaurant	C	food held at improper temperatures	Time-temperature abuse
Luciano's Pizzeria	B	dirty meat slicer, mixer and cutting board.	Cross contamination
Marco's Pizza	B	chemical bottles not stored properly.	Cross contamination
Panini Cafe bakery	B	uncovered food in freezer	Cross contamination
Rice To Go	B	food handler not wearing proper hair restraint	Personal hygiene
Sammy's Doghouse	B	uncovered drink ice stored in reach-in cooler	Cross contamination
Tequila Bar, Boulder Station	B	dirty soda gun holster moldlike substance on lettuce in walk-in	Cross contamination
Tiffany's Cafe	Closed	refrigerator	Cross contamination

REFERENCES

- Barrett, T. J., Gerner-Smith, P., & Swaminathan, B. (2006). Interpretation of pulsed field gel electrophoresis patterns in food-borne disease investigations and surveillance. *Food-borne Pathogens and Disease*, 3(1), 20-31.
- Bean, N. H., & Griffith, P. M. (1990). Food-borne disease outbreaks in the United States, 1973-1987: Pathogens, vehicles, and trends. *Journal of Food Protection*, 53, 804-817.
- Berry, J. D. (2005). Rational monoclonal antibody development to emerging pathogens, biothreat agent and agents of foreign animal disease: The antigen scale. *The Veterinary Journal*, 170(2), 193-211.
- Berta, D. (2001, May 28). Companies harness fun, games to train employees. *Nation's Restaurant News*, 35(22) 22-23.
- Bledsoe, G. E., & Rasco, B. A. (2002). Addressing the risk of bioterrorism in food production. *Food Technology*, 56(2), 43-44, 46-47.
- Bryan, F. L., (2002). Where we are in retail food safety, how we got to where we are and how do we get there? *Journal of Environmental Health*, 65(2), 29-36.
- Burkink, T., Hughner, R. & Marquart, R. (2004). *Journal of Foodservice Business Research*, 7(1), 97-115. doi: 10.1300/J369v07n01_07
- Centers for Disease Control and Prevention. (2005). Food-borne illness: Frequently asked questions. Retrieved from http://www.cdc.gov/ncidod/dbmd/diseaseinfo/files/foodborne_illness_FAQ.pdf
- Collins, J. E. (1997). Impact of changing lifestyles on the emergence/reemergence of food-borne pathogens. *Emerging Infectious Diseases*, 3, 471-479.

- Collis, B. (2002, January). So how effective is your training? *Beverage Industry*, 93(1), 52.
- Dramatic decline in foodborne illness. (2002). *Journal of Environmental Health*, 65(5) 48.
- Environmental Health Updater: 2004 FDA report on the occurrence of food-borne illness risk factors in food service facilities. (2005). *Journal of Environmental Health*, 67(6), 54.
- Federal Emergency Management Agency. (2009, June 4). General information about terrorism. In *Are you ready? An in-depth guide to citizen preparedness*. Retrieved from http://www.fema.gov/areyouready/terrorism_general_info.shtm
- Goodrich, R. M., Schneider, K. R., & Schmidt, R. H. (2005). HACCP: An overview. Retrieved from University of Florida IFAS Extension Web site: <https://edis.ifas.ufl.edu/FS122>
- Hall, M. J., Norwood, A. E., Fullerton, C. S., Gifford, R., & Ursano, R. J. (2004). The psychological burden of bioterrorism. *Journal of Aggression, Maltreatment & Trauma*, 9(1/2), 293-304.
- Henson, S., Majowicz, S., Masakure, O., Sockett, P., Jones, A., Hart, R., ... Knowles, L. (2006). Consumer assessment of the safety of restaurants: The role of inspection notices and other information cues." *Journal of Food Safety*, 26, 275-301. doi:10.1111/j.1745-4565.2006.00049.x
- Hynes, M. (2009a, June 24). Restaurant report. *Las Vegas Review-Journal*, p. 4E.
- Hynes, M. (2009b, July 1). Restaurant report. *Las Vegas Review-Journal*, p. 3E.
- Hynes, M. (2009c, July 8). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009d, July 15). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009e, August 5). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009f, August 12). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009g, August 19). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009h, August 26). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009i, September 2). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009j, September 9). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009k, September 16). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009l, September 23). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009m, September 30). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009n, October 7). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009o, October 14). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009p, October 21). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009q, October 28). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009r, November 4). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009s, November 11). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

Hynes, M. (2009t, November 25). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009u, December 2). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009v, December 9). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009w, December 16). Restaurant report. *Las Vegas Review-Journal*, p. 3E.

Hynes, M. (2009x, December 23). Restaurant report. *Las Vegas Review-Journal*, p. 4E.

- Janssen, W. F. (2009, June 18). The story of the laws behind the labels. U.S. Food and Drug Administration. Retrieved from <http://www.fda.gov/AboutFDA/WhatWeDo/History/Overviews/ucm056044.htm>
- Junod, S. W. (2000). U. S. federal food standards: The case of the peanut butter and jelly sandwich. In D. F. Smith & J. Phillips (Eds.), *Food, Science, Policy and Regulation in the Twentieth Century: International and Comparative Perspectives*, (pp. 167-188). London: Routledge Press.
- Knychalska, I. & Shaw, M. (2002). A perspective on marketing planning and its essentiality for the entrepreneurial restaurant. *Journal of Foodservice Business Research*, 5(1), 119-127. doi: 10.1300/J369v05n01_06
- Las Vegas: Economy. (n.d.) City-Data.com. Retrieved April 10, 2010 from <http://www.city-data.com/us-cities/The-West/Las-Vegas-Economy.html>
- List of food-borne illness outbreaks in the United States. (2010, February 10). Wikipedia. Retrieved April 10, 2010, from http://en.wikipedia.org/wiki/List_of_foodborne_illness_outbreaks_in_the_United_States
- Lyon, J. D. (1998). Coordinated food systems and accountability mechanisms for food safety: A law and economics approach.” *Food and Drug Law Journal*, 53, 729-776.
- McKeown, E. (2008). *A relationship analysis of restaurant inspection violations, employee behaviors and inspection grades* (unpublished master’s thesis). University of Nevada, Las Vegas.
- Mead, P. S., Slutsker, L., Dietz, V., McCaig, L. F., Bresee, J. S., Shapiro, C., ... Tauxe, R. V. (1999, September-October). Food-related illness and death in the United

- States. *Emerging Infectious Diseases*, 5(5). Retrieved from <http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm>
- National Restaurant Association. (2009). *2009 restaurant industry pocket factbook*. Washington, DC: Author. Retrieved from <http://www.restaurant.org/pdfs/research/2009Factbook.pdf>
- National Restaurant Association. (2010). *Facts at a glance. (2010 Restaurant Industry)*. Washington DC: Author. Retrieved from <http://www.restaurant.org/research/facts/>
- National Restaurant Association Educational Foundation. (2003). *Food security: An introduction*. Chicago, IL: Author.
- National Restaurant Association Educational Foundation. (2004). *ServSafe coursebook (3rd ed.)*. Chicago, IL: Author.
- National Restaurant Association Education Foundation. (2006). *ServSafe coursebook (4th ed.)*. Chicago, IL: Author.
- Norton, S. W. (1988). An empirical look at franchising as an organization form. *Journal of Business*, 61(2), 197-218. doi: 10.1086/296428.
- Olsen, S. J., MacKinon, L. C., Goulding, J. S., Bean, N. H. & Slutsker, L. (2000, March 17). Surveillance for food-borne disease outbreaks—United States, 1993-1997. *Morbidity and Mortality Weekly Report*, 49(SS-1), 22-26. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss4901a1.htm>
- Reeve, L., Stevenson, P., & Wooten, C. (2006). *The AIB international guide to food defense: For food retail and food service operations* (K. Beach & R. Wheeler, Eds.). Manhattan, KS: AIB International.

- Rinella, H. K. (2009, November 18). Restaurant report. *Las Vegas Review-Journal*, p. 4E.
- Seiver, O. H., & Hatfield, T. H. (2000, October). Grading systems for retail food facilities: A risk-based analysis. *Journal of Environmental Health*, 63(3), 22-28.
- Smith, H. (2010, January 28). Analyst: Las Vegas economy sick with 'jobophilia.' *Las Vegas Review-Journal*.
- Southern Nevada Health District. (1999, April). Regulation 96: Clark County Health District Regulations governing the sanitation of food establishments. Retrieved from <http://www.southernnevadahealthdistrict.org/download/eh/eh-reg.pdf>
- Southern Nevada InfraGard. (n.d.). Agro-terrorism and food safety: Summer meeting July 18, 2007. Retrieved from http://www.southernnevadainfragard.org/index.php?option=com_content&view=article&id=18:agro-terrorism-and-food-safety&catid=1:latest&Itemid=27
- U. S. Bureau of Labor Statistics. (2010). *Economy at a Glance: Las Vegas-Paradise, NV*. [Data file]. Retrieved from http://www.bls.gov/eag/eag.nv_lasvegas_msa.htm
- U. S. Department of Agriculture, Food and Nutrition Service. (2004). Biosecurity checklist for school foodservice programs: Developing a biosecurity management plan. Retrieved from <http://healthymeals.nal.usda.gov/hsmrs/biosecurity.pdf>
- U. S. Department of Agriculture Office of Communications. (2009, July 15). USDA and HHS praise guidelines for foodborne disease outbreak response. Release No. 0309.09.

- U. S. Department of Health and Human Services, Office of Budget. (n.d.). Budget documents & information. Retrieved from <http://www.hhs.gov/asrt/ob/docbudget/budgetfy08.html>
- U. S. Food and Drug Administration. (2005). FDA 2005 model food code. Retrieved from <http://www.fda.gov/downloads/Food/FoodSafety/RetailFoodProtection/FoodCode/FoodCode2005/ucm077341.pdf>
- U. S. Food and Drug Administration. (2007, October). Guidance for industry: Retail food stores and food service establishments: Food security preventive measures guidance (final guidance). Retrieved from <http://www.cfsan.fda.gov/guidance.html>
- U. S. Food and Drug Administration. (2009, April 30). Real progress in food code adoptions (Quarterly Update ed.). Retrieved April 10, 2010, from <http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/FederalStateCooperativePrograms/ucm108156.htm>
- Weise, E. (2010, March 4). USA pays price for food-borne illness: \$152B a year. *USA Today*. Retrieved from http://www.usatoday.com/news/health/2010-03-03-food-borne-illness_N.htm?loc=interstitialskip
- World Health Organization. (2007, March). Food safety and food-borne illness. Fact Sheet No 237. Retrieved from <http://www.who.int/mediacentre/factsheets/fs237/en/>
- Yoon, E. & Shanklin, C. W. (2007a). Food security practice in Kansas schools and health-care facilities.” *The Journal of American Dietetic Association*, 107(2), 325-329.

Yoon, E. & Shanklin, C. W. (2007b). Implementation of food biosecurity management plan against food terrorism in on-site food-service operations.” *Journal of Hospitality and Tourism Research*, 31(2), 224-240.

York, V. K., Brannon, L. A., Shanklin, C. W., Roberts, K. R., Howells, A. D. & Barrett, E. B. (2009, September). Foodservice employees benefit from interventions targeting barriers to food safety. *Journal of the American Dietetic Association*, 109(9), 1576-1581. doi: 10.1016/j.jada.2009.06.370

Zikmund, W. G. (2003). *Business Research Methods* (7th ed.). Mason, OH: Thomson Learning.

VITA

Graduate College
University of Nevada, Las Vegas

Jai Choung

Degrees:

Associate of Science, Hotel Administration, 1978
Kyung-hee University, Seoul, Korea

Associate of Occupational Studies, 1985
Culinary Institute of America, Hyde Park, New York

Bachelor of Science, Hotel Administration, 2008
University of Nevada, Las Vegas

Thesis Title: An Analysis of Restaurant Food Safety Violations: Human Factors, Non-human Factors, and Food-borne Illness

Thesis Examination Committee:

Chairperson, Yen-Soon Kim, Ph. D.
Committee Member, Billy Bai, Ph. D.
Committee Member, Carola Raab, Ph. D.
Graduate Faculty Representative, Seung mook Choi, Ph. D.