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Awareness of hazard analysis critical control points

Gayle Brosseau

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AWARENESS OF HAZARD ANALYSIS CRITICAL CONTROL POINTS (HACCP) BY FOOD HANDLER TRAINEES

By

Gayle Brosseau

A thesis submitted to the Faculty of the School of Hospitality and Service Management at Rochester Institute of Technology in partial fulfillment of the requirements for the degree of Masters of Science

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By Food Handler Trainees

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Abstract

This study was an attempt to identify the awareness of principles of Hazard Analysis Critical Control Point (HACCP) by individuals who completed an eight-hour food handlers’ class at Los Angeles Mission College. A six-item questionnaire was distributed to one hundred eighty individuals enrolled in the food handlers’ classes during the winter of 1999-2000. One hundred twenty-five questionnaires were returned and tabulated during the spring 2000. Data analysis revealed that there is limited awareness of HACCP principles by trainees. The study, coupled with the literature review, indicates that there is a need for HACCP training. Other research showed a correlation between training and reduced incidence of food borne illness. Trends point to the fact that HACCP requirements are expanding throughout the food manufacturing sector. It is recommended that further studies be conducted to show the cost and benefits of HACCP training, to determine instructor competency, to learn HACCP’s role in ISO certification, to ascertain the level of HACCP training in the California Community Colleges, and to establish the relationship between mandated HACCP training and the reduction in food borne illness.
Acknowledgements

California Community College Chancellor’s Office

Funding from a California Community College Economic Development grant entitled, “Industry Driven Regional Training Collaborative,” focused attention and resources on meeting the food industry’s need to provide Sanitation/Safety and Hazard Analysis Critical Control Point (HACCP) training.

Eloise Cantrell, Dean of Economic Development- Los Angeles Mission College

Eloise Cantrell shared her vision to meet the training needs of the food industry with staff and faculty. She sought resources to fund that vision and develop a short-term food safety course. The timeliness of her decisions positioned Los Angeles Mission College to be an exemplary training provider. The college was ready to respond to the certification of food handlers in Los Angeles County.

Dr. Frank Gomez, Los Angeles County Environmental Health

Dr. Frank Gomez, Los Angeles County Environment Health, provided his leadership and guidance in the implementation of Los Angeles County’s grading system and mandated food handler training.
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Chapter One

Introduction

“CBS Channel 2 Exposes Dirty Restaurants in Los Angeles”

These headlines screamed across the airwaves of local television and radio stations, as the shocked public was appalled at the sanitary conditions of their local eating establishments. An outraged citizenry pressured the public health department to mandate training programs and a visible grading system. As a result, Los Angeles County Ordinance #97-0071 was established which mandated an eight-hour food handlers’ sanitation program from approved training providers. The training requirement was coupled with the requirement that students must achieve a passing score on a written examination.

Background

In 1996-97 Los Angeles Mission College saw a need to modularize its three-unit sanitation course into three components. One of which was a one-half unit, eight-hour food handler course that met the professional development needs of chefs who are members of the American Culinary Federation. The college applied for and received a grant that provided funding to not only modularize the curriculum, but to adapt it for online delivery as well.

With this grant from the California Community College Chancellor’s Office, Los Angeles Mission College (LAMC) modularized its three-unit Sanitation and Safety course. During the grant funding cycle, CBS conducted an investigative report on the sanitary conditions of local restaurants. The college felt fortunate to have already developed a course module that gave an overview to sanitation principles. This allowed
Awareness of

the college to be prepared for the “overnight” training demands created from the CBS report. When the demand was at its peak, Los Angeles Mission College met the industry demand for enrollments and continues to offer weekly classes.

The college then applied for another grant under the category of economic development. This grant offset the costs of sanitation training and provided funds to establish HACCP train-the-trainer seminars. It also provided translation of the training materials into Spanish, Korean, and Chinese languages in order to serve the language needs of the ethnically diverse restaurant employees in the Los Angeles region. Classes are currently taught in Spanish or English on alternating weeks. Korean and Chinese classes are taught on an “as-needed” basis.

The LAMC curriculum is designed for anyone interested in preventing food borne illness. The course modules are of interest to 1) students interested in a career in the foodservice industry, 2) professionals who want to upgrade their skills, 3) homemakers interested in preparing home cooked meals, 4) students with food science majors, 5) workers in the industry needing certification and recertification of safety and sanitation, and 6) other interested individuals.

The course is of particular interest to food service workers because of the competitive employment advantage that food handlers’ certification provides. Restaurants give preference to hiring individuals that have their food handler certification because of the Los Angeles County Ordinance #97-0071 that requires a minimum of one certified food handler to be present during hours of operation. The health department closes restaurants that do not comply. A certified food handler is an
individual that has received a minimum of eight hours of food handler’s training and has received a passing grade on a written examination (County of Los Angeles, 2000).

**Benefits of Training - Return on Investment**

Not only does careful handling keep food safe, but it lasts longer. For foodservice operators, sanitation and safety training is the key to increasing profits and boosting an operation’s bottom line. As this industry scrambles to keep pace with consumption demands, a HACCP-trained workforce helps to ensure its success.

The economic ramifications of implementing food safety and Hazard Analysis Critical Control Points (HACCP) training are widespread throughout many industries. In a summary article, entitled “The Cost, Benefits and Distributional Consequences of Improvements in Food Safety: The Case of HACCP,” Elise Golan, Katherine Ralston, Paul Frenzen and Stephen Vogel state the following:

*The USDA’s Economic Research Service estimates the benefits of the HACCP regulatory program over twenty-five years at $4.46 billion to 22.19 billion. The USDA’s Food Safety and Inspection Service estimates the costs of HACCP over twenty-five years at $1.04 billion to $1.23 billion. In order to trace the distributional impact of these benefits and costs, two Social Accounting Matrices (SAM’s) were developed: one that incorporates the benefits of reducing food borne illnesses and one that incorporates the cost of implementing HACCP. It shows that the economic impact of human capital costs differs fundamentally from the impact of defensive expenditures. On the benefit side, the SAM experiments indicate that every dollar of income saved by preventing a premature death from food borne illness results in an economy-wide income gain of $1.92, every dollar of household income saved by reduced medical expenses results in an economy-wide income loss of $0.40, and every dollar of private and public insurance expenses saved by reduced medical expenses results in an economy-wide income loss of $0.32. On the cost side, the SAM experiments indicate that every dollar spent on HACCP results in an economy-wide gain of $0.66. The net economic impact of the costs and benefits of HACCP is an increase in production output of $7.0 billion, an increase in factor payments of $5.6 billion, and an increase in household income of $9.05 billion. These net benefits would be larger if the benefits of reduced work-loss days were included” (Golan, 1998).*
Policy makers utilize information such as this data as they make decisions for mandatory training. When the cost/benefit ratio is analyzed in this situation, we see an indication of the economic value of HEALTH.

**Purpose**

The case for HACCP training is well established. Training of food handlers in restaurants, food processing and retail outlets can reduce the risk of food borne illness and minimize the associated costs. However, the existing program at Los Angeles Mission College may not address HACCP principles sufficiently. This study is a first step in the evaluation of the Los Angeles Mission College’s food handler training program. A base-line measurement of awareness of HACCP principles is established and recommendations for curriculum and public policy changes are made.

**Significance**

The study is significant because it is the first one conducted at Los Angeles Mission College that evaluates Hazard Analysis Critical Control Point awareness of individuals completing the eight-hour food handlers’ course. The data gleaned in this study may be used to determine if there is a need to provide expanded HACCP training. In addition, the results of the study could be used to open dialog about the need for further study into topics such as: 1) how HACCP forms the basis for ISO certification which positions a food manufacturing company for increased sales internationally; 2) how the California Community Colleges are responding to the training needs of restaurants by establishing weekly seminars because of the CBS investigative report, “Dirty Restaurants in Los Angeles,” 3) the role the local, state and national government will play in mandating HACCP regulations, 4) the economic benefits to a business that
provides HACCP training to their employees, or 5) the challenges of implementing a 
food safety system.

**Methodology**

A questionnaire will be developed to ascertain the awareness of HACCP 
principles by individuals completing an eight-hour food handlers’ course at Los Angeles 
Mission College (LAMC) between July 1, 1999 and March 1, 2000. Questions were 
formulated from discussions with LAMC food handler instructors and reviewed by 
Rochester Institute of Technology faculty. The methodology consisted of distributing the 
questionnaires in food handlers’ classes at the completion of the eight-hour training.

**Literature Review**

The review of the literature gives an overview of HACCP as a preventative food 
safety system. This section shows how mandatory HACCP training is expanding within 
the food-processing sector and how it maybe required in retail food service as well. The 
literature review will provide an overview of HACCP, explore the growth of the food 
industry, explain the financial benefits of training, and delimit “awareness” as used in the 
study. Sources will include journals, books, newspaper articles, and interviews with 
HACCP trainers and instructional designers.

**Definition of Terms**

- **Awareness of HACCP**: The ability to correctly answer questions number three, 
four and five on this study’s questionnaire regarding HACCP principles.

- **CCP**: Critical Control Point.

- **CCP Decision Tree**: A sequence of questions to assist in determining whether a 
control point is a CCP.

- **Certified Food Handler**: An individual that passes a proctored examination in 
sanitary practices in handling food.
• Control Point: Any step at which biological, chemical, or physical factors can be controlled.

• Corrective Action: Procedures followed when a deviation occurs.

• FDA: Food Drug Administration.

• FSIS: Food Safety Inspection Service of the U. S. Department of Agriculture.

• Good Manufacturing Practices (GMPs) address facilities, supplier control, specifications, production equipment, cleaning and sanitation, pest control, recall systems, chemical storage controls, personal hygiene, receiving, storage and shipping.

• HACCP: A systematic approach to the identification, evaluation, and control of food safety hazards.

• HACCP Plan: Formal written procedures of HACCP principles.

• HACCP Principles: 1) Conduct hazard analysis, 2) Determine critical control points, 3) Establish critical limits, 4) Establish monitoring procedures, 5) Establish corrective actions, 6) Establish verification procedures, 7) Establish record-keeping and documentation procedures.

• HACCP System: The result of the implementation of the HACCP plan.

• Hazard: A biological, chemical, or physical agent that is reasonably likely to cause illness or injury in the absence of its control.

• Hazard Analysis: The process of collecting and evaluating information on hazards associated with the food under consideration to decide which are significant and must be addressed in the HACCP plan.

• ISO: The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from some 130 countries. ISO is not an acronym. It is a word, derived from the Greek isos, meaning "equal."

• Los Angeles County Ordinance # 97-0071: A Los Angeles County Environmental Health law that requires all eating establishments to employ a certified food handler who has complete eight-hours of sanitation training and who has achieved a passing grade on an examination.

• Potentially Hazardous Food: From the 1997 Food Code states a food that is natural or synthetic and is in a form capable of supporting rapid and progressive growth of infectious or toxigenic microorganisms; the growth of toxin production of Clostridium botulinum; or in shell eggs, the growth of Salmonella enteritidis.
• Sanitation Standard Operation Procedures (SSOPs) are standard practices, which include cleaning and sanitizing food surfaces and facilities.

• USDA: United States Department of Agriculture.

• Verification: Those activities, other than monitoring, that determine the validity of the HACCP plan and that the system is operating according to the plan.

• Validation: That element of verification focused on collecting and evaluating scientific and technical information to determine if the HACCP plan, when properly implemented, will effectively control the hazards.

Assumptions

Ideological.

The researcher makes the assumption that the participants do not have a thorough understanding of HACCP, although they may have heard of the term.

Procedural.

The limitation of this study is the development of appropriate questions that will provide accurate data. In order to guard against researcher bias and influence that can occur, a standardized written questionnaire will be developed and distributed to the participants by the instructor of the eight-hour food handlers’ class.

Scope and Limitations

Scope.

This study will examine awareness of Hazard Analysis Critical Control Point (HACCP) system in the foodservice/food processing industry with a six-item questionnaire. HACCP is required of poultry, egg, meat, seafood processors with a phase-in schedule that concluded January 1, 2000, for small processors.
to 500 employees). It is not currently required of other food processors or the retail food service industry at the present time. The participants in this study will be individuals completing the eight-hour food handlers’ course who received their training at Los Angeles Mission College from July 1, 1999 to March 1, 2000. The researcher does not personally know the participants.

**Limitations.**

A limitation may be the literacy rate of the population; therefore the questionnaire will be written simply. The content of the questionnaire will determine HACCP awareness. Although the classes are given in English, Korean, Spanish, and Chinese, only the participants in the eight-hour food handlers’ class taught in English will be surveyed.

**Procedures**

In order to determine the awareness of HACCP principles of trainees that completed an eight-hour sanitation/safety course, the researcher made arrangements for the distribution of six-item questionnaire at the completion of “Certified Food Handler” training at Los Angeles Mission College. The questionnaire was purposely designed as a short form with a choice of only two responses (yes or no) to each question.

**Long Range Consequences/Conclusions**

When HACCP awareness is low in the population surveyed, it may indicate the need to continue training at the next level. Further, if HACCP awareness is not evident, a strong case can be made to develop a marketing strategy for the college’s HACCP training programs. If the level of HACCP awareness cannot be shown, further study will be necessary.
Chapter Two

Literature Review

HACCP Overview

Hazard Analysis and Critical Control Point (HACCP) is a preventative food safety system developed by the National Advisory Committee on Microbiological Criteria for Foods (County of Los Angeles-Department of Health Services, 1998). This preventative concept is important because it identifies the potential food safety problem areas, adds corresponding critical control action steps, tracks corrective measures and rechecks for safety in a systemic approach. The intent is food safety from farm-to-table.

The Food Safety and Inspection Service (FSIS) of the USDA is responsible for ensuring the safety of meat, poultry, and egg products. A toll free meat and poultry hotline is available at 1-800-535-4555. The Food Drug Administration (FDA) regulates all other foods including seafood. Together, these agencies oversee the safety of our nation’s food supply. Each agency requires a Hazard Analysis and Critical Control Point (HACCP) system for targeted foods. In January 1998, the FSIS implemented HACCP for meat and poultry plants. The FDA is requiring HACCP for seafood and is exploring HACCP for fruit juices (Conley, 1997).

California State agencies with responsibility over food are the California Department of Alcoholic Beverage Control, the California Department of Health Services Food and Drug Branch (FDB), the California Department of Food and Agriculture (CDFA), and California Department of Fish and Game. The California Health and Safety Code can be found on the World Wide Web site (www.leginfo.ca.gov/calaw.html). The Los Angeles County Agricultural Commissioner, the Los Angles County Communicable
Disease Control, and the Los Angeles County Department of Health Services-Public Health Programs Environmental Health oversee safety and enforcement of the public health (County of Los Angeles-Department of Health Services, 1998).

Los Angeles County Environmental Health web pages list the following up-to-date information. This government agency is committed to preventing disease, promoting health, and disseminating information. Consumers, food industry staff, public and private agencies can access the following information on the web site:

1. New Requirements for Retail Food Establishments,
2. Food Establishment Rating List,
3. Weekly Food Facility Closure and Hotline,
4. Codes,
(County of Los Angeles–Environmental Health, 2000).

**Industry Growth**

As more and more of the consumers’ food dollars are being drained away from those spent on food prepared in the home; the food industry is gearing up to keep pace with the rising demand for commercially prepared food that meets both quality and safety standards. In 1997, “food” is reported to be the nation’s largest business. According to the Bureau of Labor Statistics, the food service industry is the fourth fastest growing industry in the country (Times 3/2/97). In 2000, the restaurant industry is showing its ninth consecutive year of increased sales. Industry sales are projected to be 376.2 billion in 2000, which is a 5% increase over the previous year (National Restaurant Association, 2000). The National Restaurant Association’s magazine, “Restaurants USA,” reports
continued growth through this decade. Figures quoted in the “Restaurant Industry 2010” report showed projected sales of $577 billion (Mills, 1999).

Many new businesses are emerging, particularly in the new industry cluster known as “home-meal replacement.” This new “product” is food and meals prepared outside of the home for consumption in the home. Grocery chains are increasingly moving into this area to capture the promising revenues from this niche market. In Rochester, New York, a grocery store named Wegmans is setting the benchmark against which other grocers will compete. At Wegmans shopping for food is an “adventure of many lands.” You feel as though you bought your bread in a Paris bakery, your rice in Spain, and your prepared lasagna in Italy (Visitation-Wegmans 1999). Across the continent, in California, Whole Foods Market is increasing its prepared food selections to keep pace with the demand for “home-style” meals without the preparation (Visitation-Whole Foods, 1999).

To illustrate this trend, figures from the National Restaurant Association show that “today’s consumers spend 44 percent of every food dollar on meals, snacks and beverages purchased away from home, up from just 25 percent in the 1950s. By 2010, the Association estimates that figure will reach 53 percent, as the proportion of the food dollar spent away from home continues its upward trend (Mills, 1999). The National Restaurant Association reports that one of the fastest growing segments of the industry is “social catering.” Corporate planners and busy households are hiring professional chefs to prepare food for their social events. Projected sales will reach 3.6 billion in 2000. This is a 5.7% gain over the previous year (National Restaurant Association, 2000).
Skills Training

In a report entitled, “Collaborating to Compete in the New Economy,” most industry clusters that were surveyed stressed that training was a top priority. The food industry is particularly vulnerable if they choose not to invest in training, since one mistake can be deadly for the consumer and the business as well. Also, employers are realizing the cost savings associated with training. Without such a commitment to training, events such as the two following incidents will continue. The first involved a sixteen-month-old child in Colorado who died as a result of contaminated unpasteurized apple juice and the second incident involved a three-year-old Chicago child who was hospitalized for twenty-four days from E.coli (O157:H7) contamination. According to the U. S. Food and Drug Administration E-coli (O157:H7) bacteria is responsible for at least 20,000 cases of severe food-borne illness in the United States each year (Lewis, 1999).

Even the smallest mistakes are costly, both from standpoints of liability and profitability. Jerry’s Deli, a chain of delicatessens, fell victim to the public’s outcry to the CBS news report of the unsanitary conditions in Los Angeles County restaurants. With the broadcast and media blitz of related articles targeting restaurants that did not make an “A” rating, Jerry’s Deli stock plummeted. Immediately, the restaurant chain implemented a staff training program, but only now after three years is the stock’s price recovering (Nelson, 2000).
**Education and Information Resources**

The importance of promoting the basic message of how to control food hazards and prevent illness cannot be minimized. Education and training programs are critical in informing the population about the deadly risks and the associated causes and prevention of food borne illness.

A wealth of resources exists that provide general information and specific classes regarding food safety. Government entities such as the United States Department of Agriculture and the Food and Drug Administration; private organizations such as the National Restaurant Association and the American Culinary Federation; and community colleges have web sites that list up-to-date information with links to other valuable training resources. Catherine Woteki (1998) USDA Under Secretary for Food Safety stated that the USDA conducts a variety of continuing food safety education programs and maintains a hotline to provide information to more than 120,000 callers each year. Many of these resources are no or low cost options for obtaining information and training solutions.

Of necessity, Food Safety has always been grounded in a systemic approach with national, state, and local agencies cooperating. The division comes when the food industry has used extensive lobbying activity at the governmental level to keep the food industry’s interests protected. Now, with the unprecedented access to information, the consumers’ interest in food safety has a greater potential to drive both government agencies and the industry to address the food safety issue. In the past, the food industry resisted mandated training. It is only recently that the food industry is realizing the
benefits gained through training and the documented affects of this preventative approach.

**HACCP**

HACCP is a seven-step proactive process control system used to identify, evaluate and control food safety hazards as established by the National Advisory Committee on Microbiological Criteria for Foods (NACMCF). In 1992, this committee composed a HACCP document that they revised in 1995. The current revision added definitions and included sections on prerequisite and education programs. It also explained the application of HACCP principles and provided a decision tree to identify critical control points (National Advisory Committee on Microbiological Criteria for Foods, 1997). The seven components of a HACCP plan described by the NACMCF are listed in the following table:
Table 1 - HACCP Principles

<table>
<thead>
<tr>
<th>HACCP Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principle 1</td>
</tr>
<tr>
<td>Conduct a hazard analysis – review food product ingredients, identify chemical, physical or biological hazard and evaluation.</td>
</tr>
<tr>
<td>Principle 2</td>
</tr>
<tr>
<td>Determine the critical control points (CCPs), which are the controls that are applied to prevent, eliminate or reduce hazards. Decision trees can be used to determine CCPs.</td>
</tr>
<tr>
<td>Principle 3</td>
</tr>
<tr>
<td>Establish critical limits that are maximum and/or minimum values for control of hazards.</td>
</tr>
<tr>
<td>Principle 4</td>
</tr>
<tr>
<td>Establish monitoring procedures that are a sequence of observations or measurements to determine if CCP is functioning.</td>
</tr>
<tr>
<td>Principle 5</td>
</tr>
<tr>
<td>Establish corrective actions so that plans are in place in the event that there is a deviation from established critical limits.</td>
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<tr>
<td>Principle 6</td>
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<tr>
<td>Establish verification procedures that determine the validity of the proper functioning of the HACCP system.</td>
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<tr>
<td>Principle 7</td>
</tr>
<tr>
<td>Establish record keeping and documentation procedures that include a summary of the hazard analysis, control measures, the HACCP plan, list of HACCP team, description of the food, its distribution, use and consumer, food flow diagrams.</td>
</tr>
</tbody>
</table>

(National Advisory Committee on Microbiological Criteria for Foods, 1997)

Table 2 - Decision Tree

<table>
<thead>
<tr>
<th>Decision Tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A decision tree is used to determine critical control points once a hazard analysis has been performed on the food.</td>
</tr>
<tr>
<td>Question 1</td>
</tr>
<tr>
<td>Does this step involve a hazard of sufficient likelihood of occurrence and severity to warrant its control?</td>
</tr>
<tr>
<td>Question 2</td>
</tr>
<tr>
<td>Does a control measure for the hazard exist at this step?</td>
</tr>
<tr>
<td>Question 3</td>
</tr>
<tr>
<td>Is control at this step necessary to prevent, eliminate, or reduce the risk of the hazard to consumers?</td>
</tr>
</tbody>
</table>

(National Advisory Committee on Microbiological Criteria for Foods, 1997)

Prerequisite Program

The prerequisite programs include the components listed in the following table taken from the National Advisory Committee on Microbiological Criteria for Foods report entitled, *Hazard Analysis and Critical Control Point Principles and Application*
Prerequisite programs provide the foundation for the HACCP system. In addition they show the environmental and operating conditions for preparing safe food. Prerequisite programs may impact the food safety, but differ from HACCP plans. HACCP involves direct involvement with “food” and ensuring that it is safe to consume.
Table 3 - Prerequisite Programs

<table>
<thead>
<tr>
<th>Prerequisite Programs</th>
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<tbody>
<tr>
<td><strong>Facilities</strong></td>
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<tr>
<td><strong>Supplier Control</strong></td>
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<tr>
<td><strong>Specifications</strong></td>
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<tr>
<td><strong>Production Equipment</strong></td>
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<tr>
<td><strong>Cleaning and Sanitation</strong></td>
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<td><strong>Personal Hygiene</strong></td>
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<td><strong>Training</strong></td>
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<tr>
<td><strong>Chemical Control</strong></td>
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<tr>
<td><strong>Receiving, Storage and shipping</strong></td>
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<tr>
<td><strong>Traceability and Recall</strong></td>
</tr>
<tr>
<td><strong>Pest Control.</strong></td>
</tr>
<tr>
<td><strong>Standard Operating Procedures</strong></td>
</tr>
</tbody>
</table>

(National Advisory Committee on Microbiological Criteria for Foods, 1997)
Awareness

This section of the literature review is devoted to a discussion to clarify the term “awareness” and how it is measured in this study. To begin the discussion awareness is often equated to consciousness. “We have some control over the contents of our consciousness. We can focus our awareness; we can pay attention to certain stimuli” (Zimbardo and Leippe, 1991). Students often choose to direct their attention to specific information, particularly when they are listening to a lecture for the purpose of passing a test. In the food handlers’ situation, the test is a certifying instrument and in this case attention to the material is heightened. Motivation can be high for the test-takers to go beyond awareness to understanding when their jobs depend on passing the test. Studies in 1953 by Hovland, Janis, and Kelley and a study in 1968 by McGuire described a five-step process that delineated the sequence for change in attitude to occur. The steps are the following:

1) Attention (noticing),
2) Comprehension (understanding),
3) Yielding (acceptance),
4) Retention (remember),
5) Action (implement).

This study equates the first step, “attention,” with the definition of “awareness.” The trainees in this study paid “attention” to the information because it meant continued employment and financial stability.

Another way to look at the definition is through the eyes of an instructional designer that differentiates between the concept level and the application level. The
concept level can be described as recall of facts presented by the trainer without using analysis. The second level is the application level, which an instructional designer incorporates into the majority of lesson designs. At this level information is presented, practiced and analyzed. The instructional designer would define “awareness” at the recall or first level (Wallington, 2000).

HACCP is a recently developed system; therefore, the researcher did not find awareness surveys on this topic. Awareness surveys have been used in other industries to address safety issues. One such survey was the Mining Safety Awareness Survey conducted by the Mines Inspection Branch. In 1991-92 this survey was given to forty-four non-coal mining operations in New South Wales Australia. The survey was designed to obtain data on the attitudes, level of commitment and awareness of mine personnel towards safety issues from over 2000 survey participants. This study found that respondents were not satisfied with the amount of safety training. (New South Wales, Department of Mineral Resources, Mine Inspection Branch (1992). Another study entitled, “Is Education the Missing Link in Ergonomics,” was conducted to ascertain keyboard operators’ awareness of the adjustments on ergonomic furniture. A questionnaire assessed three groups of participants prior to training and after. The results of the study showed that awareness of ergonomic controls needed to be increased (Ireland, 1990).

The Hazard Analysis Critical Control Point topic was selected for this study because of the tremendous “growth” pressures that are affecting the food industry and the need for increased awareness of food safety issues by employees. The combination of rapid growth in the food service industry without adequate training and subsequent
implementation are situations that create an environment for increased food borne illness.

The following chapter will describe an overview of the study including the purpose, methodology, target population, and questionnaire items.
Chapter 3
Methodology and Procedures

Purpose

The purpose of this study is to identify the awareness of HACCP exhibited by food handlers who received their training at Los Angeles Mission College. The findings may provide preliminary data, which the college administration will analyze to determine the need to increase HACCP training.

Methodology/Procedures

This study examines awareness of Hazard Analysis Critical Control Point (HACCP) system by foodservice/food processing personnel who responded to a six-item questionnaire. The questionnaires were distributed to trainees at the completion of an eight-hour Los Angeles Mission College food handler class that was conducted between July 1, 1999 and March 1, 2000. This method of distribution was decided upon so that the responses would be indicative of the attitudes of the majority of the population surveyed. This decision was based on the fact that if the participants received their questionnaire in the mail it could skew the results, since a limited number of participants would return the survey with only the most focused individuals replying. This methodology of surveying the entire class and asking them to return the questionnaire before leaving, gave an opportunity to increase the response rate for a more accurate picture of HACCP awareness. It also minimized the potential effect of time lapse on trainees’ recall of the concepts. The following timeline is a guide for the activities of the study.
Table 4 - Timeline

<table>
<thead>
<tr>
<th>Action Items</th>
<th>Projected Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulation of questionnaire/cover letter</td>
<td>August 1999</td>
</tr>
<tr>
<td>Review questionnaire-culinary educators</td>
<td>August 1999</td>
</tr>
<tr>
<td>Printing</td>
<td>September 1999</td>
</tr>
<tr>
<td>Distribute questionnaire</td>
<td>October 1999</td>
</tr>
<tr>
<td>Collect and record data</td>
<td>December 1999</td>
</tr>
<tr>
<td>Analyze data</td>
<td>January 2000</td>
</tr>
<tr>
<td>Document findings</td>
<td>March 2000</td>
</tr>
</tbody>
</table>

HACCP compliance is currently required of food processors of seafood, poultry, egg, and meat. At the present time, it is not required of other food processors or the retail food service industry.

Overview of Target Population

The questionnaires for this proposal were disseminated to one hundred-eighty individuals after they completed an eight-hour food handlers’ class. The researcher does not personally know the participants. The following charts give a broad overview of the intense interest in this class, not only by the English speaking population, but by others as well.

The following demographics indicate the number of individuals that enrolled in the food handlers’ eight-hour class at Los Angeles Mission College during the 1999-2000 academic year. In a report by Bernice Griska, Director of the Food Manufacturer’s Industry Driven Economic Development Grant for Food Manufacturers, the following
statistics show the number of classes taught by language designation and the number of students enrolled in classes offered through Los Angeles Mission College.

1st Quarter

July 1, 1999 – September 30, 1999

Three hundred sixteen clients (316) from over twenty (20) different companies enrolled. Table 5 is a description of the classes by language designation.

Table 5 - 1st Quarter Enrollment – Food Handler Class

<table>
<thead>
<tr>
<th>Language</th>
<th>Number of Classes Conducted</th>
<th>Total Number of Individuals Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korean</td>
<td>6 classes</td>
<td>65 individuals</td>
</tr>
<tr>
<td>Spanish</td>
<td>5 classes</td>
<td>84 individuals</td>
</tr>
<tr>
<td>English</td>
<td>14 classes</td>
<td>167 individuals</td>
</tr>
</tbody>
</table>

2nd Quarter

October 1, 1999 – December 31, 1999

Two hundred eighty-nine clients from over two hundred (200) different companies enrolled. Table 6 is a description of the classes by language designation.

Table 6 - 2nd Quarter Enrollment – Food Handler Class

<table>
<thead>
<tr>
<th>Language</th>
<th>Number of Classes Conducted</th>
<th>Total Number of Individuals Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korean</td>
<td>2 classes</td>
<td>27 individuals</td>
</tr>
<tr>
<td>Spanish</td>
<td>4 classes</td>
<td>52 individuals</td>
</tr>
<tr>
<td>English</td>
<td>12 classes</td>
<td>197 individuals</td>
</tr>
<tr>
<td>Chinese</td>
<td>1 class</td>
<td>13 individuals</td>
</tr>
</tbody>
</table>

3rd Quarter

January 1, 2000 to March 31, 2000

Two hundred forty-seven clients from two hundred (200) companies enrolled. Table 7 is a description of the classes by language designation.
### Table 7 - 3rd Quarter Enrollment – Food Handler Class

<table>
<thead>
<tr>
<th>Language</th>
<th>Number of Classes Conducted</th>
<th>Total Number of Individuals Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korean</td>
<td>3 classes</td>
<td>23 individuals</td>
</tr>
<tr>
<td>Spanish</td>
<td>9 classes</td>
<td>97 individuals</td>
</tr>
<tr>
<td>English</td>
<td>11 classes</td>
<td>127 individuals</td>
</tr>
</tbody>
</table>

**Questionnaire:** The questionnaire included the following questions:

1. Did you increase your knowledge of sanitary practices as a result of your Food Handler training?
2. Did your instructor discuss HACCP in your sanitation class?
3. The primary purpose of HACCP is to practice sanitation principles?
4. A log of daily cleaning of restrooms is a mandatory element of HACCP?
5. Hand washing is a critical control point?
6. Would you recommend the Los Angeles Mission College sanitation class?

**Survey Questions to Determine Awareness**

The direct application to this study would be that “awareness” occurs if the trainee can recall from memory the instructor’s discussion on question three, four and five on the survey. The questions on the survey were formulated to assess if the students had an awareness of HACCP not the prerequisite programs. Awareness in this study refers to the ability to correctly answer “no” to questions three, four and five. These questions were formulated to refer to prerequisite concepts rather than HACCP concepts. HACCP refers to the controls pertaining to the hazard analysis of food. The following questions are prerequisite components; therefore a “yes” answer would indicate there was NOT an awareness of HACCP:

**Question three:** “The primary purpose of HACCP is to practice sanitation principles?”
Question four: “A log of daily cleaning of restroom is a mandatory element of HACCP?”

Question five: “Hand washing is a critical control point?”

Study

Who:

Approximately one hundred eighty individuals who have completed the eight-hour “food handler” training at Los Angeles Mission College were included in the study. This is a small sample when compared to the numbers of food handlers in the City of Los Angeles. The majority of participants of this study include entry-level employees, but managers are included as well.

What:

A six-item questionnaire was developed so that respondents had only two choices of response either “Yes” or “No”. The researcher expected a return rate of greater than 75%, since the questionnaire was distributed at the conclusion of the food handler class; but the actual return rate was 69%.

How Measured:

Descriptive statistics are used to summarize participant awareness. Since the goal of this study is to establish a baseline measure of awareness, no further analysis is necessary.
Chapter Four

Analysis of Data

One hundred and eighty surveys were distributed and one hundred twenty-five were collected. This is a return rate of sixty-nine percent (69%). The high return rate can be attributed to the fact that the survey’s were distributed at the end of the class along with the class evaluation and collected the same day.

Results - Statistical

The results are as follows for all questions, but only question three, four and five pertain to the evaluation of HACCP awareness.

Table 8 - Questionnaire – Awareness of HACCP by Food Handler Trainees

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Did you increase your knowledge of sanitary practices as a result of your Food Handler training?</td>
<td>100%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Did your instructor discuss HACCP in your sanitation class?</td>
<td>99%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The primary purpose of HACCP is to practice sanitation principles?</td>
<td>76%</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>A log of daily cleaning of restrooms is a mandatory element of HACCP?</td>
<td>70%</td>
<td>28%</td>
<td>2%</td>
</tr>
<tr>
<td>5</td>
<td>Hand washing is a critical control point?</td>
<td>77%</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Would you recommend the Los Angeles Mission College sanitation class?</td>
<td>98%</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>

Results – Narrative

Question 1

Did you increase your knowledge of sanitary practices as a result of your Food Handler training?

One hundred percent (100%) of the respondents felt that they had increased their knowledge of sanitary practices as a result of their sanitation
training in the eight-hour food handler class. It is rewarding to determine that 100% of the students felt that they learned new information, particularly since this class is a mix of those new to the industry and those with food handling and sanitation experience. Also, it is interesting to learn that the curriculum was broad enough in scope that it meets the needs of both new employees and experienced food handlers.

**Question 2**

**Did your instructor discuss HACCP in your sanitation class?**

Ninety-nine percent (99%) of the respondents indicated that their instructor did discuss HACCP principles. In the Los Angeles Mission College eight-hour food handler course, HACCP is introduced as a concept through a video (approximately 20 minutes) followed by a fifteen-minute discussion period. With less than a half-hour spent on HACCP, it is understandable that students have limited awareness of HACCP. The food handler course broadly discusses sanitation practices in which HACCP is merely introduced.

**Question 3**

**The primary purpose of HACCP is to practice sanitation principles.**

Only twenty-four percent (24%) of the respondents realized that the primary purpose of HACCP is **NOT** to practice sanitation principles. HACCP is a seven-step process control system used to identify, evaluate and control food safety hazards. Sanitation principles are considered components of the prerequisite program, which precedes HACCP. The prerequisite program focuses
on standard operating procedures together with personal hygiene, equipment, training, pest control, receiving, storing and shipping issues.

**Question 4**

**A log of daily cleaning of restrooms is a mandatory element of HACCP.**

Seventy percent (70%) of those that responded indicted that daily cleaning of restrooms was a mandatory element of HACCP; but this is more accurately defined as a Standard Sanitation Operating Procedure (SSOP) in retail food service or Good Manufacturing Practice (GMP) in food processing plants. Cleaning restrooms should be a mandatory element of the standard sanitation operating procedures of any establishment. Since the primary purpose of HACCP is to prevent, reduce, or eliminate hazards in food products through appropriate **controls during production and processing**, “daily cleaning of restrooms” would not be a mandatory component of HACCP. Rather, “daily cleaning of restrooms” is a sanitation practice that falls under the prerequisite program as defined by the National Advisory Council of the Microbiological Criteria of Food (NACMCF). This national group, consisting of members from the USDA, FDA, education institutions and the food industry, delineated a HACCP definition distinct from their prerequisite definition. HACCP refers to the flow of food, its production and processing. The prerequisite program consists of issues such as training, maintenance, pest control, cleaning and management. **Standard sanitation operating procedures would fall under the prerequisite program.** Dr. Peter Snyder of the Hospitality Institute of Technology and Management knows the importance of the integration of these two systems and defines the
combination of HACCP and the prerequisite program as the “Total Quality Management System” (Snyder, 2000). Under the definition of the National Advisory Council of the Microbiological Criteria of Food, a restroom cleaning log would not be a mandatory element of HACCP.

**Question 5**

**Hand washing is a critical control point.**

Seventy-seven percent (77%) responded that hand washing was a critical control point. Hand washing is a personal hygiene issue listed under the prerequisite program; therefore, it is considered only the foundation to the HACCP system. HACCP is a science-based system that focuses on the prevention, reduction or elimination of hazards in food products through appropriate controls during production and processing. Key components of the system include:

- Identifying potential problems that could cause food to be unsafe to eat,
- Establishing and monitoring targeted control points to minimize such problems,
- Taking corrective action and verifying that the system is working,
- Documenting the results (Lewis, 1999).

**Question 6**

**Would you recommend the Los Angeles Mission College sanitation class?**

Ninety-eight percent (98%) of those that responded indicated that they would recommend the training that they received from Los Angeles Mission College. This response shows that the participants valued the sanitation training
they received. The response to question six, although not included in the
evaluation of HACCP awareness, is an indication of satisfaction with the quality
of the sanitation training programs offered through the college.

Although the respondents (99%) indicated that HACCP was discussed in
class, their responses on the questionnaire did not indicate an awareness of these
principles. The National Advisory Committee on Microbiological Criteria for
Foods makes a distinction between the prerequisite programs and the HACCP
system. Of the six questions on the survey instrument, three were used to
determine awareness of HACCP principles. The respondents were not able to
recall that “sanitation”, “log of restroom cleaning”, and “hand washing” were
elements of the prerequisite program. In Chapter Five the conclusions of the
study are discussed, along with implications and recommendations.
Chapter Five

Discussion and Recommendations

Conclusions

As a result of this questionnaire, it was found that although ninety-nine percent (99%) of the respondents indicated that their instructor discussed HACCP, only a small percentage of the participants answered the HACCP questions correctly. This fact indicates that the respondents may have heard the term “HACCP,” but did not have an awareness of the concepts. Upon analysis of the course content, it was determined that less than a one-half hour is spent discussing HACCP principles in the food handlers’ course. Responses showed that only twenty-four percent (24%) accurately indicated that sanitation is not the primary purpose of HACCP. Thirty-one percent (31%) indicated that daily cleaning of restrooms was a mandatory element of HACCP when it is a standard sanitation operating procedure. Finally, only twenty-three percent (23%) responded that hand washing was not a critical control point.

From these responses, the researcher’s analysis is that awareness of HACCP principles cannot occur in a thirty-minute discussion of the topic in the eight-hour food handlers’ class. It can be inferred that although ninety-nine percent (99%) of student responses indicated that their instructor had discussed HACCP principles, most did not have an awareness. Among the list of potential reasons for the lack of HACCP awareness are the following: 1) HACCP concepts were not adequately covered, 2) information was poorly presented, 3) learning styles of trainees were not addressed, 4) instructors did not have a thorough understanding of HACCP principles, 5) questions on the survey were confusing, or 6) absence of common definition of terms.
Further study is necessary because of several factors: 1) the most reliable results are obtained from questionnaire designed by experienced professionals, 2) the survey instrument must be carefully aligned with the course content, and 3) the target audience’s abilities must be taken into account. Since the study revealed there was not “awareness” of the information, several questions should be asked and addressed in further studies. First, was the training material complete and relevant information presented? Second, was the training structured to fit a “recall” questionnaire or structured for practical application and understanding of content? Third, are the training methods appropriate for the content and the learners’ abilities?

An inference made from this study is that wording of subsequent questionnaires must be carefully constructed by a team of experienced researchers in order to avoid ambiguity. Questions should be selected from the HACCP content so that there is no controversy over the terminology.

Finally, train-the-trainer programs must be comprehensive, since inexperienced trainers with insufficient understanding of the differences between the prerequisite program and the HACCP system may misguide their students. The researcher recommends that a gap-analysis be conducted to assess instructors’ current understanding of HACCP principles compared to prerequisite programs defined by the National Advisory Committee on Microbiological Criteria for Foods.

Using the findings from this study, coupled with the information gleaned in the literature review and discussions with industry leaders, a case for Hazard Analysis Critical Control Point training could be made. David Garonkin, executive vice president
of operations for Buffets, Inc. stated that food-safety training is “part of being in the restaurant business” (Featsent, 1998).

**Trends**

**Expansion of Mandated HACCP Training**

At the federal level, the Food and Drug Administration believes that mandatory HACCP programs are critical for food safety. The HACCP regulation for the juice industry includes: 1) food safety control programs for the juice industry, 2) new labeling, and 3) consumer education programs (Federal Registry, 1997). The educational campaign is targeted to both the consumer and the food processor. An example of educating the consumer occurred on July 4, 1998. The President, in his weekly radio address, announced a new regulation requiring warning labels to alert consumers about the risks associated with unpasteurized juices. The label will need to contain the following message:

“Warning: This product has not been pasteurized, therefore, may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems” (Clinton, 1998).

In June 1998 in a speech delivered at Michigan State University, Catherine Woteki, the USDA Under Secretary for Food Safety, announced the multifaceted “farm to table” computer model program that identifies the interventions that provide the best returns in protecting the public health. The concept is a strategy that is broad based rather than focusing on one area of the production consumption chain (Woteki, 1998).
Adaptation of Grading System

At the local level, elected officials are encouraging the adaptation of legislation that requires eating establishments to post letter grades ranging from A to F in a prominent place so that it is clearly visible to the public. In Los Angeles County this grade is based on the score the establishment received on the County’s, “Official Food Inspection Report” (Los Angeles County, 1999). The letter grades have been so popular with consumers in Los Angeles that in February 1998, Los Angeles County Supervisor, Mike Antonovich, urged the State of California to make this practice mandatory (Currier, 1998).

Access to Information

Another step taken to disseminate information by the County of Los Angeles is posting the weekly closures on the County’s web site under, “Food Facility Closure List.” The information contained on this site includes an alphabetical list by the restaurant name, the date closed, the date reopened and the reason for the closure. Another vehicle of dissemination is the establishment of a Food Program Hotline Number 1-888-700-9995. By calling the Environmental Health telephone number, consumers can log a complaint or ask a question, and within twenty-four hours the consumer is promised a response. Consumers can search for the letter grade of their favorite restaurant and find supporting details for the grade. Other web sites that offer HACCP assistance are listed in Table 9.
### Table 9 - HACCP Information

<table>
<thead>
<tr>
<th>Agency</th>
<th>Web Site Address</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and Drug Administration Food Information Lines (800) 332-4010</td>
<td><a href="http://www.fda.gov/">http://www.fda.gov/</a></td>
<td></td>
</tr>
<tr>
<td>FoodNet</td>
<td><a href="http://www.cdc.gov/ncidod/dbmd/foodnet">www.cdc.gov/ncidod/dbmd/foodnet</a></td>
<td></td>
</tr>
<tr>
<td>Food Safety and HACCP sites</td>
<td><a href="http://www.oznet.ksu.edu/pr_haccp/related.htm">http://www.oznet.ksu.edu/pr_haccp/related.htm</a></td>
<td>Search HACCP implementation section</td>
</tr>
<tr>
<td>FSIS Fast Fax System toll free at 800 238-8281 /in Washington D.C. at 202 690-3754</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Meat &amp; Poultry HACCP Alliance at Texas A&amp;M University</td>
<td><a href="http://ifse.tamu.edu/alliance/foodsafety.html">http://ifse.tamu.edu/alliance/foodsafety.html</a></td>
<td></td>
</tr>
<tr>
<td>Los Angeles Mission College</td>
<td><a href="http://www.lamission.cc.ca.us">www.lamission.cc.ca.us</a></td>
<td></td>
</tr>
<tr>
<td>National Cattlemen’s Beef Association</td>
<td><a href="http://www.cowtown.org">www.cowtown.org</a></td>
<td></td>
</tr>
<tr>
<td>National Food Safety Initiative</td>
<td><a href="http://vm.cfsan.fda.gov/~dms/fs-toe.html">http://vm.cfsan.fda.gov/~dms/fs-toe.html</a></td>
<td></td>
</tr>
<tr>
<td>Online Certification Courses Sanitation, Nutrition, Supervision Culinary Educator</td>
<td><a href="http://www.lamission.cc.ca.us/online">http://www.lamission.cc.ca.us/online</a></td>
<td></td>
</tr>
<tr>
<td>USDA free HACCP training and consultation for food manufacturers. Contact Frank Gillis, Food Technologist 620 Central Avenue Bldg. 2-C, Alameda, CA 94501. Phone 510 337-5000.</td>
<td>Meat and Poultry Hotline 800 535- 4555</td>
<td></td>
</tr>
</tbody>
</table>
Implication

The lack of awareness of HACCP principles by food handler trainees suggests that further investigation into the level of HACCP knowledge is needed. Additional studies will call attention to the lack of total commitment by the food industry to HACCP training and its implementation particularly in the foodservice sector where HACCP is not mandated. These studies could raise questions that have the potential to attract media coverage, as was the case in Los Angeles with the investigative report, “Dirty Restaurants.” Initially, business and industry did not embrace the training and government mandates. Many viewed the mandates as “Big Government” interference. But the media attention prompted the County government to mandate training.

Once mandated and over a period of time, companies often see the benefits of HACCP and related training. These benefits translate into profits from reduced food spoilage, increased yields and an expanded customer base. In addition to cost savings, the HACCP system creates an opportunity for increased international sales because the “quality” foundation is in place for international acceptance. Food manufacturers are finding that the strict FDA standards help to align their business practices with the international ISO standard of quality. The policies and procedures that comprise the HACCP training plan lay the foundation that allows a company to expand nationally and internationally as well. Integration of ISO 9000 with HACCP programs is already occurring in the seafood processing industry. “A computerized quality assurance program was developed using Microsoft Access which would allow comparison between ISO and HACCP principles. The program integrates ISO 9001 elements with hazard
analysis critical control point concepts to increase marketability of seafood products” (Yacout, Soumaya; Bourbonnais, Patrick; Boudreau, Jacqueline, 1998).

The consumer, as well as foodservice personnel, has an opportunity to increase their knowledge through food safety certification training programs offered by many organizations and private companies. Food Service 2000 (FS2000) is a food safety education program sponsored by the International Food Service Executives Association (IFSEA), Experior (formerly the National Assessment Institute) and NSF International (Food and Beverage, 1999). The program offers four-hours of training and related testing. For those who successfully pass the examination, an NSF International HACCP certificate is awarded. Experior and NSF International have developed CD-ROM training programs that compliment the Food Service 2000 that The National Restaurant Association’s Education Foundation offers. This is “A Practical Approach to HACCP” curriculum that includes a coursebook and three-part video series culminating in a certificate for successful completion of a test. Also, the Premier Foodservice Distributors of America, Inc. have an interactive CD ROM multimedia self-paced training series.

Accreditation

Dr. Peter Snyder at the Food Institute of Technology and Management in Minnesota and the American Institute of Baking International/ Guelph Food Technology Centre in Canada offer HACCP accreditation. The International Food Safety Council conducted surveys to ascertain the growing importance of food safety information. Fifty-two percent (52%) of the consumers that were surveyed in one study indicated that food safety has increasing importance. This interest is linked to growing awareness and
promotion of food safety issues on the media. Seventy-nine percent (79%) of those surveyed reported seeing media coverage on this topic. In another study it was found that eighty-seven percent (87%) of those surveyed trusted information from televised investigative reports (Walsh, 1998). News broadcasts and print coverage increase awareness of risks associated with improper food handling, and a correlation can be seen in increased demand for food safety training.

**Recommendation - Mandated Training**

Progressive companies understand the return on investment for employee training. They understand that the training costs and the employee costs incurred from the time spent in workshops rather than on the job are offset by sustaining a competitive advantage. Companies learn that preventative food safety measures have an effect on their profits by reducing costs associated with liability claims and by increasing the company’s operational efficiencies through reduction of food spoilage (Anonymous, 1999). Training does increase food safety and reduce the liability risk for a company that incorporates food safety training into its business practices.

Each year it is estimated that 76 million individuals experience foodborne illness in the United States. The Center for Disease Control’s surveillance network entitled Food Net, was developed to collect data on nine foodborne diseases in selected U.S. sites and to monitor foodborne illness reports. The 1999 data suggest a decrease in foodborne illness when compared to the 1996-1998 data. “Decreases in the incidence of foodborne illnesses occurred concurrently with disease prevention efforts, including implementation of changes in meat and poultry processing plants, new requirements for food service establishments, and increased attention to good agricultural practices for produce and
eggs on farms (Anonymous 2000). According to AIB International there is no downside to implementing HACCP training, but rather many benefits.

**Recommendation – Early Training Interventions**

It is important to provide training about food safety not only to the food industry, but also to children in preschool and elementary school. The U.S. Department of agriculture and the Chef and Child Foundation of the American Culinary Federation have developed programs to educate the parents and youth. It is recommended that these programs be recognized and expanded. Children are eager learners and will become the foundation of a nation of food safety conscious individuals (Thibodeau and Conley).

In conclusion, training is a critical element in HACCP awareness. Early training interventions have the potential to have a profound effect on food safety. The cycle of HACCP training, application of knowledge, and decrease in food borne illness is an important concept for the food industry to embrace. As a result of this study, the research will make the following recommendations to the administration of the Los Angeles Mission College Food Handlers’ program:

- Continued professional development of HACCP trainers,
- Advocacy of legislation that mandates HACCP training,
- Obtain grant funding to expand HACCP training.
References


Conley, S. (1997). Speech: *Consumer Education: Completing the Farm-to-Table Chain.* Food Safety & Inspection Service USDA.


Federal Registry. (1997, August). Fruit and Vegetable Juice Beverages: Notice of Intent to Develop a HACCP Program Interim Warning Statement, and Educational Program.


Golan, E; Ralston, K; Frenzen, K; Vogel, S. (1998). The Costs, Benefits and Distributional Consequences of Improvement in Food Safety: The Case of HACCP. [Online] Available: http://www.umass.edu/nel65/haccpl998/golan.html (e-mail:egolan@econ.ag.gov)


Snyder, Peter, Dr. (2000, July 22). Interview 1:30 PM Pacific Daylight Savings Time


