FOOD SAFETY MANAGEMENT AND ASSOCIATED FOOD HANDLER BEHAVIOURS IN A PROMINENT SOUTH AFRICAN ENTERTAINMENT FACILITY

by

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DECLARATION

The author hereby declares that the work contained in this thesis is her own original work and that she has not previously, in its entirety or in part, submitted it at any other university for a degree.

1 December 2011

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SUMMARY

Millions of people in South Africa eat out every day, utilising the food service sector. Although the lack of an effective reporting system makes it difficult to know how many of these people suffer from food-borne illness, statistics from the developed countries show that this number may be significant. There is, therefore, the need to ensure that the food service sector, which encompasses fast food outlets, hotels and similar accommodation outlets offering food and beverage services, restaurants, caterers, etc., implement effective food safety management systems. Internationally, the trend has been that food safety management systems should be based on the internationally accepted Hazard Analysis Critical Control Point (HACCP) principles. In South Africa, the implementation of HACCP as a food safety management system has been driven by international trade requirements where foods are exported to countries such as the European Union or the United States of America. A national regulation requiring HACCP implementation was promulgated in 2003, but compliance is not yet required for the food service sector. Currently, neither of the above mentioned factors put adequate pressure on the food service sector to implement formal food safety management systems. However, increasing international tourism and the hosting of international sporting events has brought this sector under scrutiny.

Food handlers have been implicated in many outbreaks of food-borne illness and much research has been done to investigate causal factors in this regard. Food handler training has been proposed as a strategy to improve food safety practices. However, research has shown that the traditional provision of food safety and food hygiene knowledge does not equate to improved food safety behaviours. Some authors postulate that the organisational context, created largely by the management of an organisation, is of greater significance than training. Less research is available on these management factors – defined as the situational factors when discussing organisational culture, or defined as enabling and reinforcing factors when discussing food handler behaviour.

This study commenced with the hypothesis that food handlers are not able to implement the correct food safety behaviours in the absence of sufficient management support. This support would require appropriate policies regarding food safety, the provision of training and infrastructure and enforcing the correct behaviours by line management, as a minimum.

The aim of this study was to investigate and assess the role of line management in relation to food safety at a prominent South African entertainment facility. In order to achieve this, the following objectives were defined for the study: to conduct a qualitative assessment of the role of management in food safety, to assess the role of management in the provision of food safety training and to assess the role of management in the provision of a basic hygiene infrastructure at the study site in order to allow food handlers to carry out the correct behaviours.

The objective of conducting a qualitative study of management practices, policies and resource provision with respect to food safety revealed that there was no formal evidence of management commitment to food safety other than the recent provision of food handler training. The findings also indicated a lack of a formal management system for food safety at the study site. In the exploratory survey of food safety training and knowledge, results showed that only 60 % of staff in the survey had received training. This indicates that at the time of the survey, the study site did not fully comply with the minimum legal requirements for food handler training. The results of the employee survey further indicated that employees were aware of the importance of hand washing although it was not possible to determine whether this knowledge was as a result of the training intervention or prior knowledge. Many of the supervisors were not yet trained in food safety and the impact of the food safety training intervention on related behaviours at the site will require further in-depth assessment.

Upon investigating the food hygiene infrastructure provided at the study site to allow food handlers to carry out the correct behaviours, findings indicated that although the personnel hygiene programme addressed most of best practice requirements in

design, the implementation of the hand washing requirements was not aligned with accepted norms due to the lack of sufficient hand wash basins. The provision of facilities such as sufficient and conveniently located hand wash basins is a management function and findings suggest that, as a priority, management should ensure that they are not contributing to the lack of implementation of the correct food safety behaviours of food handlers as a result of failing to provide the necessary resources.

The results of this study should be of value in the food service sector, specifically hotel kitchens, as a guideline to ensure that management plays an effective role in facilitating food safety management systems. A robust food safety and food hygiene training programme for all levels of the organisation is essential in ensuring adequate knowledge of food safety hazards and correct practices. Training should be supported by daily supervision of food safety controls, management commitment and a work environment that supports the implementation of the correct behaviours.

Literature has shown that undesirable practices are often deeply rooted in kitchen culture. It has further been commented that culture changes require a top-down approach which usually involves working with the leadership of the organisation. Important policies and procedures generally originate from the management tiers and will always require the concurrence of management in providing resources, altering priorities or otherwise changing how things are done in the organisation. The results of this study are invaluable in highlighting areas in an organisation that could be targeted to change the kitchen culture. Such changes are primarily the responsibility of management. Ultimately, this study endeavours to contribute to the body of knowledge pointing to the role of social-behavioural aspects in ensuring food safety and thereby consumer well-being.

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LIST OF ACRONYMS

CAC/RCP 39-1993	Code of hygienic practice for pre-cooked and cooked foods in mass catering, Codex Alimentarius Commission
CFA	Chilled Foods Association
CIEH	Chartered Institute of Environmental Health
Codex	Codex Alimentarius Commission
EHP	Environmental Health Practitioner
FAO	Food and Agricultural Organisation
FDA	Food and Drug Administration
FHTP	Food Hygiene Training Programme
FSA	Food Standards Agency
FSAANZ	The Food Standards Authority – Australia New Zealand
FSMS	Food Safety Management System
GHP	Good Hygiene Practices
HACCP	Hazard and Critical Control Point
ISO	International Organisation for Standardisation
KAP	Knowledge, attitudes and perceptions
KPAs	Key performance areas
KSOM	Kitchen Standard Operating Procedures Manual
OHSAS	International Guidelines on Occupational Health & Safety Systems
PRP	Pre-requisites Programmes
RTE	Ready-to-Eat Food
SABS 049:2001	South African National Standard Code of Practice – Food Hygiene
SABS	South African Bureau of Standards
SANS 10330:2007	South African National Standard, Requirements for a Hazard Analysis and Critical Control Point (HACCP) system
SANS ISO 22000:2005	South African National Standard, Food safety management systems – requirements for any organisation in the food chain

SAQA	South African Qualifications Authority
SMEs	Small/Medium Enterprises
TQM	Total Quality Management
TRA	Theory of Reason & Action
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

Chapter 1

Literature review

1.1 Food-borne illness – an ongoing problem

Food-borne illness remains a significant public health concern in the developed world, including the United Kingdom (UK) and the United States of America (USA) based on the predominance of reported outbreaks. It is estimated that at least 76 million people fall ill to a food-borne illness every year in the USA, 325 000 may be hospitalised and 5000 may die (Mead *et al.*, 1999). The Food Standards Agency (FSA) in the UK estimates that there are 850 000 cases of food-borne illness in the UK each year (Sprenger, 2008). In South Africa there are limited formalised statistics available, due to the lack of a reporting system.

1.2 The role of the food handler in food safety

Griffith (2000) reported that, at the time, up to 70 % of food-borne illness outbreaks in the UK were associated with food service functions such as restaurants, hotels, institutions and caterers. A common denominator in these sectors of the food chain (often collectively referred to as the food service sector), is the reliance on many manual processes resulting in large numbers of food handlers. In attempting to determine the reasons for these outbreaks, researchers have focused on the role of the food handler and findings would suggest that the food handler does indeed play a significant role. In one such study, poor personal hygiene has been identified as a contributing factor in some outbreaks as identified by the Center for Disease Control (Mead *et al.*, 1999). In two US Food and Drug Administration studies, inadequate hand washing practices by food handlers were found in all types of retail food services (Strohbehn *et al.*, 2008). Inadequate hand washing was also cited as a contributory factor in 31 % of outbreaks occurring in Washington State from 1990 to 1999 (Todd *et al.*, 2009). Food handlers have been observed to wash and dry their hands and then wipe their clean hands on their dirty pants. Contamination can also be transferred to and from food handlers through raw food, hands (including dirty fingernails, rings, and other jewellery), clothing, aerosols, fomites,[1] food waste, food packaging and other environmental sources.

[1] A fomite is any inanimate object or substance capable of carrying infectious organisms (such as germs or parasites) and hence transferring them from one individual to another. A fomite can be anything (such as a cloth or mop head), skin cells, hair, etc.

Pathogens can survive for extended periods of time on many surfaces, including skin, and food handlers may therefore transmit pathogens passively from a contaminated source, for example raw poultry, to a food such as cold cooked meat that is eaten without further processing (Todd *et al*., 2009). They may also themselves be sources of organisms, either during the course of gastrointestinal illness or during and after convalescence, when they no longer show symptoms (Bas *et al*., 2006). Shojaei *et al*. (2006) cited several studies confirming that poor personal hygiene by food handlers has caused outbreaks of food-borne illness caused by various pathogens, including *Staphylococcus aureus*, gram-negative bacilli *Salmonella* spp., *Shigella* spp., *Campylobacter jejuni*; enterotoxigenic *Escherichia coli* as well as viral agents, Hepatitis A and Norovirus. In a survey of the hands of Iranian food handlers, the most common potentially pathogenic bacteria isolated were *Bacillus* spp., *E. coli*, *Enterobacter* spp., *Klebsiella* spp., and *S. aureus* (Shojaei *et al*., 2006).

Based on the results of these studies, it was hypothesised that improving food handlers' food safety practices would result in a direct improvement in food safety. A lack of food handler training has also been proposed to be a factor in the dramatic increase in the incidence of food-borne illness (Motarjemi and Käferstein, 1998). In the UK, the Audit Commission (1990) found a strong link between those premises with poor food safety practices and low levels of training. Food handler training is regarded as an important strategy whereby food safety can be increased and this approach for food safety has been incorporated into legal requirements in many countries, including South Africa.

A current mandatory requirement in the food service sector, which addresses the training of food handlers, is "Regulations governing General Hygiene requirements for Food Premises and the transport of food", Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977)". In regulation 10(b) this states that: "A person in charge of food premises shall ensure that any person working on the food premises is adequately trained in food hygiene by an inspector or any other suitable person". This requirement is supported by

guidelines from the SA Department of Health, regarding the management and health surveillance of food handlers. This document highlights the training of food handlers as the responsibility of the health authorities who should ensure that appropriate programmes are implemented. However, it does not exclude other trainers as service providers, provided that they are "properly trained". A test of knowledge after training food handlers should be a requirement, as well as the provision of refresher courses. Current local authorities have limited capacity to provide such training for the industry and the majority of companies seek alternative training mechanisms to ensure legal compliance. This regulation is limited as a motivator due to a lack of formal certification requirements as evidence of training. However, despite these factors, many food service outlets have implemented food safety and food hygiene training for their staff.

Using food handler training as the only strategy to improve food safety is considered flawed by researchers, as a number of studies indicate that although training may bring about an increased knowledge of the correct food safety practices, it does not always result in a positive change in food handling behaviour (Howes *et al*., 1996; ÇakÂroglu and Uçar, 2008). Clayton *et al*. (2002) asserted that although food handlers were aware of food safety actions, the results of their study indicated that 63 % of food handlers did not behave in the correct way to ensure food safety. These findings would suggest that there are other factors that influence food handler behaviour. Strobehn *et al*. (2008) cite two studies in Oregon where barriers to the correct food handler behaviour of proper hand washing included multiple factors: time pressures, inadequate facilities and supplies, lack of accountability, and lack of manager and co-worker involvement. It is reportedly not uncommon to hear kitchen personnel complain that they cannot practice food safety because it is not practical: "Food safety takes time and with the unrelenting pressure on cooks to meet production goals, there is simply no time" (Walczak and Reuter, 2004).

1.3 Understanding food handler behaviour

"Restaurant food safety is very much dependent on human behaviour" – this is the opinion of Laura Green (2008), a behavioural scientist. Recent food safety research has utilised the behavioural sciences to explore and understand food handler behaviour. A variety of models have been proposed in an attempt to delineate the process of how a person's behaviour is changed and the factors that influence this change. Research using the traditional education model known as KAP in food safety training has noted limited success. This model is based on the assumption that the provision of knowledge (K) leads to changed attitudes (A) and thus to changed practices (P) (Rennie, 1994, Ehiri *et al.*, 1997). The studies cited previously in section 1.2 have shown this model to be flawed. Other studies have reported social cognitive models to be more suitable as they take social and environmental factors into account. These models suggest motivation, constraints, barriers and facilities, as well as the cultural aspects of the correct hygiene practices to have an impact on food handlers applying the correct food safe procedures (Griffith, 2000).

One such model, the Theory of Reasoned Action (TRA) suggests that behaviour is influenced by a person's intentions to carry out behaviour (Figure 1.1) (Ajzen and Fishbein, 1980). These intentions are affected by a combination of attitudes towards the behaviour and the perception of important others' attitudes towards this behaviour. Ajzen expanded this model to the Theory of Planned Behaviour by adding perceived behavioural control (1985). This is defined as an individual's perception of the extent to which the performance of the behaviour is either easy or difficult. Another proposed model, the Health Action Model (Tones and Tilford, 1994) was used by Rennie (1995) in investigating the provision of food hygiene training. The model incorporates the knowledge obtained from training, the influence of norms which can be affected by the support of management and colleagues, incentives to change behaviour, the facilitating effects of a suitable workplace and the development of personal skills to implement the knowledge. Seaman and Eves (2006) have proposed further changes to this model with the addition of evaluation of training needs and the choice of a relevant training programme to meet these needs (Figure 1.2).

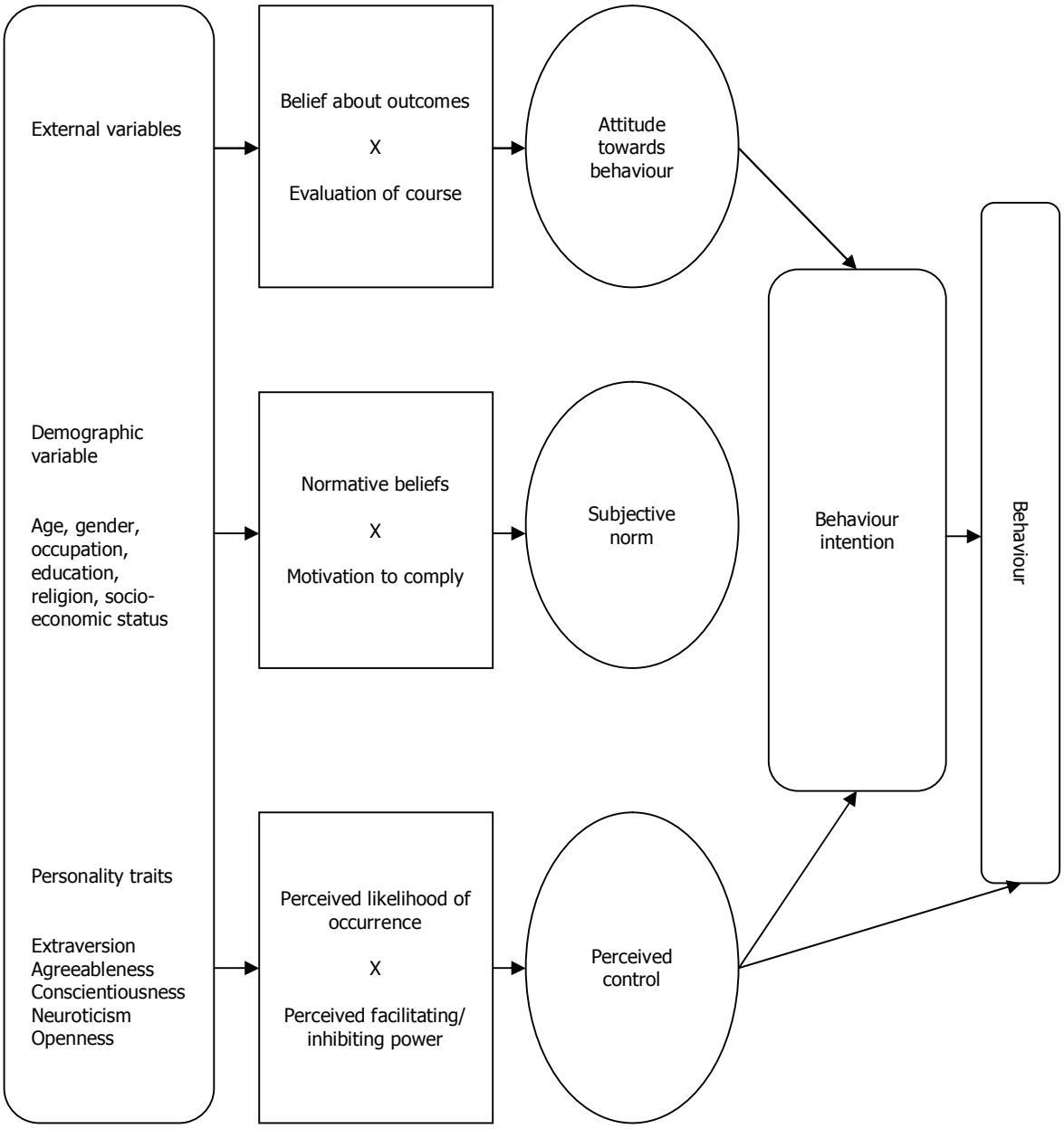

Figure 1.1: The Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980).

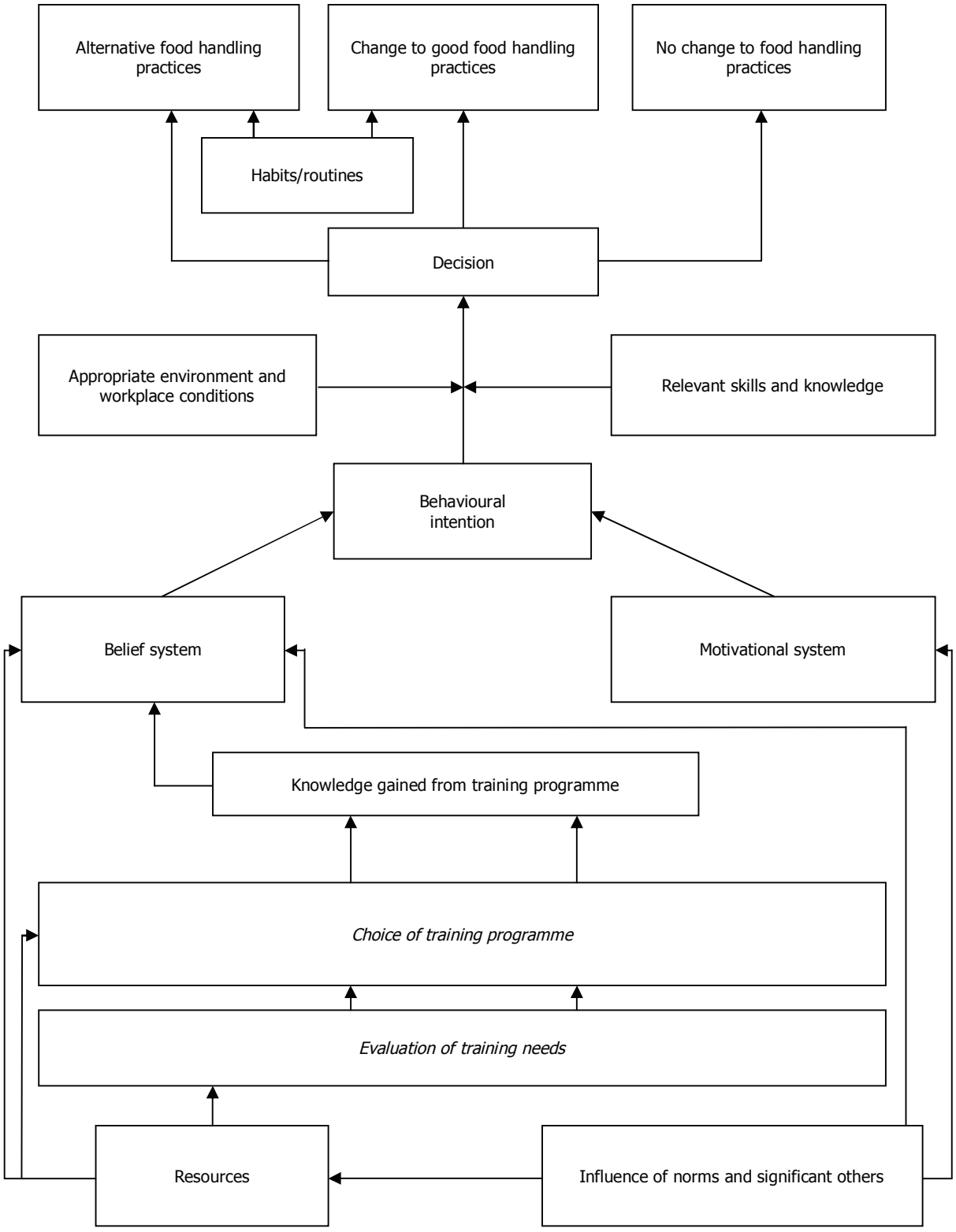

Figure 1.2: The Health Action Model (Rennie, 1995, as adapted by Seaman and Eves, 2006).

A further model "PRECEDE-PROCEED", used extensively in health promotion initiatives, was designed to systematically incorporate individual and ecological factors on health behaviour (Green and Kreuter, 1999). This model has been used by Mitchell *et al*. (2007) to highlight so-called ecological factors that can impact on the effectiveness of food safety training (Figure 1.3). In this model, safe food handling behaviours are defined as behaviours, such as hand washing, that reduce the risk of transmission of food-borne illness. Pre-disposing factors refer to those aspects that provide the motivation or rationale for engaging in that behaviour, such as knowledge about food safety, beliefs about the level of risk and perceptions relating to self-efficacy in performing the behaviour. Enabling factors make it easier for motivated individuals to engage in the behaviour and involve the availability and accessibility of resources necessary for the behaviour. Reinforcing factors appear after the behaviour has been carried out (or not) and provide the continuing incentive to continue with the behaviour. These would include social pressure, peer influence, organisational policies and discipline. In summary, "pre-disposing factors provide the rationale or motivation for the behaviour, enabling factors allow aspiration to be realised, and reinforcing factors provide the continuing reward, incentive or disincentive for the behaviour" (Dedobbeleer and German, 1987).

A comparison of the models highlights an overlap between researchers on the factors that may impact on the behaviour of the food handler. These factors include the impact of the workplace, the training programme itself as the means to provide the required knowledge, motivating factors such as incentives and the influence of management and colleagues' attitudes towards the correct food safety behaviour. These factors cannot be influenced by the food handler and this would suggest that the success of food safety training as a strategy to improve food safety relies on the behaviour of another group of people – the management of the workplace where the food handler is employed.

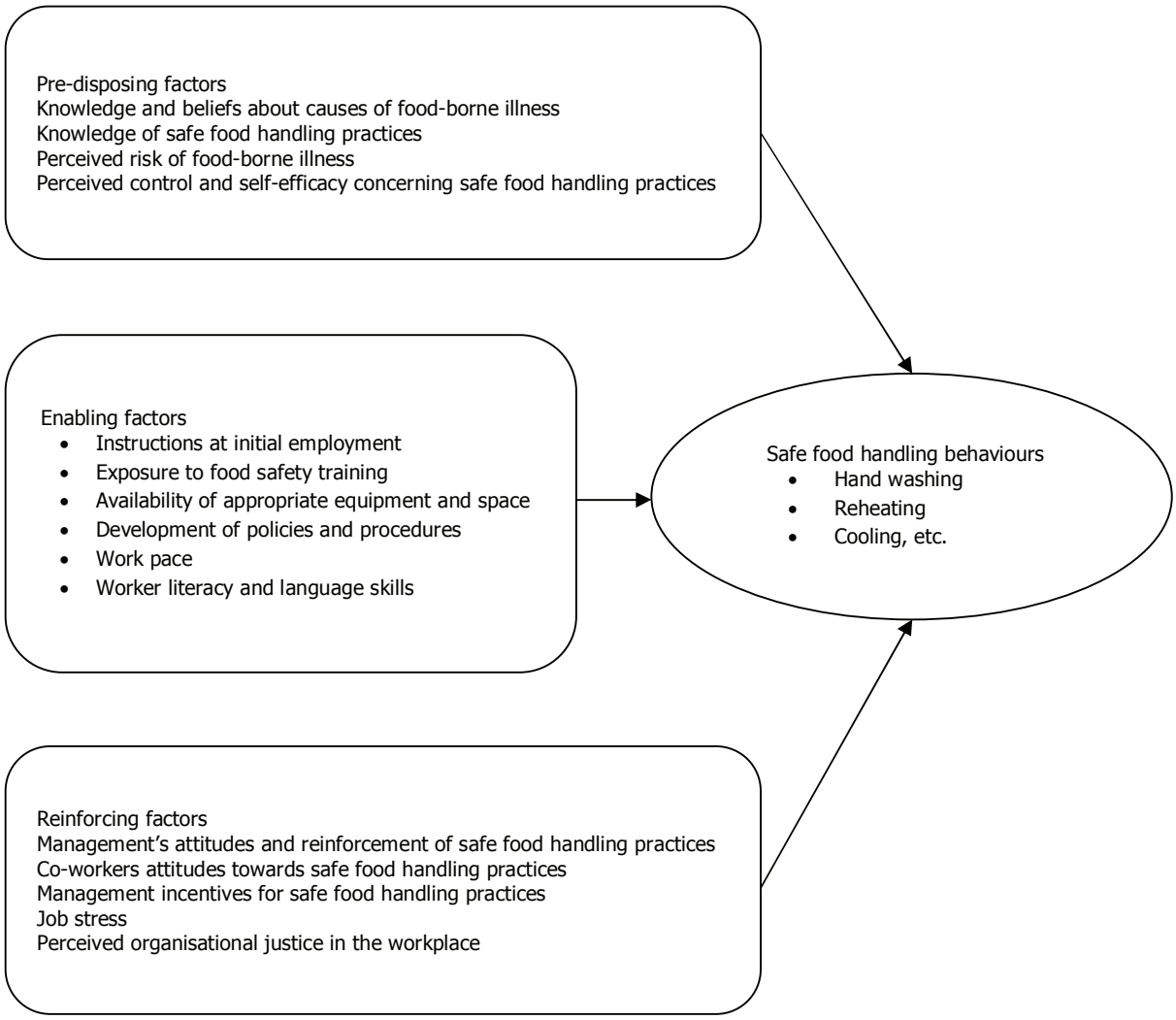

Figure 1.3: Predisposing, enabling and reinforcing factors of the PRECEDE-PROCEED framework as applied to worker behaviours (Mitchell *et al.*, 2007).

1.4 The role of management in food safety management systems

Jones *et al*. (2008a) cited the authors of the Richmond report as recognising management factors as a risk to food safety. High staff turnover, casual and part time, which is routinely observed in many food service organisations, requires sound management to ensure that staff members adhere to food safety controls. The study showed that there was no significant difference between training or formalised HACCP systems amongst catering businesses involved in an outbreak versus those that were not. North (unpublished work, as cited by Sprenger, 2008) suggests that management failures have been the direct causal factors in some food-borne disease outbreaks in the UK.

The following management failures were identified in this study: failure to carry out a risk assessment when a menu changed; lack of contingency planning for breakdowns/equipment failure; communication – a failure of management or head office to provide front-line staff with information; management disincentives, for example, bonuses paid in relation to the amount of cleaning chemicals used; commercially driven misuse or abuse of equipment or premises, for example, overloading of refrigerators or catering for numbers beyond capacity; a failure to recognise potentially hazardous procedures of the operation; failure to learn lessons or implement recommendations following an earlier outbreak; failure to replace facility or time consuming operations; unrealistic demands placed on junior management or untrained staff and the absence of routine planning and consistent procedures.

Jones *et al*. (2008b) found in their study of food service operators involved in outbreaks of food-borne illness that the businesses were more likely to be hotels or larger SMEs, more likely to have two tiers of management, to employ casual staff and were less likely to have a manager or owner working in the kitchen. It was also found that businesses implicated in cases of food-borne disease were more inclined to offer staff incentives and less likely to communicate verbally on a daily basis. Formal food hygiene training was, however, found to be associated with an increased risk of outbreaks whereas the presence of a formal HACCP system did not

offer protection from outbreaks. In order for food hygiene training to be effective, commitment, motivation and management supervision is, therefore necessary. Clayton and Griffith (2004) reported in a survey of food handler practices, that hygiene practices did not improve significantly after the provision of training and suggested that effective intervention may need to focus on changing the organisation's food safety culture.

As previously discussed, the provision of food safety training in South Africa is currently in response to legal requirements. In a survey done by MacAuslan (2003), it was reported that the majority of food businesses do not have satisfactory training policies for their staff. Too much reliance is placed upon obtaining a certificate rather than attention being paid to achieving competency in food hygiene practice. It was suggested that more emphasis and resources need to be diverted towards assisting managers to become highly motivated food hygiene managers who develop and maintain a food safety culture within their businesses. Mortlock *et al*. (2000) suggests that the provision of formal food hygiene training without coordinated workplace reinforcement of messages or incentives to adopt new behaviours is unlikely to have any major effect on food hygiene standards. Approaches are needed to take into account social and environmental influences on food safety (Ehiri *et al*., 1997).

Training and enforcement are the primary interventions used to promote food safety in the food service environment (Mitchell *et al*., 2007). Training typically focuses on the presentation of science-based facts regarding the causes of food-borne illness, or in some cases competency-based training around specific behaviours such as hand washing. This training has been generally narrow in focus and inattentive to the factors that influence the transfer of training from the learning environment to the workplace. Enforcement is also considered to be limited in its impact on worker behaviour. "The contextual and organisational influences on worker behaviour have been largely ignored" (Mitchell *et al*., 2007). This is confirmed by Seaman and Eves (2006) who stated that for hygiene training to have any impact on food safety management, it would need to be effective and relevant and delivered with the

support of the organisation, adequate resources and peer support of colleagues. The authors are of the opinion that this will have a greater effect on the intention and actual behaviour of the food handler, ensuring that safe working practices are carried out at all times. Management should provide these resources and the support role in any organisation.

1.5 Formalising the role of management

It is the responsibility of managers to develop systems in order to ensure that all employees are able to carry out their tasks effectively by using safe food handling practices. The key to the success of an integral quality programme (extrapolating this to the aspect of food safety management) and to the motivation of each employee is the manager (Vasconcellos, 2003). Workers work "in" the system whereas management works "on" the system. A manager is thus responsible for the system as a whole and its continued improvement. A good system should be fully integrated into the company and be a cohesive system that offers internal consistency and harmony.

Over the past four decades, considerable effort has been expended on developing and implementing food safety management systems in an attempt to improve food safety performance. It is widely recognised that traditional approaches such as end-point testing, inspection and knowledge-based training provision do not provide sufficient control for food safety hazards (Ehiri and Morris, 1996; Eves and Dervisi, 2005). The HACCP approach to food safety is a pro-active preventive method to control problems. Food safety management systems based on this method for assuring safer food have been adopted in many food sectors (Griffith, 2000).

The HACCP system is an internationally agreed approach to food safety management and control. The reference standard for implementation of HACCP is published by the Codex Alimentarius Commission of the Food and Agricultural Organisation (FAO) and the World Health Organisation (WHO) (CAC RCP, 2004). This reference standard defines seven principles as indicated in Table 1.1, and articulates these principles in 12 stages of implementation as indicated in Table 1.2. HACCP is designed to control

significant food safety hazards i.e. hazards that are likely to cause an adverse health effect when products are consumed (Wallace *et al*., 2005). However, it is important to implement a support system of pre-requisite programmes. These programmes have been referred to as "the universal steps or procedures that control the operational conditions within a food establishment allowing for environmental conditions that are favourable for the production of safe food". These programmes also simplify the HACCP plan and ensure there is the appropriate focus on the significant hazards (Wallace and Williams, 2001).

Despite well documented challenges with using the HACCP approach in the food service sector (Panisello *et al*., 1999; Taylor, 2001; Walker and Jones, 2002; Walker *et al*., 2003; Yapp and Fairman, 2006; Eves and Dervisi, 2005; Sun and Ockerman, 2005; Bas *et al*., 2007), the need to formally manage food safety cannot be disputed. Food safety is ultimately a management responsibility and failing to manage it may lead to serious business consequences. The aim of all successful catering operations should be to produce high quality food and one component of this goal is food safety (Griffith, 2000). Food safety also requires management intervention and all companies are likely to have a formal or informal management system. In their review of food lawsuits filed between 1985 and 1999 in the USA, Swanger and Rutherford (2003) recommended that one of the best legal defences for a food service operator is to be able to show they have done everything in their power to reduce the chances of something going wrong in their operation. This involved a written policy and procedures manual, a structured on-going training programme for all staff at all levels, regular inspections by management at the unit and corporate level for adherence, and detailed documentation of breakdowns along the way. It is also stated that it is easy to have manuals collecting dust on office shelves; however, unless management and staff know and adhere to those policies and procedures in an active way on a daily basis, operators leave themselves wide open for lawsuits. Even a perfectly sound HACCP system is not a guarantee for safe food since some hazards and critical control points such as personnel hygiene, hand washing, cannot be easily measured (Kang, 2000).

Table 1.1: CODEX HACCP principles.

Codex principle	Description
Principle 1	Conduct hazard analysis
Principle 2	Identify critical control points(CCPs)
Principle 3	Establish critical limits
Principle 4	Establish CCP monitoring requirements
Principle 5	Establish corrective actions
Principle 6	Establish verification procedures
Principle 7	Establish record keeping procedures

Table 1.2: Stages of HACCP implementation according to Codex Alimentarius (CAC RCP, 2004).

Codex stage	Description
Stage 1	Assemble HACCP team
Stage 2	Describe the product
Stage 3	Identify the intended use
Stage 4	Construct product flow diagram
Stage 5	On site confirmation of the flow diagram
Stage 6	Identify potential hazard, conduct hazard analysis, consider control measures
Stage 7	Determine CCPs
Stage 8	Establish critical limits
Stage 9	Establish a monitoring system
Stage 10	Establish corrective actions
Stage 11	Establish verification procedures
Stage 12	Establish documentation and record keeping

Prior to effectively implementing HACCP, a food business should have in place various practices including ingredient and product specifications, staff training, cleaning and disinfectant regimes, hygienically designed facilities and be engaged in good hygienic practices (GHP) or pre-requisite programmes (PRP) (Walker *et al.*, 2003). It is unlikely, in a large, or even a small organisation that a HACCP system could be effectively implemented in the absence of some other management systems, for example hygiene (Mortimore, 2001). These concepts are well-developed and have been employed by the food industry for many years such that any responsible food manufacturer operates some kind of PRP programme (Wallace and Williams, 2001). However, Walker and Jones (2002) identified pre-requisite programme failures as the majority of food safety shortfalls in their survey. A review of a number of recent large food-borne illness outbreaks indicated that many of these outbreaks are related to deficiencies in basic hygiene measures, including environmental controls, employee hygiene, equipment design, cross-contamination and water quality (Orriss and Whitehead, 2000). These hygiene matters should be controlled as part of an overall quality assurance system that is necessary before the implementation of the HACCP system. These aspects rely on the provision of the correct resources to implement effective PRPs, which is once again a management responsibility.

1.6 Management and food safety culture

The success of a HACCP or food safety management system is often a result of the culture within which the people who implement it, operate (Mortimore, 2001). This means not only their technical expertise, attitude and approach to food safety management but the overall business culture including ethical approach, positive attitude to empowerment, training and management style. HACCP can be used to help stimulate a supportive quality culture. However, without this culture change, it is more difficult to make it work in practice. MacAuslan (2005) reported that motivation, evaluation, leadership and training were key management skills missing in small businesses surveyed and the lack of these skills can impact on the effectiveness of a food safety management system. These skills are reliant on the management structure of the organisation.

At this point, a brief discussion on organisational culture is necessary. The 1980s saw the growth of an intense interest in organisational culture and management. Several popular scientific books were published, of which 'In Search of Excellence' (Peters and Waterman, 1982) and 'Corporate Cultures' (Deal and Kennedy, 1982) were two of the most well known. The books describe the qualities of successful corporations and how they work, and were bestsellers both in the United States and Europe. The main message in these books is that corporations with what is termed a strong culture do well, particularly if their management style emphasises basic values and common goals. By directing attention to what an important management tool culture can be, culture can be used as a control instrument and as an alternative to other forms of control in organisations (such as bureaucratic control) (Haukelid, 2008). Extensive work has been done using organisational climate theory on improving safety in the manufacturing industry (Clayton and Griffith, 2008). Schein (1992) uses the term organisational culture to describe the observed behavioural regularities when people interact (language, customs and traditions, and rituals), group norms, espoused values, formal philosophy, rules of the game, climate, embedded skills, habits of thinking/mental models/linguistic paradigms and shared meanings which shows the complexity of meanings of a culture. Cooper (2000) defines corporate culture as the reflection of shared behaviours, beliefs, attitudes and values, organisational goals, functions and procedures. In short, organisational culture is the interaction between organisation and individuals, where employees' behaviour can change through mutual interaction.

Using the research conducted in the safety discipline, Choudry *et al*. (2007) are of the opinion that researchers tend to use (safety) culture, (safety) climate and perhaps (safety) management interchangeably, as the terms are not clear cut. Safety management is regarded as the documented and formalised system (policy, procedures, training, instructions and resources, etc.) of controlling against risk or harm (Kennedy and Kirwan, 1998). Nevertheless, the standard of an organisation's safety management system, as it exists on paper, does not necessarily reflect the way it is carried out in practice. This is where the concept of safety culture comes into the picture. It is the safety culture of the organisation that will influence the

deployment and effectiveness of the safety management resources, policies, practices and procedures as it represents the work environment and underlying perceptions, attitudes, and habitual practices of employees at all levels (Kennedy and Kirwan, 1998).

1.7 Assessing food safety management

Extrapolating the definition of safety management given by Choudry *et al*. (2007) to food safety, food safety management would be the documented and formalised system (policy, procedures, training, instructions and resources) of controlling against risk or hazards to the safety of the product. In more recent research, Fernández-Muñiz *et al*. (2009) reviewed safety management systems and identified the following key aspects as critical for a good occupational health and safety management system: the development of a safety policy that includes the organisation's commitment to safety and formally expresses objectives in relation and health and safety at work; incentives for employees' participation in health and safety activities aimed at promoting safe behaviour and involving personnel in decision making processes, punishment or rewards; training and development of employee competencies in order to improve ability, skills and aptitude in terms of risk prevention; communication and transfer of information about the workplace, its possible risks and how to combat them; planning to implement policies and actions to prevent accidents and an effective plan for emergencies; and control and review of activities carried out within the organisation to permit continuous improvement. Indicators that are often used in safety research to assess organisational culture include management commitment to safety, safety training and motivation, safety committees and safety rules, record keeping on accidents, sufficient inspection and communication, adequate operation and maintenance procedures, well-designed and functioning technical equipment and good housekeeping (Grote and Kunzler, 2000).

Although Codex HACCP is an internationally accepted method for assessing the hazards associated with food, the Codex approach to HACCP provides limited guidance on the role of management in the food safety management system. This aspect has been developed further in voluntary food safety management standards

such as the British Retail Consortium Food standard, ISO 22000:2005 and locally within SANS 10330:2007. These standards formalise the involvement of management as the underpinning structures of the technical aspects of the food safety management system. The requirements are largely based on the requirements of ISO 9001:2008, a popular standard for quality management. Many of these requirements have also been utilised in safety and environmental management systems. This standard uses the management approach known as PDCA – Plan, Do, Check, Act, as the foundation for its structure. This model is depicted in Figure 1.4. According to ISO 9001, this model can be applied to all processes. PLAN is defined as the activity of establishing the objectives and processes necessary to deliver the desired results in accordance with stakeholder requirements and the organisation's policies; DO is defined as the activity of implementing these planned processes; CHECK is the activity of monitoring and measuring the processes and product/output against planned, policies, objectives and requirements for the process and reporting the results; ACT is the activity of taking action to continually improve process performance. The model can thus be used in food safety in an organisation as depicted in Figure 1.5 and demonstrates the aspects of management that will be developed within this study.

1.8 Rationale of the study

Outlining the problem

Limited research is available on the management factors of food service outlets, defined as the situational factors by Cooper (2000) when discussing organisational culture, defined as enabling and reinforcing factors when discussing food handler behaviour. Given the aforementioned information, it is reasonable to propose that food handlers are not able to implement the correct food safety behaviours in the absence of sufficient management support.

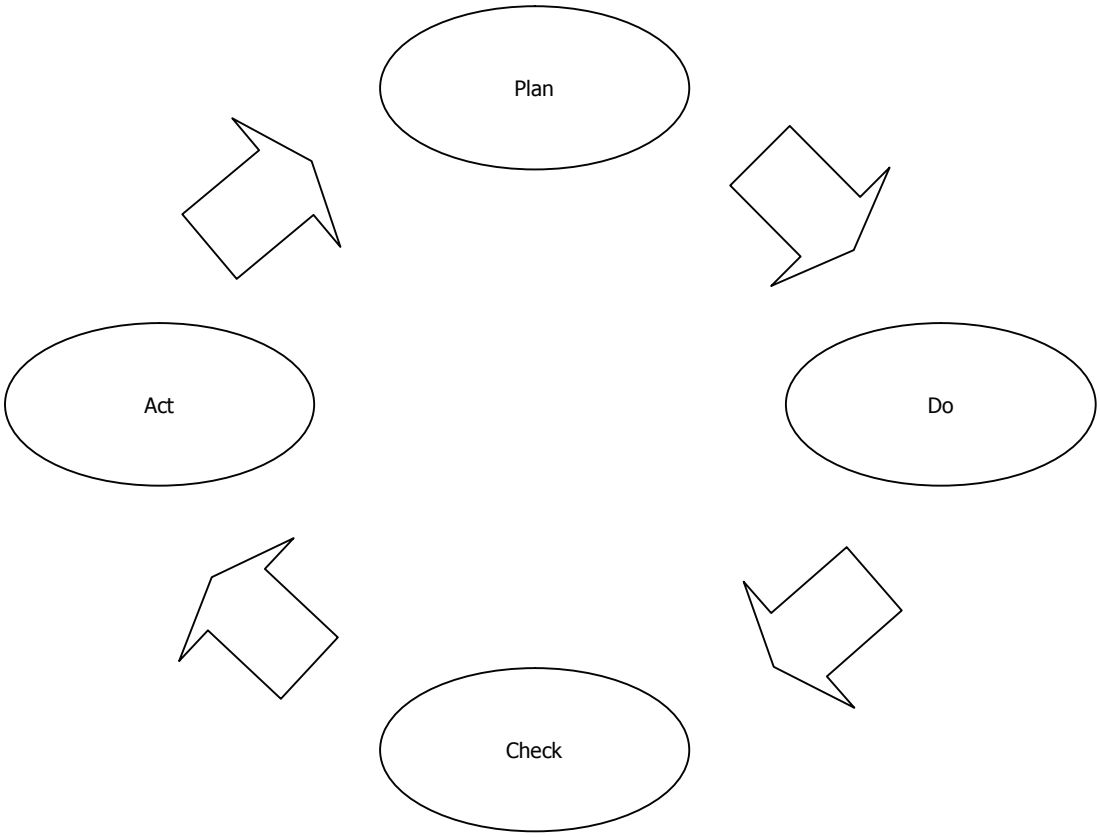

Figure 1.4: PDCA Model from ISO 9001:2008 Quality management systems: requirements.

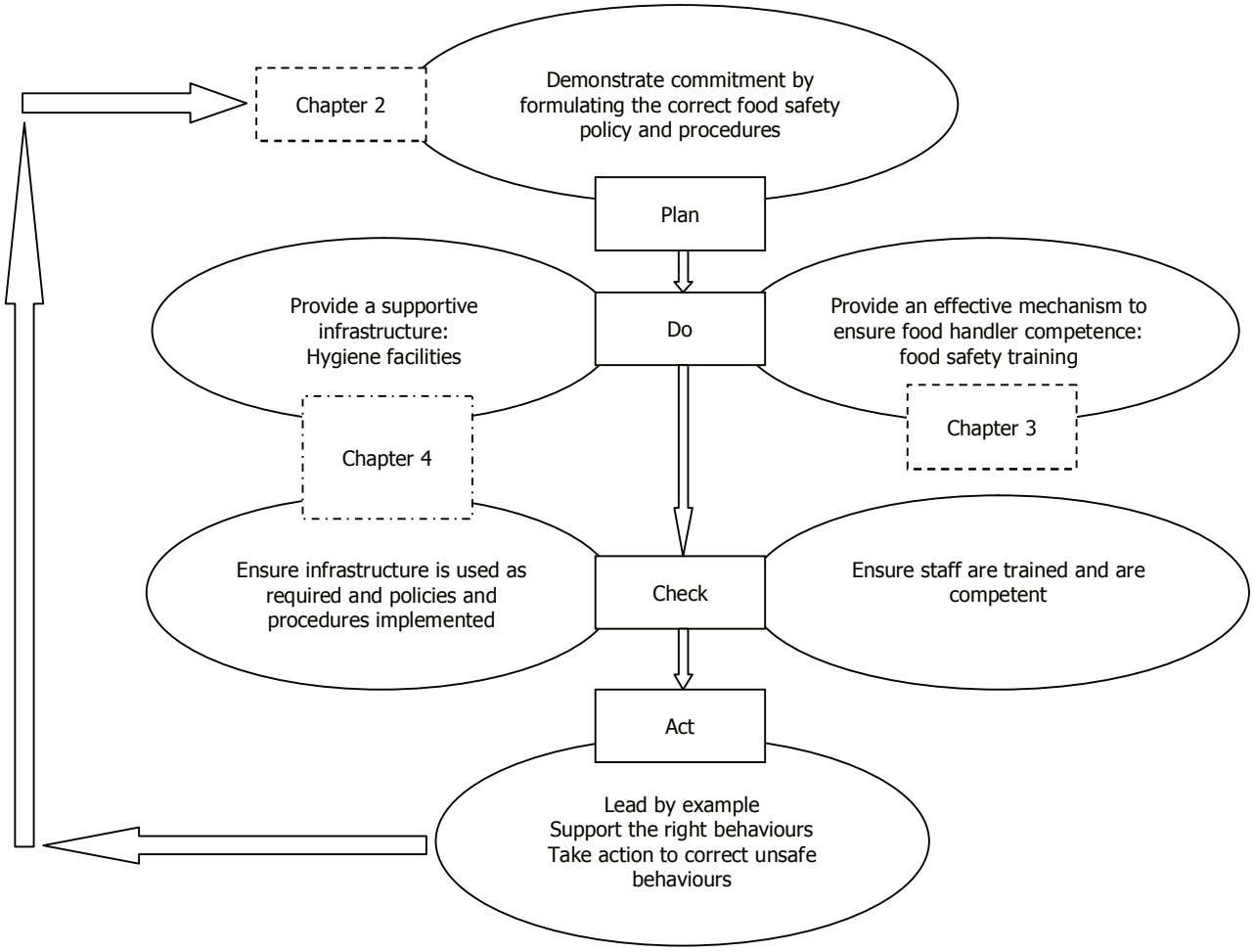

Figure 1.5: The PDCA model as adapted to depict management's role in removing barriers to the correct food safety behaviours and development of a food safety management system.

Such support can be defined in the simplest terms as the correct policies to ensure food safety, the provision of training and infrastructure and enforcing the correct behaviours.

Aims

The aim of this study was to investigate and assess the role of line management in relation to food safety with special emphasis on the provision of resources and training at a prominent South African entertainment facility. In order to achieve this, the following objectives were defined:

- **Conduct a qualitative assessment of the role of management in food safety;**
- **Assess the role of management in the provision of food safety training;**
- **Determine the role of management in the provision of basic hygiene infrastructure at the study site to allow food handlers to carry out the correct behaviours; and**
- **Investigate the standardisation and optimisation of training programmes and approach.**

The results of this study should shed light on safety management factors impacting on food handler behaviour and thus give an improved understanding of the food safety culture of a food service organisation. The study provides a multi-level analysis of food safety culture by conducting interviews, surveys, audits and meta-analysis, and it is envisaged that the findings may be used in knowledge transfer programmes at the study site and other similar establishments towards improving the safety of foods and the well-being of the consumer.

1.9 References

Ajzen, I. (1985), "Intentions to actions: a theory of planned behaviour", in Kuhl, J. and Beckman, J. (Eds.) *Action Control: From Cognition to Behaviour*, Springer, Berlin, pp. 11-39.

Ajzen, I. and Fishbein, M. (1980), "Understanding attitudes and predicting social behaviour", *Journal of Basic and Applied Psychology*, Vol. 7, pp. 259-276.

Audit Commission (1990), *Environmental Health Survey of Food Premises*. HMSO, London.

Bas, M., Safak, E.A. and Kivanc, G. (2006), "The evaluation of food hygiene knowledge, attitudes and practices of food handlers in food businesses in Turkey", *Food Control*, Vol. 17, pp. 317–322.

Bas, M., Ersun, A.O. and Kavanç, G. (2007), "Implementation of HACCP and prerequisite programs in food businesses in Turkey", *Food Control*, Vol. 17, No. 2, pp. 118–126.

ÇakÂroglu, F.P. and Uçar, A. (2008), "Employees' perception of hygiene in the catering industry in Ankara (Turkey)", *Food Control*, Vol. 19, pp. 9–15.

Choudry, R.M., Fang, D. and Mohamed, S. (2007), "The nature of safety culture: A survey of the state-of-the-art", *Safety Science*, 45, pp. 993–1012.

Clayton, D.Q. and Griffith, C.J. (2004), "Observation of food safety practices in catering using notational analysis", *British Food Journal*, Vol. 106, No. 3, pp. 211-227.

Clayton, D.A. and Griffith, C.J. (2008), "Efficacy of an extended theory of planned behaviour model for predicting caterers' hand hygiene practices", *International Journal of Environmental Health Research*, Vol. 18, No. 2, pp. 83-98.

Clayton, D., Griffith, C., Price, P. and Peters, A. (2002), "Food handlers' beliefs and self-reported practices', *International Journal of Environmental Health Research*, Vol. 12, pp. 25–39.

Codex Alimentarius (2004), "Guidelines for the application of the hazard analysis critical control point system", *ALINORM*, Vol. 93, p. 131.

Cooper, M.D. (2000). "Towards a model of safety culture", *Safety Science*, 36, pp. 111–136.

Deal, T. and Kennedy, A. (1982), *Corporate Cultures*. Addison-Wesley, Reading, MA.

Dedobbeleer, N. and German, P. (1987), "Safety Practices in Construction Industry", *Journal of Occupational Medicine*, Vol. 29, No. 11, pp. 863-868.

Department of Health, *Regulations governing General Hygiene requirements for Food Premises and the transport of food*, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), Regulation 10(b), Republic of South Africa.

Ehiri, J. and Morris, G. (1996), "Hygiene training and education of food handlers: does it work?", *Ecology of Food Nutrition*, Vol. 35, pp. 243–251.

Ehiri, J.E., Morris, G.P. and McEwen, J. (1997), "Evaluation of a food hygiene training course in Scotland", *Food Control*, Vol. 8, No. 3, pp. 137–147.

Eves, A. and Dervisi, P. (2005), "Experiences of the implementation and operation of HACCP in the food service sector", *International Journal of Hospitality Management*, Vol. 24, pp. 3-19.

Fernández-Muñiz, B., Montes-Peón, J.M. and Vázquez-Ordás, C.J. (2009), "Relation between occupational safety management and firm performance", *Safety Science* , 47, pp. 980–991.

Green, L. (2008), "Behavioural Science and Food safety", *Journal of Environmental Health*, Vol. 71, No. 2, pp. 47-49.

Green, L. and Kreuter, M. (1999), *Health Promotion Planning: An Educational and Ecological Approach*, Mountain View, CA, Mayfield Publishing Co.

Griffith, C. (2000), "Food safety in catering establishments", in: Farber, J.M. and Todd, E.C. (Eds.), *Safe Handling of Foods*, Marcel Dekker, New York, pp. 235–256.

Grote, G. and Kunzler, C. (2000), "Diagnosis of safety culture in safety management audits", *Safety Science*, Vol. 34, pp. 131-150.

Haukelid, H. (2008), "Theories of (safety) culture revisited—An anthropological approach", *Safety Science*, Vol. 46, pp. 413–426.

Howes, M., McEwen, S., Griffiths, M. and Harris, L. (1996), "Food handler certification by home study: measuring change in the knowledge and behaviour", *Dairy Food Environmental Sanitation*, Vol. 3, pp. 208-214.

ISO (2008), ISO 9001:2008, *Quality Management Systems: Requirements*, International Organisation for Standardisation, Geneva.

ISO (2005), ISO 22000:2005, *Food Safety Management Systems: Requirements*, International Organisation for Standardisation, Geneva.

Jones, S.L., Parry, S.M., O'Brien, S.J. and Palmer, S.R. (2008a), "Are Staff Management Practices and Inspection Risk Ratings Associated with Food-borne Disease Outbreaks in the Catering Industry in England and Wales?", *Journal of Food Protection*, Vol. 71, No. 3, pp. 550-557.

Jones, S.L., Parry, S.M., O'Brien, S.J. and Palmer, S.R. (2008b), "Operational Practices Associated with Food-Borne Disease Outbreaks in the Catering Industry in England and Wales", *Journal of Food Protection*, Vol. 71, No. 3, pp. 1659-1665.

Kang, Y.-J. (2000), "Safe food handling in airline catering", in Farber, J.M. and Todd, E.C. (Eds.), *Safe Handling of Foods*, Marcel Dekker, New York, pp. 197– 233.

Kennedy, R. and Kirwan, B. (1998), "Development of a hazard and operability-based method for identifying safety management vulnerabilities in high risk systems", *Safety Science*, Vol. 30, pp. 249–274.

MacAuslan, E. (2003), "The boss, the owner, the proprietor...the food hygiene manager?", *The Journal of the Royal Society for the Promotion of Health*, Vol. 123, No. 4, pp. 229-332.

MacAuslan, E. (2005), "Think laterally on training", *Environmental Health Journal*, July, pp. 20-21. [Available at www.ehj-online.com/archive/2000/july2005 /july5.html].

Mead, P.S., Slutsker, L., Dietz, V., McCaig, L.F., Bresee, J.S., Shapiro, C., Griffin, P.M. and Tauxe, R.V. (1999), "Food-Related Illness and Death in the United States", Centre for Disease Control and Prevention, Atlanta, Georgia, USA. [Available at: www.cdc.gov/ncidod/eid/vol5no5/mead.htm].

Mitchell, R., Fraser, A. and Bearon, L. (2007), "Preventing food-borne illness in food service establishments: Broadening the framework for intervention and research on safe food handling behaviours", *International Journal of Environmental Health Research*, Vol. 17. No. 1, pp. 9-24.

Mortimore, S. (2001), "How to make HACCP really work in practice", *Food Control*, Vol. 12, pp. 209–215.

Mortlock, M.P., Peters, A.C. and Griffith, C.J. (2000), "A national survey of food hygiene training and qualification levels in the UK food industry", *International Journal of Environmental Health Research*, Vol. 10, pp. 111-123.

Motarjemi, Y. and Käferstein, F. (1998), "Food Safety, Hazard Analysis and Critical Control Point and the Increase in Food-borne Disease: A Paradox?", *Food Control*, Vol. 10, pp. 325-333.

Orriss, G.D. and Whitehead, A.J. (2000), "Hazard analysis and critical control point (HACCP) as a part of an overall quality assurance system in international food trade", *Food Control*, Vol. 11, pp. 345–351.

Panisello, P.J., Quantick, P.C., and Knowles, M.J. (1999), "Towards the implementation of HACCP: Results of a UK regional survey", *Food Control*, Vol. 10, pp. 87–90.

Peters, T. and Waterman, R. (1982). *In Search of Excellence*. Harper & Row, New York.

Rennie, D. (1994), "Evaluation of food hygiene education', *British Food Journal*, Vol. 96, No 11, pp. 20-25.

Rennie, D. (1995). "Health education models and food safety education", *Journal of the Royal Society of Health*, Vol. 115, pp. 75–79.

SANS (2007), SANS 10330:2007, *Requirements for a HACCP System*, Standards South Africa, Pretoria.

Schein, E.H. (1992). *Organisational Culture and Leadership*, second ed. Jossey-Bass, San Francisco.

Seaman, P. and Eves, A. (2006), "The management of food safety – The role of food hygiene training in the UK service sector", *International Journal of Hospitality Management*, Vol. 25, pp. 278-296.

Shojaei, H., Shooshtaripoor, J. and Amiri, M. (2006), "Efficacy of simple hand washing in the reduction of microbial hand contamination of Iranian food handlers", *Food Research International*, Vol. 39, pp. 525-529.

Sprenger, R. (2008), "*Hygiene for Management – A Text for Food Safety Courses"*, Highfield.co.uk Limited, pp. 264-321.

Strobehn, C., Sneed, J., Paez, P. and Meyer, J. (2008), "Hand washing frequencies and procedures used in retail food services", *Journal of Food Protection*, Vol. 71, No. 8, pp. 1641-1650.

Sun, Y.-M. and Ockerman, H.W. (2005), "A review of the needs and current applications of hazard analysis and critical control point (HACCP) system in foodservice areas", *Food Control*, Vol. 16, No.4, pp. 325-332.

Swanger, N. and Rutherford, D.G. (2003), "Food-borne illness: the risk environment for chain restaurants in the United States", *International Journal of Hospitality Management*, Vol. 23, pp. 71-85.

Taylor, E. (2001), "HACCP in small companies: benefit or burden?", *Food Control*, Vol. 12, pp. 217-222.

Todd, E.C.D., Greig, J.D., Bartleson, C.A. and Michaels, B.S. (2009), "Outbreaks where food workers have been implicated in the spread of food borne disease. Part 6. Transmission and survival of pathogens in the food processing and preparation environment", *Journal of Food Protection*, Vol. 72, No.1, pp. 202-219.

Tones, K. and Tilford, S. (1994*)*, *Health Education Effectiveness*, *Efficiency and Equity*, second ed. Chapman & Hall, London, pp. 90–103.

Vasconcellos, J.A. (2003), *Quality Assurance for the Food Industry – a Practical Approach*, CRC Press.

Walczak, D. and Reuter, M. (2004), "Putting restaurant customers at risk: unsafe food handling as corporate violence", *International Journal of Hospitality Management*, Vol. 23, pp. 3-13.

Walker, E. and Jones, N. (2002), "An assessment of the value of documenting food safety in small and less developed catering businesses", *Food Control*, Vol. 13, No.4–5, pp. 307–314.

Walker, E., Pritchard, C., and Forsythe, S. (2003), "Hazard analysis critical control point and prerequisite programme implementation in small and medium size food business", *Food Control*, Vol. 14, pp. 169–174.

Wallace, C. and Williams, T. (2001), "Pre-requisites: A help or a hindrance to HACCP", *Food Control*, Vol. 12, pp. 235–240.

Wallace, C., Powell, S.C. and Holyoak, L. (2005), "Post-training assessment of HACCP knowledge: Its use as a predictor of effective HACCP development, implementation and maintenance in food manufacturing", *British Food Journal*, Vol. 107, No. 10, pp.743 – 759.

Yapp, C. and Fairman, R. (2006), "Factors affecting food safety compliance within small and medium sized enterprises: Implications for regulatory and enforcement strategies", *Food Control*, Vol. 17, pp. 42-51.

Chapter 2

The role of management in food safety at a prominent South African entertainment facility I: A qualitative assessment of practices and approach

For submission partially or in full to: International Journal of Environmental Health Research

2.1 Abstract

Purpose:

To conduct an assessment of the management practices to food safety and approach in various kitchens at a prominent South African entertainment facility. The assessment tools were informed by a comprehensive literature review that reflected on the role of management in food safety behaviours.

Design/methodology/approach:

A review of current national and international food safety standards was conducted and a checklist developed defining the constructs of best practice for management involvement and approach to food safety. This checklist was utilised in semi-structured interviews to obtain information regarding management involvement in the food safety management system at the study site.

Findings:

The majority of best management practices assessed via the checklist were found not to be in place at the study site including the lack of a formal food safety policy. Food safety training was the one notable demonstration of management commitment.

Originality/value:

The literature review and subsequent checklist assessment identified shortcomings that called for further empirical research into management practices and the impact of these on a food safety management system. The results further provide insight into aspects of the organisational culture of the study site in terms of food safety and hygiene.

Keywords: Food safety, management, South Africa, training, food safety management system, organisational culture

Paper type: Qualitative research and situational analysis

2.2 Introduction

An effective food safety management system in any organisation requires a deliberate management intervention and the aim of all successful catering operations should be to produce high quality food (Griffith, 2000). One component of this goal is food safety. Food safety requires management intervention and all companies are likely to have some kind of formal or informal management system. Food safety is a specific aspect of food quality and is defined as the assurance that food will not cause harm to the consumer when it is prepared and/or eaten in accordance with its intended use (Codex Alimentarius, CAC 2004, ISO 22000:2005) (Luning *et al*., 2009). Quality management refers to all activities that organisations use to direct, control and co-ordinate quality, including formulating a quality policy, setting quality objectives, quality planning, control, assurance and improvements (Luning and Marcellis, 2007). Organisations use a quality management system to direct and control the implementation of quality policies and achievement of quality objectives. A quality management system includes all the organisational structures, responsibilities, processes, procedures and resources that facilitate the achievement of quality management (Luning and Marcellis, 2007). A food safety management system is that part of the quality management system that is specifically focused on food safety.

2.3 Development of food safety management systems

The traditional strategic approach to food safety management in food service has been to implement hygienic practices, often in a relatively uncoordinated way, based on, amongst others, food storage, pest control, cleaning, and personal hygiene (Griffith, 2000). The management responsibility for these practices has been shared among various staff members and food safety was based on the traditional "floors, walls and ceilings" approach. Current legal requirements in the UK and Europe require a formal approach to food safety with all food business having to implement a food safety management system based on Codex HACCP principles (Regulation (EC) No. 852/2004 on the hygiene of foodstuffs). The reluctance on the part of the food service sector is well documented (Panisello *et al*., 1999; Taylor, 2001; Walker *et al*., 2003; Yapp and Fairman, 2004; Walker and Jones, 2002; Sun and Ockerman,

2005; Eves and Dervisi, 2005; Bas *et al*., 2007). However, in practice the Codex approach has not proved successful for small catering or retail businesses and this sector has had some difficulty applying the HACCP system, which was originally developed for manufacturers producing the same product(s) over long periods of time (Sprenger, 2008). By comparison, food service HACCP systems should have the flexibility to accommodate changing products or procedures, diverse employee capabilities and inconsistent production volumes. Other problems identified in the catering industry have been reported as lack of knowledge, lack of training, high staff turnover and large numbers of part-time workers (Panisello and Quantick, 2001). Griffith (2000) suggested that smaller catering operations may benefit from a generic HACCP model where the HACCP principles were applied to the processing steps rather than to each recipe individually. The UK Department of Health has developed 'Assured Safe Catering' (1993) and the FSA has funded the development of several food safety management systems such as 'Safer Food Better Business', 'Safe Catering' and 'Cook-Safe' to assist this sector.

Despite the volume of literature citing reasons why HACCP is ineffective in food service operations, the need to formally manage food safety cannot be disputed. Food safety is ultimately a management responsibility and failing to manage it may lead to far-reaching business consequences. To date, the focus of research has been associated with the technical aspects of food management systems and less with the "softer" behavioural issues, implicating that managers are provided with ample guidance on how to apply the HACCP principles but little guidance with how to motivate employees to adhere to the HACCP system.

The role of management does not end with the development of a HACCP system, as even a perfectly sound HACCP system is not a guarantee for safe food because some hazards and critical control points such as personnel hygiene, hand washing, etc. cannot be easily measured (Kang, 2000).

It has been suggested that management failures may have been the causal factors in some food-borne disease outbreaks in the UK, for example. Many of these failures relate to poor management principles of planning, organising and control. It is the responsibility of the manager to develop these systems in order to ensure that all employees are able to effectively carry out their tasks.

2.4 The link between proper management and effective food safety/hygiene training

Regulations governing General Hygiene requirements for Food Premises and the transport of food, published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), states in regulation 10(b): "A person in charge of food premises shall ensure that any person working on the food premises is adequately trained in food hygiene by an inspector or any other suitable person."

As a result of employees not being able to train themselves, the responsibility lies with management who should provide resources for training, either internal training, which will require the development of an adequate in-house training programme, or external, which will require the selection of an appropriate service provider. All training interventions will require time to deliver the required outcomes and staff will need time away from duties to attend training. Management should consequently facilitate to assess the effectiveness of training interventions towards changing and implementing new behaviours. Safe food handling and the effective implementation of training programmes therefore, depend essentially on well trained, knowledgably, and positive minded managers of food businesses (Seaman and Eves, 2006). Training and enforcement are the primary interventions used to promote food safety in the food service environment (Mitchell *et al.*, 2007). Training typically focuses on the presentation of science-based facts regarding the causes of food-borne illness, or in some cases competency-based training around specific behaviours such as hand washing. This training has been generally narrow in focus and inattentive to the factors that influence the transfer of training from the learning environment to the workplace. Similarly enforcement is considered to be limited in its impact on worker behaviour. The contextual and organisational influences on worker behaviour

have also been largely ignored (Mitchell *et al.*, 2007). This is confirmed by Seaman and Eves (2006) who state that, for hygiene training to have any impact on food safety management it would need to be effective and delivered with the support of the organisation, adequate resources and peer support of colleagues. These factors will have a greater effect on intention and actual behaviour of the food handler, ensuring that safe working practices are carried out at all times.

It is more difficult to develop a HACCP system in the absence of management commitment (Mortimore, 2001a&b) and it is recommended that as a pre-requisite programmes are an essential partner to the HACCP system, and management commitment to these should be embedded in the heart of the business (Jevsnik *et al.*, 2008). The responsibility for HACCP implementation should, therefore, be assigned to a senior company employee to embed food safety into the culture of the company. Management commitment is one of the HACCP pillars and it has been suggested that an organisation should integrate the HACCP system with management responsibility requirements of ISO 9001 to ensure management responsibilities are clearly articulated and measurable (Panisello and Quantick, 2001).

2.5 Formalising management involvement in food safety management systems

Studies into the relationship between management and safety culture have been explored widely in the field of occupational health and safety (Hale *et al.*, 1997). Safety management has followed the format presented in general management textbooks or legislative documents as their starting point for describing management obligations and do not present specific models for safety management system. It appears that this is the same approach followed by food safety management.

Corbett and Young (2008) refer to the use of meta-standards and define this as standards that apply to broad processes rather than individual products and to entire families of such standards. The International Standards Organisation Standards on Quality Management Systems (ISO 9001) is the most famous of these standards and

have been, or are being used as a basis for devising standards for safety management systems, environmental management systems and more recently food safety management systems. The third party certification system increased in popularity in the 1990s to assess compliance with such standards. This process has relied on the development and use of management system audits to assess whether a system is adequate and how it can be improved. Such audit systems are largely based on the collective experience of years of consultancy or management and do not have explicit management models underlying them (Hale *et al*., 1997).

Many of the requirements of ISO 9001 have been included in ISO 22000:2005, the International Standard for a Food Safety Management System. These requirements are confirmed by Sprenger (2008) as best practice for management of an organisation. The author states that for an effective management system, managers should set the required standard/objectives, provide the necessary resources and establish systems and controls, including documentation to achieve the standards. Standards should be communicated to staff that should be trained to ensure their competence to produce safe food and effective supervision and monitoring, while analysis should be provided to compare actual standards with those required. If necessary, corrective action should be taken to improve performance to facilitate achievement of safety objectives.

2.6 Purpose of this study

It has been reported that motivation, evaluation, leadership and training were key management skills missing in small businesses and the lack of these skills can impact on the effectiveness of a food safety management system (MacAuslan, 2005). However, limited empirical research exists relating to the impact of the role and activities of management in the food safety or quality systems. Current research on the implementation of food safety management systems has focused predominantly on the technical aspects of the systems and barriers to implementation such as documentation, training, infrastructure, lack of time and only marginally on the role of management practices and leadership (Pansiello and Quantick, 2001).

Against this backdrop, the purpose of this study was to assess the management aspects of a food safety management system and to explore whether deficiencies in this area would impact the implementation of the food safety training intervention. The study seeks to define the constructs of management's role by reviewing current best practices and formulating a questionnaire. The latter would then be used to assess the practices in use at the study site during a descriptive assessment involving interviews and the review of documented policies and procedures.

2.7 Materials and methods

2.7.1 Background to the study site

The focus of the study was a prominent entertainment facility in South Africa with extensive conferencing and casino facilities. The facility boasts seven kitchens under its direct control which were the subject of this study. A wide range of restaurants are tenants in the facility but these were excluded from the study. The survey comprised only the kitchens under the direct control of the study site management that employed 168 staff and fed on average 140 000 patrons every month.

The facility is part of a larger group of hotels and the management of the organisation functions at two levels; a Facility General Manager who reports to the Group Operations Manager and the Facility Executive Sous Chef who is responsible for all the kitchens as well as the implementation of the food safety management system, the latter reporting to the Facility General Manager. The Facility Executive Sous Chef is responsible for all the kitchens within the group.

The organisation had developed a formalised food safety management system at the study site with limited reported success in implementation of this system. A full HACCP system had been the objective with formal certification but this had not yet been achieved by the time of the study.

2.7.2 Development of the questionnaire

A set of criteria for management involvement in a food safety management system was developed based on the standards listed in Table 2.1 and additional criteria were selected from literature (Porter and Parker, 1993; Griffith, 2000; Hale, 2003a&B; Eves and Dervisi, 2005; Worsfold, 2005; Singh, 2007). The study was conducted using a qualitative approach, as it aimed to explore the selected criteria in depth, rather than simply describe them at a superficial level as may be achieved through the use of questionnaires (Creswell, 1998).

Table 2.1: A review of food safety standards for food safety management best practice.

SABS 049:2001	South African National standard, Code of practice – Food hygiene
Regulation 918 of the Health Act, Act 63 of 1977	Regulations governing General Hygiene requirements for Food Premises and the transport of food
CAC/RCP 39-1993	Code of hygienic practice for pre-cooked and cooked foods in mass catering, Codex Alimentarius Commission
SANS 10330:2007	South African National Standard, Requirements for a hazard analysis and critical control point (HACCP) system.
ISO 22000:2005	International standard, Food safety management systems – requirements for any organisation in the food chain
SQF 2000 (2008) Code	A HACCP-Based Supplier Assurance Code for the Food Manufacturing and Distributing Industries
The BRC Global Standard for Food Safety Issue 5	British Retail Consortium Standard for Food Safety
International Food Standard	Standard for auditing retailer and wholesaler branded products, version 5

2.7.3 Execution of the study

The study was conducted using a series of interviews where respondents were asked open-ended questions relating to the criteria. These one-on-one interviews also allowed the respondents to express their opinions freely, and information relating to non-verbal communication could thus be assessed (Harris *et al.*, 2009). The answers provided were verified by the provision of further documented evidence such as policies and procedures and records to confirm the implementation, or lack thereof, of the requirement.

In total, six respondents were interviewed, selected at each management level within the kitchens. An in-depth semi-structured interview was conducted with the Facility Executive Chef, who was responsible for food safety on the site and for developing food safety systems for the group. This interview sought to gather information on the corporate food safety management system and the role of corporate management in the food safety system implemented at the facility. Further evidence was gathered during subsequent interviews of the Food Safety Auditor, who dealt with food safety requirements on a daily basis and reported to the Facility Executive Chef; the Back-of-House manager, who was responsible for, amongst others, cleaning activities in the kitchen; and the Training Officer. These respondents were selected as they had been responsible during the preceding five years for the development and implementation of the food safety management system at the facility under study. Additional comments were obtained from the Executive Sous Chefs and supervisors in order to provide middle management insights.

The respondents were contacted prior to the interview and an appointment was set up detailing the objective of the interview. During the interviews, qualitative information was gathered regarding the system, and company documentation was reviewed to confirm the responses given by respondents, where necessary. The duration of the interviews was 30 to 90 minutes and time was not restricted, but determined by the volume of information provided by respondents. Discussions surrounding the key issues listed in the checklist were wide-ranging. Handwritten

notes were taken. After the initial interview, a further focus group discussion was held with the respondents to confirm the correctness of the evidence obtained. This interview lasted a further 60 minutes.

2.8 Results and discussion

2.8.1 Food safety policy and objectives

The results of the interviews suggest that the organisation had no formal food safety policy detailing the commitment to produce safe food, comply with legal requirements and ensure the safety of guests. There was no formal corporate food safety policy in place. The decision to implement a food safety management system had been taken at the operations level and not as a result of corporate strategy.

2.8.2 Knowledge of legal requirements and food safety risks

The staff members who were interviewed were familiar with the requirements of Regulation 918 and the mandatory certificates of acceptability were available in all kitchen outlets. All sous chefs had been issued with a copy of this regulation but little specific training had been conducted on the legal requirements. Although all the kitchen outlets on the site were registered with the local Department of Health, the legal basis for many of the procedures in the Kitchen Standard Operating Procedures Manual (KSOM) was not referenced. Due to the profile of the organisation under study, there were regular inspections by the local authorities. However, due to the limitations of the legal requirements, this served as limiting motivation in developing formal food safety management systems and records.

2.8.3 Handling food safety complaints and emergencies

Negligible formal training had been provided with respect to how to deal with an alleged outbreak of food-borne illness or guest food safety complaints and it appeared that there was no formal procedure in place. An employee handbook was available, which instructed the employee to take responsibility for a guest's complaint. During the survey, a guest complaint was received regarding a dish "tasting off". There was little evidence of samples being sent for testing, the rest of

the batch of ingredients being discarded as a pre-cautionary measure, or records kept of the complaint. The general impression given by interviewees regarding guest complaints was that "you cannot satisfy everyone all of the time" and that these complaints were not taken seriously. According to respondents, several incidents of alleged food-borne illness had been reported in the previous five years, although these had involved only one guest per complaint.

2.8.4 Performance appraisal system and food safety incentive scheme

A performance appraisal system had been implemented the month before the interviews were performed. In accordance with the Corporate Performance assessment form guidelines, the criteria for this performance assessment were: quantity of work, quality of work, knowledge of work, reliability/attendance/ punctuality, initiative, human relationships, leadership potential, planning and organising and self-development. A training needs analysis form was included in the performance assessment. Limited direct links to food safety were evident in these criteria and no further specific guidance on the interpretation of these requirements for kitchen staff had been provided. Job profiles were in place and these indicated the key performance areas for each chef in the kitchen. Food safety requirements related to supporting HACCP, completing daily checklists and encouraging training. Limited specific measurable activities had been defined for food safety and, in discussions with the Food Safety Auditor and the Facility Chef, it was clear that employee motivation remained a significant challenge, specifically the motivation of the sous chefs responsible for the various kitchen outlets.

The barrier of employee motivation is well documented (Griffith, 2000; Panisello and Quantick, 2001; Eves and Dervisi, 2005; Bas *et al.*, 2006). Employee motivation may be affected by several factors. Problems associated with employees in the catering industry have been reported to range from: 1) high staff turnover; 2) low staff pay; 3) low status of staff; and 4) large numbers of part-time workers; to 5) staff language problems, or low education levels (Griffith, 2000). In their survey of food hygiene and safety training, Worsfold and Griffith (2003) found that 30 % of managers admitted to failing to provide feedback on performance and only 50 %

stated they would reward or praise good hygienic performance. These practices are likely to further de-motivate staff. Rosenthal *et al*. (2003) found that when performance feedback was incorporated into hand washing interventions, the compliance increased to a greater degree and identified that administrative support provides a positive influence in efforts to improve hand washing adherence.

2.8.5 Delegation of responsibility and authority

The Facility Chef had been assigned responsibility for food safety for the site and his responsibilities also included food safety at all other facilities within the corporate structure. A full-time, dedicated Food Safety Auditor had been appointed one year prior to the interviews. The incumbent expressed concern that, despite many efforts, there was still little progress towards HACCP at the site. Reasons given for this included lack of co-operation at some of the outlets, lack of co-operation from the executive sous chefs, lack of time by the sous chefs and resistance to the documentation required for the system. The incumbent had no line responsibility and, as such could not enforce food safety requirements directly. This lack of authority was a frustration although the direct reporting line to the Facility Executive Sous Chef had assisted in resolving problems with compliance. It did however necessitate the process of having to involve the Facility Chef rather than resolving the issue immediately. The incumbent had received basic food safety and HACCP training as well as attending internal auditing training. Additional training such as conflict management, project management, developing and implementing management systems should be considered. The incumbent's role in the current system involved being the eyes and ears of the Facility Chef in the kitchens. However, the responsibility for developing and driving the implementation of the site food safety management system was not clear, particularly relating to the involvement of the chefs at all levels.

During interviews, a lack of time was highlighted as a barrier to the effective implementation of the food safety documentation that had been developed. This has also been found in previous studies (Panisello and Quantick, 2001; Bas *et al*., 2007). It has also been reported that time is always limited in a catering establishment and

employees will therefore prioritise tasks according to their own perception of importance (Panisello and Quantick, 2001). This emphasises the need for clear leadership regarding the priority of food safety and the responsibility on management to ensure that time is made available by ensuring availability of sufficient resources.

2.8.6 Training policy

No evidence was found of a formal food safety training policy. Food hygiene training had commenced shortly before the interviews took place but this was the first time such training had been conducted on the site or in the organisation. All food handlers were required to attend this training, whereas prior to this only stewards had been trained on the use of cleaning chemicals by the chemical supplier. Temporary or contract staff were predominantly used and although it was reasoned that the labour broker was responsible for providing staff with food safety training, this has not materialised. During the interviews, comments were noted relating to the costs associated with training and the subsequent loss of trained staff was noted. These concerns are consistent with the survey results reported by Kramer and Scott (2004) and Worsfold (2005).

All employees had received the Employee Handbook when they were taken into service. However, no evidence was available to confirm that top management had received training in food safety. The contents of the 2006 version included: the employment policy, terms and conditions of employment, remuneration, leave conditions, details of benefits, training and development, code of conduct, and rules and regulations. Additional kitchen rules were provided in the Kitchen Standard Operating Procedures Manual (KSOM) file. The Employee Handbook referred to the corporate training policy, which was not available for review.

Negligible evidence could be found to verify if all employees had been trained and the Training Officer indicated that classes were not filled as required, although the KPAs for supervisors included the encouragement of training and ensuring that training was done in accordance with a training plan. Job profiles for supervisors and

senior chefs did not indicate any pre-requisite training in food safety, no formal induction training was available, and neither had provision been made for refresher training. This was also found in other studies by Mortlock *et al*. (2000) and Worsfold (2005). Worsfold also highlights the phenomenon of skills decay and the importance of refresher training provision.

Swanger and Rutherford (2003) cited three important duties applicable to hospitality operators, and included serving food and beverages fit for consumption, proper training of employees and terminating employees who pose a danger to other employees or guests. It was further stated that training and retraining are some of the most important duties especially when the dining public's health is at stake. Basic sanitation training should be ongoing and not merely mentioned briefly during an employee orientation. According to the Training Officer, the food hygiene training programme had been well received by the staff but improved practices were not observed during routine internal audits conducted by the Food Safety Auditor. In a study done by Bolton *et al*. (2008), it was found that improved formal training did not appear to significantly link to improved food safety practices. This was also confirmed by Clayton and Griffith (2008), who reported that it was unwise to automatically assume that improved knowledge would lead to improved food safety behaviour. At the time of the survey, no formal follow-up mechanisms had been implemented to assess the effectiveness of the training.

An additional challenge that emanated from the interviews was high staff turnover. With the focus on contract employees, it was stated that if a chef was not performing they were terminated immediately. The priority is to cook, not to be aware of food safety. A practical procedure is therefore required to ensure that staff are appropriately selected based on culinary skills and then trained in food safety requirements as soon as possible after employment. The common practice of employing casual staff can give rise to additional risks. It has been reported that businesses involved in outbreaks of food-borne illness were more likely to employ casual staff (Jones *et al*., 2008). Another factor relating to agency staff is the acceptance of the temporary staff by permanent staff. During interviews it was

stated that the former were not treated fairly by permanent staff and that abusive behaviour was observed during kitchen inspections. Such behaviour may be consistent with the prevailing cultural norms and organisational policies (Bloisi and Hoel, 2008).

2.8.7 Direct management involvement in food safety

According to respondents, there were limited formal management review processes in place and only ad-hoc management walkabouts by corporate management were carried out. However, back-of-house activities were not the focus of these walkabouts. Walkabouts were pre-scheduled and kitchens were cleaned up prior to the visit and did not represent day-to-day situations. Weekly meetings were held with the sous chefs who had the responsibility of completing food safety documentation on a daily basis. The responsibility for cleaning had caused many discussions in these meetings as chefs did not feel they were responsible for cleaning and that this responsibility lay with the stewards. In some outlets, sous chefs were reluctant to take responsibility for the stewarding function as the direct reporting line for stewards is to the Back-of-House Manager, which was confirmed during kitchen visits during the survey. These conflicting responsibilities and the absence of any formal Food and Beverage management involvement (a separate department is responsible for front-of-house in the restaurant) highlighted possible barriers to successful implementation of related systems.

2.8.8 Communication

Communication regarding food safety took place in an informal way with suppliers. Such channels were in place for banqueting clients but food safety issues such as allergens were not formally addressed. Only one outlet addressed allergens on the menu, but control systems in the kitchen were not formalised. Extensive use was made of subcontracted service providers and kitchen staff; however, no formal communication systems existed to address food safety requirements with these parties. Weekly sous chef meetings were designed to ensure communication with kitchen staff. However, this mechanism was not considered effective, based on perceptions reported during interviews. No other mechanisms for communication of

food safety issues could be found. The facility made extensive use of posters and awards systems for front-of-house personnel but these did not extend to the kitchen staff and the General Manager had reportedly addressed the sous chefs only on one occasion.

The aim of communication has been identified as promoting employees' complete understanding of food safety messages (Sprenger, 2008). A business culture that practices good communication begins with management setting specific standards to be achieved, including measurable financial goals and safe food of a quality expected by the customer. Policies and standards should be in the rule book for such an organisation and unless senior management is committed to, and fully understands their policies and standards, communication has been shown to be ineffective. The executive sous chefs held weekly meetings with the outlet sous chefs to discuss operational issues, and food safety often featured on the agenda with respect to documentation not being completed, training not being done, audit scores being discussed and subsequent corrective actions. Minutes of these meetings were required to be discussed with staff and displayed on the notice board. This, however, was not the case in all outlets and it was stated that staff often complained of a lack of information. When provided, these communications appeared mainly negative in nature, such as discussions on issues that were not done or not correct. Very little positive information relating to food safety was communicated.

Management should further encourage employee feedback concerning the effectiveness of communication to ensure that the desired message is being received (Sprenger, 2008). Jevsnik *et al*. (2008) also cautioned managers and owners to take care not to give food handlers the impression that food safety will add meaningless chores to their workload when implementing, for example, a HACCP system. The perception that excessive paperwork is a barrier to HACCP implementation was recorded by Pansiello and Quantick (2001) and confirmed by the managers in surveys conducted by Eves and Dervisi (2005) and Bas *et al*. (2006). Managers

should, therefore take care not to communicate their perceptions in relation the food safety management system and thereby demotivate staff.

2.8.9 Supervision of food safety practices

The Sous Chefs of each outlet were required to supervise staff in addition to their cooking responsibilities. The skills required for supervision and motivating a team have not been defined and there may be a need for training in this area. The pivotal role of a supervisor in food safety management systems as providing a link from senior management to food handling staff and vice versa has been highlighted by Sprenger (2008). The author confirms the role of the supervisor in implementing the organisation's food safety policies and procedures and also highlights the importance in training staff, delegating tasks and monitoring activities. The need for training in management and time management skills is emphasised. However, managers in the food service sector are generally poorly equipped to meet the responsibilities of management due to the industry being insular, emphasising craft rather than management skills (Guerrier and Deery, 1998). The current research supported these findings.

A daily hygiene checklist was in place in all kitchen outlets. The supervision of personnel hygiene requirements had been delegated to the sous chef but on review of the documentation it was found that checklists were often not completed and requirements not consistently enforced. Similar problems have been found by Eves and Dervisi (2005) with implementing documentation by chefs and also that a general problem of people not taking ownership of the system and not understanding that they played an important role in its implementation. Motarjemi and Käferstein (1998) also noted that food safety documentation was often perceived as complicated and unnecessary, recordkeeping was not considered part of the job and that the system and its importance are not realised. Documents are often completed for inspection purposes and not as an integral part of the food safety system (Eves and Dervisi, 2005).

2.8.10 Disciplinary measures

Although there were no formal incentives for food safety, the study site employed significant resources to communicate with front-of-house personnel as well as incentive schemes for guest satisfaction. However, there was no equivalent for back-of-house staff. It was clear from interviews that food safety misdemeanours were treated with written warnings issued for noncompliance and staff indicated that there had been dismissals as a result of personnel hygiene and other food safety misdemeanours. Due to the use of contract staff, staff members were often relieved of duties immediately. Operators need to adopt a zero tolerance policy when it comes to infraction of policies and procedures that put the health of others at risk (Swanger and Rutherford, 2003). It has also been reported that financial reward on its own does not guarantee higher work satisfaction and affiliation to the company in the long run, but that the fact that he or she is being acknowledged might be an important motivational factor to a worker (Jevsnik *et al*., 2008).

2.8.11 Internal audits of the food safety management system

External audits were implemented and reports were issued to senior site management. Various minor issues were highlighted, such as microbiological contamination on washed crockery but with no link to daily monitoring of this activity. Temperatures of fridges were taken during these audits, but offered no trend with respect to daily operation and control. Senior management was inclined to reacting to an external auditor's findings more readily than those of the Food Safety Auditor or even a staff member from the area affected. An effective management system should encourage employee participation and feedback and action should be taken on the feedback to ensure employees are empowered to make inputs. Previous studies also reported on the over-reliance on inspection results causing owners and managers to focus on fixing specific violations rather than on evaluating the overall performance of their food safety management system (Hedberg *et al*., 2006).

Criteria for the external audits also related to infrastructure requirements such as suitable floors, lighting and other maintenance requirements. The kitchens were penalised for actions over which they have no control, as maintenance was another organisational department who had the overall responsibility for site maintenance. This department had not been formally involved in the food safety system to date. To achieve an effective HACCP system, a suitable work environment is required in addition to motivated, satisfied and qualified staff (Jevsnik *et al*., 2008). Staff can become demotivated if they are required to implement control systems in a facility which is congested and unhygienically designed. This has also been identified by Panisello and Quantick (2001) as a technical barrier to the implementation of HACCP which should be addressed by management.

Monthly internal food safety audits were carried out by the Food Safety Auditor and addressed aspects such as: personnel hygiene, protective clothing, facility and local environment, pest control, equipment, facility layout and production control, receiving, stock rotation and food storage, cleaning and sanitation and process control such as cooking temperatures. In addition to reports, photos were taken of non-conformances. Results of the audits (scores) were communicated to senior management and were considered in performance appraisal systems. There was no evidence of formal methods of recording corrective action taken on these audit findings.

2.8.12 Documented policies and procedures for food safety, including personnel hygiene

Existing policies as defined in the Kitchen Standard Operations Manual (KSOM) did not address food safety and were found to be contradictory. In a review of factors affecting food safety compliance in the United Kingdom, it was found that many proprietors blamed their staff (and their lack of knowledge) for noncompliance issues identified by the Environmental Health Practioners (EHPs) (Yapp and Fairman, 2004). It was suggested that if the companies had implemented formal food safety management systems, food safety non-compliance would have been identified prior to regulatory inspections. Although the KSOM document was available electronically

to the senior sous chefs, limited evidence of formal training on these procedures was available. The contents of the file were focused on kitchen activities and preparation of food types, and limited food safety information was available. There was also a lack of consistency between the Food Hygiene Training Programme (FHTP), the employee handbook issued on employment, and the KSOM. Food safety information was limited to checklists and personnel hygiene requirements and the reasons that certain conditions are required (such as temperatures) were not given. The document was also not dated or approved by senior management to endorse its credibility and use and internal audits were not linked to adherence to this manual. Jouve *et al.* (1998) has suggested that appropriate documentation procedures reflect the commitment of the organisation's management to consistently apply the basic control measures identified in HACCP. Good documentation also demonstrates to third parties that people know and understand their operations and, in particular, how to maintain good hygiene practices in their establishments. While conceding that there is the need for clear instruction, Jevsnik *et al*. (2008) recommend that staff should be given the opportunity of commenting on these procedures and their opinions should be taken into consideration to strengthen the affiliation to the company.

2.8.13 Management leading by example

During the survey, management staff was observed in the kitchens not wearing protective clothing. This practice can further contribute to a lack of employee motivation to comply with food safety requirements. Previous reports agree that if managers or peers downplay training, individuals approach training with negative perceptions (Tracey and Tews, 2004). By contrast, positive behaviours by management also result in positive staff behaviours. For example, it has been found that a mentor's use of hand hygiene and glove usage was associated with increased hand hygiene among students (Rosenthal *et al*., 2003). Similar studies have also noted management commitment as an important element in ensuring good hygienic standards, citing both a lack of management awareness and negative attitudes towards hygiene among the top five factors contributing to a business representing a significant or high risk to public health (Audit Commission, 1990). Many managers

perceive their business to be low risk regardless of the foods they are handling (Mortlock *et al.*, 2000). This lack of appreciation for the inherent risk can impact on recognising the need to train or the contribution that training can make to food safety.

2.9 Conclusions

The purpose of this study was to assess a wide array of management practices in relation to food safety management at the study site. There was limited formal evidence other than the recent provision of food handler training of management commitment to food safety. The findings of this study point to the lack of a formal management system for food safety. While the choice of the system is currently at the discretion of top management, given that HACCP is not a mandatory requirement in South Africa in this sector, it can be assumed that the management of the study site was motivated to ensure the business was profitable. Several authors include the quality (and thus the food safety) of food and beverages as requirements for a total quality service system and view these as critical success factors for a business in the food service sector (Brotheron and Shaw, 1996; Wilkins *et al.*, 2006). Incorporating the food safety management system into the business objectives is, therefore likely to ensure its sustainability rather than simply conformance to legislation.

Top management is responsible for at least 94 % of the difficulties within organisations because they control the assignment of resources, establish and implement methods of work, and influence the culture (Deming, 1986). Improvement of a system is therefore the responsibility of top management (Herrero *et al.*, 2002). Management behaviour such as understanding, commitment and leadership has been found to be the single most critical success factor in the implementation of a Total Quality Management (TQM) process (Porter and Parker, 1993). Without a strong management foundation in a food safety management system, the chances of success are limited. These factors can be closely linked to the culture of an organisation.

In a review on work conducted in the safety discipline, Choudry *et al*. (2007) argued that researchers tend to use safety culture, safety climate and perhaps safety management interchangeably, as the terms are not always clear cut. Safety management is regarded as the documented and formalised system (policy, procedures, training, instructions and resources, etc.) of controlling against risk or harm. Nevertheless, the standard of an organisation's documented safety management system does not necessarily reflect the way it is carried out in practice. This is where the concept of safety culture comes into play, as it is the safety culture of the organisation that will influence the deployment and effectiveness of the safety management resources, policies, practices and procedures, as it represents the work environment and underlying perceptions, attitudes, and habitual practices of employees at all levels (Kennedy and Kirwan, 1998).

2.10 References

Audit Commission (1990), *Environmental Health Survey of Food Premises*. HMSO, London.

Bas, M., Safak, E.A. and Kivanc, G. (2006), "The evaluation of food hygiene knowledge, attitudes and practices of food handlers in food businesses in Turkey", *Food Control*, Vol. 17, pp. 317–322.

Bas, M., Yuksel, M. and Cavusoglu, T. (2007), "Difficulties and barriers for the implementing of HACCP and food safety systems in food businesses in Turkey", *Food Control*, Vol. 18, p. 124.

Bloisi, W. and Hoel, H. (2008), "Abusive work practices and bullying among chefs: A review of literature", *International Journal of Hospitality Management*, Vol. 27, pp. 649–656.

Bolton, D.J., Meally, A., Blair, I.S., McDowell, D.A. and Cowan, C. (2008), "Food safety knowledge of head chefs and catering managers in Ireland", *Food Control*, Vol. 19, pp. 291–300.

(BRC, 2008), "BRC Global Standard for Food Safety Issue 5", British Retail Consortium, London.

Brotherton, B. and Shaw, J. (1996), "Towards an identification and classification of critical success factors in UK Hotels Plc", *International Journal of Hospitality Management*, Vol. 15, No. 2, pp. 113–135.

CAC/RCP 39-1993, *Code of hygienic practice for pre-cooked and cooked foods in mass catering*, Codex Alimentarius Commission.

Choudry, R.M, Fang, D. and Mohamed, S. (2007), "The nature of safety culture: A survey of the state-of-the-art", *Safety Science*, Vol. 45, pp. 993–1012.

Clayton, D.A. and Griffith C.J. (2008), "Efficacy of an extended theory of planned behaviour model for predicting caterers' hand hygiene practices", *International Journal of Environmental Health Research*, Vol. 18, No.2, 83–98.

Codex Alimentarius (1993), *Guidelines for the application of the hazard analysis critical control point system* ALINORM 93/131. Appendix 11.

Corbett, C.J. and Young, A.C.L. (2008), "Special issue on meta-standards on operations management: Cross-disciplinary perspective", *International Journal of Production Economics*, Vol. 113, pp. 1–2.

Creswell, J.W. (1998), *Qualitative inquiry and research design: Choosing among the five traditions*, Sage, London, pp. 115–117.

Deming, W.E. (1986), *Out of crisis*, Cambridge, MA: MIT Press.

Department of Health (1993), *Assured safe catering*, Her Majesty's Stationery Office, London.

Department of Health, *Regulation 908 of the Foodstuffs*, *Cosmetics and Disinfectants Act*, Act of 54 of 1972, South Africa.

Department of Health, *Regulations governing General Hygiene requirements for Food Premises and the transport of food*, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), Republic of South Africa.

Eves, A. and Dervisi, P. (2005), "Experiences of the implementation and operation of HACCP in the food service sector", *International Journal of Hospitality Management*, Vol. 24, pp. 3–19.

FMI (2008), *SQF 2000 Code*, *A HACCP-Based Supplier Assurance Code for the Food Manufacturing and Distributing Industries*, Arlington, USA.

FSANZ(2007) Food Safety Australia New Zealand

http://www.foodstandards.gov.au/foodstandards/foodsafetystandardsaustraliaonly/standard321.cfm

Griffith, C. (2000), "Food safety in catering establishments". In: Farber, J.M., Todd, E.C. (Eds.), *Safe Handling of Foods*. Marcel Dekker, New York, pp. 235–256.

Guerrier, Y. and Deery, M. (1998), "Research in hospitality human resource management and organisational behaviour", *International Journal of Hospitality Management*, Vol. 17, pp. 145–160.

Hale , A.R., Heming, B.H.J., Catfhey, J. and Kirwan, B. (1997), "Modelling of safety management systems", *Safety Science*, Vol. 26, No. l/2, pp. 121-140.

Hale, R. (2003a), "How training can add real value to the business, part 1", *Industrial and Commercial Training*, Vol. 35, No. 1, pp. 29–32.

Hale, R. (2003b), "How training can add real value to the business, part 2", *Industrial and Commercial Training*, Vol. 35, No. 2, pp. 49–52.

Harris, J.E., Gleason, P.M., Sheean, P.M., Boushey, C., Beto, J. and Breummer, B. (2009), "An introduction to qualitative research for food and nutrition professionals", *Journal of the American Dietetic Association*, Vol. 109, pp. 80–90.

Hedberg, C.W., Smith, S.J., Kirkland, E., Radke, V., Jones, T.F., Selman, C.A. and EHS-NET – working group (2006), "Systematic environmental evaluations to identify food safety differences between outbreak and non-outbreak restaurants", *Journal of Food Protection*, Vol. 9, No. 11, pp. 2697–2702.

Herrero, S.G., Saldana, M.A.M., Del Campo, M.A.M. and Ritzel, D.O. (2002), "From the traditional concept of safety management to safety integrated with quality", *Journal of Safety Research*, Vol. 33, pp. 1–20.

(IFS, 2007), *International Food Standard*, *Standard for auditing retailer and wholesaler branded products*, version 5, International Featured Standard, Berlin.

(ISO, 2005), ISO 22000:2005, *Food Safety Management Systems: Requirements*, International Organisation for Standardisation, Geneva.

(ISO, 2008), ISO 9001:2008, *Quality Management Systems: Requirements*, International Organisation for Standardisation, Geneva.

Jevsnik, M., Hlebec, V. and Raspor, P. (2008), "Food safety knowledge and practices among food handlers in Slovenia", *Food Control*, Vol. 19, pp. 1107–1108.

Jones, S.L., Parry, S.M., O'Brien, S.J. and Palmer, S.R. (2008), "Are Staff Management Practices and Inspection Risk Ratings Associated with Food-borne Disease Outbreaks in the Catering Industry in England and Wales?", *Journal of Food Protection*, Vol. 71, No. 3, pp. 550–557.

Jouve, J.J., Stringer, M.F. and Baird-Parker, A.C. (1998), *Food safety management tools*, ILSI Europe report series.

Kang, Y.-J. (2000). Safe food handling in airline catering. In Farber, J.M. and Todd, E.C.D. (Eds.), *Safe Handling of Foods*, Marcel Dekker, New York, pp. 197–233.

Kennedy, R. and Kirwan, B. (1998), "Development of a hazard and operability-based method for identifying safety Management vulnerabilities in high risk systems", *Safety Science*, Vol. 30, pp. 249–274.

Kramer, J. and Scott, W.G. (2004), "Food safety knowledge and practices in ready-to-eat food establishments", *International Journal of Environmental Health Research*, Vol. 14, No. 5, pp. 343–350.

Luning, P.A. and Marcelis, W.J. (2007), "A food quality management functions model from a techno-managerial perspective", *Trends in Food Science and Technology*, Vol. 18, No. 3, pp. 159–166.

Luning, P.A., Marcellis, W.J., Rovira J., Van der Spiegel, M., Uyttendaele, M. and Jacxsens, L. (2009), "Systematic assessment of core assurance activities in a company specific food safety management system", *Trends in Food Science and Technology*, article in press.

MacAuslan, E. (2005), "Think laterally on training", *Environmental Health Journal*, July, pp. 20–21. [Available at www.ehj-online.com/archive/2000/july2005/july5. html].

Mitchell, R., Fraser, A. and Bearon, L. (2007), "Preventing food-borne illness in food service establishments: Broadening the framework for intervention and research on safe food handling behaviours", *International Journal of Environmental Health Research*, Vol. 17, No. 1, pp. 9–24.

Mortimore, S. (2001a), Conclusions. In Mayes, T. and Mortimore, S. (Eds.), *Making the most of HACCP. Learning from others' experience* (pp. 235–264). Cambridge, Boca Raton (etc.): CRC Press, Woodhead.

Mortimore, S. (2001b), "How to make HACCP really work in practice", *Food Control*, Vol. 12, pp. 209–215.

Mortlock, M.P., Peters, A.C. and Griffith, C.J. (2000), "A national survey of food hygiene training and qualification levels in the UK food industry", *International Journal of Environmental Health Research*, Vol. 10, pp. 111–123.

Motarjemi, Y. and Käferstein, F. (1998), "Food safety, Hazard Analysis and Critical Control Point and the Increase in Food-borne Disease: A Paradox?", *Food Control*, Vol. 10, pp. 325–333.

Panisello, P.J. and Quantick, P.C. (2001), "Technical barriers to hazard analysis critical control point (HACCP)", *Food Control*, Vol. 12, No. 3, pp. 165–173.

Panisello, P.J., Quantick, P.C. and Knowles, M.J. (1999), "Towards the implementation of HACCP: Results of a UK regional survey", *Food Control*, Vol. 10, pp. 87–90.

Porter, L. and Parker, A. (1993), "Total quality management – the critical success factors", *Total Quality Management and Business Excellence*, Vol. 4, No. 1, pp. 13–22.

Regulation EC (2004), *No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the Hygiene of Foodstuffs*, Official Journal of the European Communities, p. 18.

Rosenthal, V.D., McCormick, R.D., Guzman, S., Villamayor, C. and Orellano, P.W. (2003), "Effect of education and performance feedback on hand washing: The benefit of administrative support in Argentinean hospitals", *American Journal of Infection Control*, Vol. 31, No. 2, pp. 85–92.

(SANS, 2001), SABS 049:2001, *Code of Practice – Food Hygiene*, Standards South Africa, Pretoria.

(SANS, 2007), SANS 10330:2007, *Requirements for a HACCP System*, Standards South Africa, Pretoria.

Seaman, P. and Eves, A. (2006), "The management of food safety – The role of food hygiene training in the UK service sector", *International Journal of Hospitality Management*, Vol. 25, pp. 278–296.

Singh, P. (2007), "Empirical assessment of ISO 9000 related management practices and performance relationships", *International Journal of Production Economics*, Vol. 113, pp. 40–59.

Sprenger, R. (2008), *Hygiene for Management – A Text for Food Safety Courses*, Highfield.co.uk Limited, pp. 264–321.

Sun, Y.-M., & Ockerman, H. W. (2005). "A review of the needs and current applications of hazard analysis and critical control point (HACCP) system in foodservice areas". *Food Control*, Vol. 16, No. 4, pp. 325-332.

Swanger, N. and Rutherford, D.G. (2003), "Food-borne illness: the risk environment for chain restaurants in the United States", *International Journal of Hospitality Management*, Vol. 23, pp. 71–85.

Taylor, E. (2001), "HACCP in small companies: benefit or burden?", *Food Control*, Vol. 12, pp. 217–222.

Tracey, J.B. and Tews, M.J. (2004), "An Empirical Investigation of the Relationships among Climate, Capabilities, and Unit Performance", *Journal of Hospitality and Tourism Research*, Vol. 28, No. 3, pp. 298–312.

(USFDA, 2005) U.S. Food and Drug Administration. 2005. *Food Code*, *2005*. Available at: Http://www.cfsan.fda.gov/_dms/fc05-toc.html. Accessed 1 September 2009.

The Supplement to the FDA Food Code, *2007*.

Walker, E. and Jones, N. (2002), "An assessment of the value of documenting food safety in small and less developed catering businesses", *Food Control*, Vol. 13, No. 4–5, pp. 307–314.

Walker, E., Pritchard, C. and Forsythe, S. (2003), "Food handlers' hygiene knowledge in small food business", *Food Control*, Vol. 14, pp. 339–343.

Wilkins, H., Merrilees, B. and Herington, C. (2006), "Towards an understanding of total quality service in hotels", *International Journal of Hospitality Management*, Vol. 26, pp. 840–853.

Worsfold, D. (2005), "A survey of food safety training in small food manufacturers", *International Journal of Environmental Health Research*, Vol. 15, pp. 281–288.

Worsfold, D. and Griffith, C.J. (2003), "A survey of food hygiene and safety training in the retail and catering industry", *Nutrition and Food Science*, Vol. 33, No. 2, pp. 68–79.

Yapp, C. and Fairman, R. (2004), "Factors affecting food safety compliance within small and medium sized enterprises: Implications for regulatory and enforcement strategies", *Food Control*, Vol. 17, pp. 42–51.

Chapter 3

The role of management in food safety at a prominent South African entertainment facility II: The provision of food safety training

For submission partially or in full to: British Food Journal

3.1 Abstract

Purpose:

To determine the extent and level of food safety training conducted at a prominent South African entertainment facility in order to ascertain the deployment of the training policy.

Design/methodology/approach:

A questionnaire survey was conducted on a random sample of staff in all seven kitchens within the facility to determine various aspects related to food safety training.

Findings:

Training had been provided to 38 of the 63 employees interviewed, with 0.55 days as the average time spent in training. Furthermore, of the untrained employees in this sample, 16 had been employed for less than one year and these staff had no prior experience with handling food. Sixty-two percent (62 %) of staff agreed with disciplinary action taken if the correct food safety behaviours were not practiced.

Originality/value:

Given ample research findings that point to food handlers as a causal factor in many outbreaks of food-borne illness, the importance of ensuring food safety training is essential as part of a preventive food safety management system. This study further highlights the role of line management in the food safety management systems by ensuring skilled and competent staff via effective training programmes.

Keywords: Food safety, food service, South Africa, personnel hygiene, training, food handlers

Paper type: Descriptive survey

3.2 Introduction

In South Africa, as in many countries, training food handlers in food safety is a legal requirement, with regulations governing General Hygiene requirements for Food Premises and the transport of food, published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), stating in regulation 10(b): "A person in charge of food premises shall ensure that any person working on the food premises is adequately trained in food hygiene by an inspector or any other suitable person."

The importance of food safety training is more than merely legal compliance. A lack of food handler training is a pivotal factor in the constant incidence of food-borne illnesses (Motarjemi and Käferstein, 1998). In the United Kingdom, the Audit Commission (1990) found a strong link between those premises with poor food safety practices and low levels of training. Food handler training is regarded as an important strategy whereby food safety can be increased and is a requirement of the personnel hygiene pre-requisite programme (PRP) for Hazard Analysis Critical Control Point (HACCP) (Wallace and Williams, 2001). In addition, the lack of training was identified as a barrier to HACCP as a food safety management system (Pansiello *et al*., 1999).

While the need for food handler training has received considerable attention, the need for managers and supervisors to be trained is often overlooked. In a UK survey, Mortlock *et al*. (2000) found that fewer than 20 % of managers were trained appropriately in food safety. This lack of training may restrict management's ability to assess risks in their businesses and to assign appropriate hygiene training for staff. Similarly, Bolton *et al*. (2008) found that 20 % of the head chefs surveyed had no formal training in food hygiene. Senior chefs are responsible for supervising and enforcing food safety practices in a kitchen and are thus crucial in the success of any food safety initiative. An adequate training policy should, therefore address the training needs of all levels of authority to be effective. Training on its own has not proved to be an effective mechanism for ensuring an effective food safety management system. Although food handlers were aware of food safety actions,

63 % have been reported not to reflect such knowledge in the correct behaviour (Clayton *et al*., 2002).

Despite the lack of congruence in literature on the effectiveness of training, there is no dispute regarding the need for it. Hand washing has been found more likely to be practiced in restaurants where workers had food safety training (Green *et al*., 2006). In another study, the hand hygiene of workers with more work experience (>10 years) was found to be superior to inexperienced ones and even workers with higher educational levels would still require specific training on food and personal hygiene (Aycicek *et al*., 2004). In the UK, 94 to 97 % of food handlers interviewed identified the need to wash their hands after using the toilet, to wear protective clothing, to cover cuts with easily detectable plasters and that jewellery should not be worn in the kitchen as it can carry dirt and bacteria (Walker *et al*., 2003). However, Bas *et al*. (2006) reported that only 21.2 % of Turkish food handlers identified the need to wash their hands after using the toilet, handling raw foods and before handling ready-to-eat (RTE) food. Despite training, it was also found that food service workers commonly reported risky food handling practices (Green *et al*., 2005). A quarter of the workers were of the opinion that that they did not always wash their hands while a third did not always change their gloves between touching raw meat or poultry and RTE food.

A number of studies have indicated that, although training may provide an increased knowledge of food safety, it does not always result in a positive change in food handling behaviours (Howes *et al*., 1996; Powell *et al*., 1997). Clayton *et al*. (2002) found that food handlers were aware of food safety actions, although 63 % of them did not conduct behaviour in favour of food safety. On the other hand, Roberts *et al*. (2008) reported that hand washing knowledge and behaviour improved significantly after training.

3.3 Standards for training – an international perspective

The UK food service industry has relied on nationally accredited foundation level food safety education and training to provide the knowledge food handlers need to make safe and informed decisions about their food safety practices (Seaman and Eves, 2006). This requirement is strengthened with the promulgation of Regulation 852/2004 (EC), Chapter XII, which states that food business operators must ensure that "food handlers are supervised and instructed and/or trained in food hygiene matters commensurate with their work activity". The regulation further requires that those responsible for the development and maintenance of the HACCP procedure have received adequate training in the application of HACCP principles and compliance with any requirements of national law concerning training programmes for persons working in certain food sectors. The business owner can determine the level of training required, depending on the nature of the business and the activities carried out by each food handler employed. Persons preparing high risk open food require the level of training equivalent to that contained in the Level 2 Food Safety courses accredited by one of the recognised awarding bodies such as the Royal Institute of Public Health (Sprenger, 2008).

The US model places similar emphasis on the manager. As stated in Chapter 2 of the 2007 Supplement to the Federal Department of Agriculture (FDA) Food Code (2005), a person in charge of a food handling establishment is required to demonstrate knowledge of food safety requirements and be a certified food protection manager. This certification can only be awarded on successful completion of an examination as set by an accredited agency. This person shall then ensure that employees are properly trained in food safety as it relates to their assigned duties. The Food Standards Australia New Zealand (FSANZ) require food businesses in Australia to ensure that food handlers and supervisors of food handling operations possess the skills and knowledge of food safety and food hygiene for the work they perform. In the State of Victoria, for example, for a food business to be registered it should have a food safety programme and an appointed food safety supervisor. This individual, who does not need to be on site full-time, nor be a member of staff, should obtain a statement of attainment for their food safety skills and knowledge. The minimum

competency standards are defined for the food service sector. Further guidance is given by the FSANZ in terms of the skills and knowledge required by food handlers to assist food service businesses in developing adequate in-house training programmes. The training requirements for the USA, the UK and Australia are summarised in Table 3.1. Similar minimum mandatory requirements for the level of training are not available in South Africa and training is at management's discretion.

3.4 Purpose of the study

Given that in South Africa the requirements for training are not mandated and enforcement of training is infrequent, this study seeks to investigate the deployment of food safety training at the study site, isolated from external factors. It is envisaged that the results from the study would cast light on the food safety knowledge, attitudes and perceptions of food handlers at the entertainment facility in order to improve these if necessary, and in so doing improve food safety and the well-being of the consumer.

Table 3.1: Summary of selected food handler training systems.

Country	Training requirements	Level	Certification required
USA	Food protection	Person in charge	Yes
	Food hygiene	Food handler	No
UK	HACCP requirements Industry guides	Interpreted as manager	No
	Food hygiene	Food handler	No
Australia	Food safety	Manager or person supervising staff	Yes
	Food hygiene	Food handler	No
South Africa	Food hygiene	Food handler	No

3.5 Materials and methods

A survey was conducted in the kitchens of a prominent South African entertainment facility which has seven kitchens under its direct control that vary in size from a small breakfast outlet with four kitchen staff members to a banqueting kitchen with 30 kitchen staff members during peak periods. The kitchens also vary in production type from full à la carte service to breakfast buffet only. Jointly, the kitchens employ 168 staff members including stewarding and feed on average 140 000 patrons every month. The survey was conducted via a self-administered questionnaire which was developed with the aim of collecting descriptive information on the length of employment and provision of food safety training. The researcher had been involved with the study site for several years prior to the survey and as such was well positioned to address the specific needs and systems in use. A number of discussions were held at various levels with employees and questions were benchmarked during these sessions. The questionnaire was piloted informally during site visits prior to the survey date with these employees. The survey addressed the length and type of employment, position in the company, the type of food safety training attended whilst employed and length of this training. Four questions relating to food handler perception were included where respondents were asked to score their perception of a statement based on a rating system of importance. Respondents were then asked a further two open-ended questions in relation to responsibility for food safety and actions to be taken if an infringement of a food safety practice was noted. All staff were informed of the survey and requested to participate on a voluntary basis.

The respondents were randomly selected based on who was on shift at the time of the survey. Employees were informed verbally of the reason for the survey. Alternative participants were selected if staff refused to participate in the interviews. Interviews were conducted during normal working hours in the kitchen. The questionnaire was completed by the participants and the researcher in cases where ambiguity arose. All information was captured anonymously to further protect the participants.

3.6 Results and discussion

A total of 63 questionnaires were completed during the survey. Table 3.2 indicates the details of employment of the respondents. Results are presented as the means of observations expressed as frequencies and percentages.

3.6.1 Details of employment

Sixty-three of the 168 staff members in the seven kitchens were interviewed to complete the questionnaire. Of the staff interviewed, 15 (24 %) were permanently employed and 49 (76 %) were temporary staff supplied by a labour broker. The average period of service at the facility was 34 months, and ranged from three days to 18 years. More than one third (22) of the employees had been employed for less than one year. Table 3.2 further shows the job function of the respondents, ranging from the most senior Executive Sous Chef to trainees. The majority of staff interviewed (60 %) were chefs with no supervisory responsibilities.

3.6.2 Details of food hygiene/food safety training

The average duration of internal training (provided off-the-job at the facility) received was 0.55 days, with 24 (38 %) employees having received no training, as indicated by Table 3.3. Sixteen of these untrained employees had been employed for less than one year and many indicated that this was their first job. At the time of the survey, one employee had been employed for 10 years and had not received any food safety training, and another had been employed for 16 years and also stated that no food safety training had been provided in that time. When questioned on whether hand washing training had been provided by the facility, 38 (60 %) indicated that they had received this training while 14 (22 %) respondents indicated they had received this training at a previous employer.

Table 3.2: Type of employment (n=63).

Criteria	Type	Frequency	Percentage (%)
Employment status	Permanent	15	24
	Labour broker	49	76
Position	Facility Executive Sous Chef	1	1.6
	Executive Sous Chef	2	3.2
	Sous Chef	9	14.3
	Jnr Sous Chef	2	3.2
	Chef De Partie	4	6.2
	Chef	38	60.3
	Commie chef	4	6.2
	Trainee	4	6.2
Number of months employed at the facility			
Mean	34 months		
Range	22 employees employed for less than 1 year 3 days – 18 years		

Table 3.3: Details of training received (n=63).

Criteria	Frequency	Percentage (%)
Number of employees trained	39	61.9
Number of employees not trained	24	38.1
Position of staff not trained		
Chef	15	23.8
Trainee	2	3.2
Chef de Partie	2	3.2
Sous Chef	5	7.9
Number of days food safety training provided by the facility		
Mean (days)		
Internal training	0.55	
External training	0.30	
Number of employees trained in hand washing at the facility	38	60.3
Number of employees trained in hand washing by previous employer	14	22.2
Number of employees scheduled to attend training but then could not attend	6	9.5

The supervisors had not all attended the internal training, and only four of the 14 sous chefs interviewed attended. This raises a concern as the lack of reinforcement of concepts learnt on training or contradiction of learning concepts have been shown to impact on food safety practices. Trained managers were also found more likely to train their staff and that any food safety training initiative should have the full support of all levels of management (Roberts and Barrett, 2009). Moreover, having a shift manager knowledgeable about food safety was found to have the same effect as having all the food handlers trained (Pilling *et al*., 2008). One could thus argue that more emphasis should be placed on training the sous chefs. Such findings are supported by Hedberg *et al*. (2006) who found that restaurants where kitchen managers had attended food safety certification training were associated with a reduced incidence of food-borne illness. In addition, Clayton and Griffith (2008) found that the food safety practices of work colleagues and supervisors affected caterers' intentions to carry out hand hygiene. Studies have found that hand washing compliance improved if the supervisor led by example (Larson and Kretzer, 1995; Snow *et al*., 2003). Clayton and Griffith (2008) concluded that providing off-site food hygiene training to individual food handlers without providing training to the other food handlers in the organisation may be ineffective in changing the recipients' practices. To improve practices, the authors propose that all members of the workforce should be targeted, including supervisors and managers.

3.6.3 Comparative analysis of employees' food safety opinions

Employee responses to the questions relating to opinions are given in Table 3.4. Fifty-four percent of respondents described their opinion of hand washing as extremely important, 33 % indicating it as very important, while 13 % felt that this practice was only important. Thirty-three percent of respondents indicated that the transmission of food-borne illness by their hands was only likely, 24 % as very likely, with 26 % of the opinion that this was extremely likely. The majority of respondents indicated "likely" which would suggest some knowledge of this crucial practice.

Table 3.4: Results of food handler food safety opinion survey.

Criteria	Frequency				
Choose one which best describes your opinion					
Proper washing and drying of my hands is	**Extremely important**	**Very important**	**Important**	**Unimportant**	**Extremely unimportant**
	34 (53.9)	21 (33.3)	8 (12.7)	0	0
Improper washing and drying of my hands could result in a customer becoming ill	**Extremely likely**	**Very likely**	**Likely**	**Unlikely**	**Extremely unlikely**
	18 (28.6)	15 (23.8)	21 (33.3)	7 (11.1)	2 (3.2)
My boss thinks proper washing and drying of my hands is	**Extremely important**	**Very important**	**Important**	**Unimportant**	**Extremely unimportant**
	*21 (33.3)	26 (41.3)	14 (22.2)	1 (1.6)	0
***one respondent did not answer this question**					
For me to wash and dry my hands at appropriate times is	**Extremely difficult**	**Very difficult**	**Difficult**	**Easy**	**Extremely easy**
	0	2 (3.2)	10 (15.9)	41 (65.1)	9 (14.2)

Note: Value in parentheses indicates percentage(%)

In a study done by Lues and van Tonder (2007) coliforms were present on 40 % of food handlers' hands and on 26 % of aprons. According to Shojaei *et al*. (2006), a notable reduction in hand contamination occurred after a simple intervention which included face-to-face health education on strict hand washing after using the toilet, and this supports numerous citations that hands are an important vehicle of food cross-contamination.

In two cases, respondents indicated that they had been exposed to proper hand washing techniques and the importance of safe food handling practices during their tertiary theoretical education. However, when questioned on their impression of the implementation of these practices at the study site under study, both identified that they had observed that these practices were not carried out by staff and that they did not wish to "appear different" from the rest. These comments suggest that the effect of colleagues, as reported by Seaman and Eves (2006) is a factor with potentially notable impact. This tendency may also have affected the results on the ease of hand washing with only two respondents indicating that the practice was very difficult (Table 3.4). During the interviews, this was expressed as being due to time constraints. This agreed with studies conducted by Green and Selman (2005) and Strobehn *et al*. (2008).

3.6.4 Responsibilities for food safety and disciplinary measures

During the interviews, respondents were questioned about who they regarded as being responsible for food safety at their place of work or outlet (Table 3.5). The sous chefs had been formally appointed to complete hygiene checklists and cooking temperature records. Twenty-two respondents indicated that the sous chef was responsible for food safety, which implies that they associated food safety with paperwork and not safe food practices. Two respondents indicated the Food Safety Auditor as being responsible, seven respondents said this was the responsibility of the Chef de Cuisine or the Senior Sous Chef and two indicated the Executive Facility Sous Chef. These last would be the highest level of management for the outlet (Chef de Cuisine) or for the entire facility (Executive Facility Chef).

Table 3.5: Results of a survey related to food safety responsibility (n=63).

Criteria	Frequency	Percentage (%)
Person responsible for food safety		
Sous Chef	22	34.9
Chef de Cuisine	7	11.1
Food Safety Auditor	2	3.2
Executive Facility Chef	2	3.2
It's a team effort – me too	26	41.3
Have no idea	4	6.3

This is correct in terms of the legal requirement that assigns "the person in charge" responsibility for ensuring that the correct practices are implemented and enforced. However, the desired outcome would be that food safety is a team effort where each food handler is individually responsible for his or her actions. Forty-one percent of respondents indicated this was their opinion.

Respondents were reluctant to comment on disciplinary measures (Table 3.6). Almost 62 % of the respondents agreed that a written warning for not following the hygiene rules was appropriate. This was the current practice of the organisation in the study. Twenty-three percent were of the opinion that this practice was too strict and did not take into account time constraints and other barriers to implementation in the kitchens. Ten percent of the staff interviewed indicated that the action was not severe enough based on their experience with other employers. One respondent indicated that no action had been taken on their infraction which suggests that the stated policy is not enforced uniformly.

An interesting observation was highlighted by one contract employee who referred to disciplinary measures as "holiday". This meant that the employee was not placed on the roster for a period of time, resulting in "no work, no pay" action for not complying with food safety requirements. This was, however not the formal company policy. In general, the responses indicated that employees were in favour of feedback regarding incorrect food safety behaviours.

3.7 Conclusion

The study identified that only 60 % of staff in the survey had received training, indicating that the study site did not fully comply with the legal requirements for training of food handlers. The results of the survey further indicated that employees were aware of the importance of hand washing, although it was not possible to determine if this was as a result of the training intervention or prior knowledge. Many of the supervisors were not yet trained in food safety and the impact of the food safety training intervention on food safety behaviours will require more in depth assessment.

Table 3.6: Opinion of disciplinary actions (n=39).

Criteria	Frequency	Percentage (%)
No action is taken if I do not follow food safety rules such as hand washing	1	2.6
A written warning is given and I agree with this practice	24	61.5
A written warning is given and I do not agree with this practice	9	14.3
The written warning is not strict enough	4	10.2
Contract staff are not utilised for a period	1	2.6

The need for evaluation of training is evident, but this should go beyond an assessment of the training content and design. Factors, such as management support, availability of equipment and tools, training and pre-training motivation can all influence the extent to which individuals react to training. The effectiveness of training is dependent on both managerial attitude and willingness to provide food handlers with the resources and systems to implement proper practices. The existence of formal feedback systems in cases of adhering to food safety practices will assist with developing the correct management culture for food safety, provided that the implementation of training is possible and given that the facilities are in place to conveniently carry out behaviours.

3.8 References

Audit Commission, 1990. *Environmental Health Survey of Food Premises*. HMSO, London.

Aycicek, H., Aydogan, H., Kucukkaraaslan, A., Baysallar, M. and Basustaoglu, A.C. (2004)," Assessment of the bacterial contamination on hands of hospital food handlers", *Food Control*, Vol. 15, pp. 253–259.

Bas, M., Ersun, A.O. and Kavanç, G. (2006), "The evaluation of food hygiene knowledge, attitudes and practices of food handlers in food businesses in Turkey", *Food Control*, Vol. 17, pp. 317–322.

Bolton, D.J., Meally, A., Blair, I.S., McDowell, D.A. and Cowan, C. (2008), "Food safety knowledge of head chefs and catering managers in Ireland", *Food Control*, Vol. 19, pp. 291–300.

Clayton, D.A. and Griffith C.J. (2008), "Efficacy of an extended theory of planned behaviour model for predicting caterers' hand hygiene practices", *International Journal of Environmental Health Research*, Vol. 18, No. 2, pp. 83–98.

Clayton, D., Griffith, C., Price, P. and Peters. A. (2002), "Food handlers' beliefs and self-reported practices', *International Journal of Environmental Health Research*, Vol. 12, pp. 25–39.

FSANZ(2007) Food Safety Australia New Zealand

http://www.foodstandards.gov.au/foodstandards/foodsafetystandardsaustraliaonly/standard321.cfm

Green, L. and Selman, C. (2005), "Factors impacting food workers' and managers' safe food preparation practices: a qualitative study", *Food Protection Trends*, Vol. 25, pp. 981–990.

Green, L., Selman, C., Banerjee, A., Marcus, R., Medus, C., Angulo, F., *et al*. (2005), "Food service workers' self-reported food preparation practices: an EHS-Net study", *International Journal of Hygiene and Environmental Health*, Vol. 208, pp. 27–35.

Green, L.R., Selman, C.A., Radke, V., Ripley, D., Mack, J.C. Reimann, D.W. *et al*. (2006), "Food worker hand washing practices: An observation study", *Journal of Food Protection*, Vol. 69, pp. 2417–2423.

Hedberg, C.W., Smith, S.J., Kirkland, E., Radke, V., Jones, T.F., Selman, C.A. and EHS-NET – working group (2006), "Systematic environmental evaluations to identify food safety differences between outbreak and non-outbreak restaurants", *Journal of Food Protection*, Vol. 9, No. 11, pp. 2697–2702.

Howes, M., McEwen, S., Griffiths, M. and Harris, L. (1996), "Food handler certification by home study: measuring change in the knowledge and behaviour", *Dairy Food Environmental Sanitation*, Vol. 3, pp. 208–214.

Larson, E. and Kretzer E.K. (1995), "Compliance with hand washing and barrier precautions", *Journal of Hospital Infection*, Vol. 30, pp. 88–106.

Lues, J.F.R. and van Tonder, I. (2007), "The occurrence of indicator bacteria on hands and aprons of food handlers in the delicatessen sections of a retail group", *Food Control*, Vol. 18, pp. 326–332.

Mortlock, M.P., Peters, A.C and Griffith, C.J. (2000), "A national survey of food hygiene training and qualification levels in the UK food industry", *International Journal of Environmental Health Research*, Vol. 10, pp. 111–123.

Motarjemi, Y. and Käferstein, F. (1998), "Food safety, Hazard Analysis and Critical Control Point and the Increase in Food-borne Disease: A Paradox?", Food Control, Vol. 10, pp. 325–333.

Panisello, P.J., Quantick, P.C. and Knowles, M.J. (1999), "Towards the implementation of HACCP: Results of a UK regional survey", *Food Control*, Vol. 10, pp. 87–90.

Pilling, V.K., Brannon, L.A., Shanklin, C.W., Roberts, K.R., Barrett, B. and Howells, A.D. (2008), "Food safety training requirements and food handlers' knowledge and behaviours", *Trends in Food Protection*, Vol. 28, No. 3, pp. 192–200.

Powell, S.C., Attwell, R.W. and Massey, S.J. (1997), "The impact of training and knowledge and standards of food hygiene DA pilot study", *International Journal of Environmental Health Research*, Vol. 7, pp. 329–334.

Regulations governing General Hygiene requirements for Food Premises and the transport of food, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), Regulation 10(b), Republic of South Africa.

Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs.

Roberts, K.R. and Barrett, B. (2009), "Behavioural, normative and control beliefs impacts on the intention to offer food safety training to employees", *Food Protection Trends*, Vol. 29, No. 1, pp. 21–30.

Roberts, K.R., Barrett, B., Howels, A.D., Pilling, V.K. and Brannon, L.A. (2008), "Food safety training and food service employees knowledge and behaviour", *Food Protection Trends*, Vol. 28, No. 4, pp. 252–260.

Seaman, P. and Eves, A. (2006), "The management of food safety – The role of food hygiene training in the UK service sector", *Hospitality Management*, Vol. 25, pp. 278–296.

Shojaei, H., Shooshtaripoor, J. and Amiri, M.E. (2006), "Efficacy of simple hand washing in the reduction of microbial hand contamination of Iranian food handlers", *Food Research International*, Vol. 39, pp. 525–529.

Snow, M., White, G.L., Alder, S.C. and Stanford, J.B. (2003), "Mentor's hand hygiene practices influence student's hand hygiene rates", *American Journal of Infection Control*, Vol. 31, pp. 85–92.

Sprenger, R. (2008), *Hygiene for Management – A Text for Food Safety Courses*, Highfield.co.uk Limited, pp. 264–321.

Strohbehn, C., Sneed, J., Peaz, P. and Meyer, J. (2008), "Hand washing frequencies and procedures used in retail food services", *Journal of Food Protection*, Vol. 71, No. 8, pp. 1641–1650.

(USFDA, 2005) U.S. Food and Drug Administration. 2005. *Food Code*, *2005*. Available at: Http://www.cfsan.fda.gov/_dms/fc05-toc.html. Accessed 1 September 2009.

The Supplement to the FDA Food Code, 2007.

Walker, E., Pritchard, C. and Forsythe, S. (2003), "Food handlers' hygiene knowledge in small food business", *Food Control*, Vol. 14, pp. 339–343.

Wallace, C. and Williams, T. (2001), "Pre-requisites: A help or a hindrance to HACCP?", *Food Control*, Vol. 12, pp. 235–240.

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http://www.foodstandards.gov.au/foodstandards/foodsafetystandardsaustraliaonly/standard321.cfm

Chapter 4

The role of management in food safety at a prominent South African entertainment facility III: The provision of basic hygiene infrastructure

For submission partially or in full to: British Food Journal

4.1 Abstract

Purpose:

To assess the adequacy of basic hygiene related infrastructure provision by the management of a prominent South African entertainment facility.

Design/methodology/approach:

A data collection checklist was constructed using published norms for hygiene related infrastructure, and seven kitchens in the facility were surveyed for compliance using this checklist. Data was recorded and presented as frequencies and qualitative observations.

Findings:

The facilities provided did not fully comply with the assessment criteria, with the exception of the issue and control of protective clothing.

Originality/value:

This study highlights the importance of management providing the correct support structures to facilitate the correct personnel hygiene practices. The study further emphasises the role of hand washing as an indicator of basic personnel and premises hygiene.

Keywords: Food safety, South Africa, personnel hygiene, hand washing, food handlers

Paper type: Qualitative survey

4.2 Introduction

The hands of food service employees can be vectors in the spread of food-borne disease, mainly because of poor personal hygiene and cross-contamination (Ehiri and Morris, 1996). It was reported in 1999 by Guzewich and Ross that in 89 % of outbreaks caused by food contaminated by food handlers, pathogens were transferred by workers' hands. More recently, Strohbehn *et al*. (2008) found in two US Food and Drug Administration studies (FDA), that inadequate hand washing practices by workers occurred in all types of retail food services. Inadequate hand washing was found to be a contributory factor in 31 % of outbreaks occurring in Washington State from 1990 to 1999 (Todd *et al*., 2009).

Proper hand washing was defined by the FDA Food Code for retail establishments (2007) as an activity lasting for at least 20 seconds involving the use of warm running water, soap, friction for 10 to 15 seconds, rinsing and drying with clean towels or hot air. This procedure is described slightly differently in other sources and may include a single or double wash process, depending on the activity prior to hand washing (Sprenger, 2008). A single wash would involve using friction and soap only while the double wash would require the use of a nail brush before re-washing with friction.

4.3 Barriers to hand washing compliance

After training, the food handler may face further barriers when trying to carry out safe food handling practices (Seaman and Eves, 2006). This is referred to as "the effect of significant others" and "the effect of physical and psychological job related barriers" relating to the food handler being affected by the prevailing attitudes, standards and morale within a business, which forms part of its organisational culture. This culture may have an effect on the motivation of employees to transfer training to the workplace. Food handlers may be aware of the need to carry out certain practices but without the provision of adequate resources, these practices become difficult to implement (Clayton *et al*., 2002).

Two studies conducted in Oregon revealed barriers to proper hand washing to be multiple factors, such as time pressures, inadequate facilities and supplies, lack of accountability and lack of manager and co-worker involvement (Strohbehn *et al*., 2008). Sink accessibility and time pressure have also been perceived to be a barrier to hand washing compliance (Green and Selman, 2005). An additional perceived barrier of dry skin from frequent hand washing may also cause employees to avoid frequent hand washing. Green *et al.,* (2007), found that there are a number of factors are related to hand hygiene practices and support those who have suggested that food worker hand hygiene improvement requires more than the provision of food safety education. These factors may include, but are certainly not limited to activity type, worker busyness, number and location of hand sinks, availability of supplies (e.g., gloves, soap, towels), restaurant ownership, and the relationship between prevention methods (i.e., glove use and hand washing).

Several researchers have applied social cognition theory and models to hand hygiene behaviour. Mullan and Wong (2009), Pilling *et al*. (2008), and Clayton and Griffith (2008) have all used the theory of planned behaviour in an attempt to understand the barriers to hand hygiene compliance. From the reported results it was evident that factors exist other than knowledge that influences a person's intention and attitude towards compliance. Effective interventions may need to focus on changing the organisational food safety culture rather than only paying attention to training programmes (Clayton and Griffith, 2008).

Behavioural theories and secondary intervention that are largely focused on the individual are insufficient to effect sustained change (Pittet, 2001). The interdependence of individual factors, environmental constraints and the institutional climate should be considered for improving hand washing compliance in the study. Factors such as lack of education and performance feedback, high workload, understaffing and lack of role models can affect the individual but also the group of staff members, which in turn influence the individual's behaviour. Factors operating at the institutional level include a lack of written guidelines, lack of appropriate hand hygiene agents and facilities, lack of an atmosphere conducive to compliance and

lack of administrative leadership, sanctions, rewards and support. These factors can often be related to the level of hand washing compliance in the food industry.

4.4 Purpose of the study

The provision of adequate procedures and facilities for hand hygiene is the responsibility of management. Furthermore, strategies to improve hand hygiene compliance will require the recognition and subsequent removal of these barriers. It is unlikely that these barriers can be removed by the employees themselves. The aim of this study was to assess the current hand hygiene facilities available in a food service facility and to identify resource shortcomings and other barriers that may impact on hygiene compliance. The results of this study can be useful in guiding other organisations to take note of these factors when developing a strategy for hand washing.

4.5 Materials and methods

4.5.1 Backdrop

The study area comprised the largest entertainment facility of a well known South African Hotel and Casino Group that is nationally represented. The facility consisted of four hotels on site and extensive conferencing facilities with a casino. The facility has seven kitchens under its direct control which were the subject of this study. The kitchens vary in size from a small breakfast outlet with four kitchen staff members to a banqueting kitchen with 30 kitchen staff members during peak periods. The kitchens also vary with regard to production type from full à la carte service to breakfast buffet only. Jointly, the kitchens employ 168 staff members including stewarding and feed on average 140 000 patrons every month. Table 4.1 describes each kitchen with respect to service type, staff, location and general infrastructure.

4.5.2 Development of the survey checklist

A data collection checklist was developed based on SABS 049:2001(SANS 10049:2001) South African National standard, Code of practice – Food hygiene, Regulation 918 of the Health Act, Act 63 of 1977, CAC/RCP 39-1993, Code of

hygienic practice for pre-cooked and cooked foods in mass catering, Codex Alimentarius Commission and PAS 220:2008 (BSI, 2008) pre-requisite programmes on food safety for food manufacturing. Aspects of the checklist were also added from reports by Martinez-Tome *et al*. (2000), Couto Campos *et al*. (2008) and Veiros *et al*. (2009). The survey was conducted via walk through and observation. Given the importance of hand washing as a mechanism to prevent the spread of food-borne illness, the survey focused on facilities provided for hand washing.

Table 4.1: Description of kitchens surveyed in the study.

Outlet	Type of food service	Maximum number of staff/shift	Setting
P	Breakfast	4 chefs 3 stewards	Old kitchen
O	Breakfast buffet All day à la carte service	6 chefs 2 stewards	New hotel and thus new kitchen facilities
A	Breakfast buffet All day à la carte	8 chefs 3 stewards	Originally designed as a coffee shop, now being utilised as flag ship restaurant servicing 5 star hotel, small and cramped
SP	All day à la carte	5 chefs 3 stewards	Adequate size and facilities
Q	Buffet	Function dependent 11-15 chefs 3 stewards	Kitchen incorrectly designed for safe food practices, originally outsourced and designed for reheating services only.
M	Banqueting	Function dependent 18-28 chefs 4 stewards	Kitchen is zoned into hot and cold areas, pastry section separate.
GD	Set menu staff canteen	3 chefs 4 stewards	Located in the main kitchen and share hot kitchen facilities. Small and cramped.

NOTE: A, SP, Q, M and GD are abbreviations used to identify the restaurant outlets studied.

The requirements for hand washing have been defined as a designated hand wash station, an accessible wash hand basin or trough, non-hand operable taps, a supply of clean warm (35–45°C) running water with a volume of at least 4 to 8 litres per minute, suitable soap, preferably liquid, non-irritating in a replaceable cartridge, paper towels, preferably using an infrared dispenser and a foot operated or open-topped bin for used towels, which is emptied as often as necessary (Sprenger, 2008). Many of these requirements are consistent with the requirements as defined in the documents used as reference for the checklist.

4.5.3 Execution of the survey

A detailed kitchen inspection took place with all seven kitchens inspected on the same day. The kitchen inspection involved observations of the hand washing facilities for the food handlers only and interviews were carried out during this inspection.

4.5.4 Scoring methodology for the checklist

A customised scoring system for the kitchen inspection was applied as follows: 1) one mark for a dedicated hand wash basins (zero was applied in this requirement if the hand wash basin was shared with a sink/pot wash area as this indicated there were insufficient hand wash basins in the area); 2) one mark for liquid antibacterial soap preparation being available; 3) one mark for paper towels for hand drying; 4) one mark for hot water being available at the hand wash basin; 5) one mark for the taps being non-hand-operated; 6) one mark for a hand sanitiser being available; and 7) one mark for appropriate signage instructing employees how to wash their hands. Thus a total of 7 marks were attainable for each hand wash basin provided. Results were presented as frequency values in relation to qualitative comments

4.6 Results and discussion

The results of the survey of the hygiene facilities in the kitchen are represented in Table 4.2. None of the hygiene facilities scored 100 %, with the most common cause for noncompliance being the absence of a dedicated hand wash basin, as this facility was also being used as a food sink. Although all hand wash basins were equipped with hot and cold water, liquid soap and paper towels, the facilities were not fitted with non-hand-operated taps (Table 4.2).

4.6.1 Adequacy of hand washing facilities

The survey of the hand wash facilities in the kitchen resulted in a score of 71 %. A total of 15 hand wash stations were provided. More than 50 % of these were not dedicated to hand washing and although it could be argued that any hand washing is better than none, the opportunity for cross-contamination is limited using a dedicated hand washing facility. It is known that, although soap and water remove contamination from the hands, soap itself has a limited antimicrobial effect, which implies that contamination is transferred to the sink (Bloomfield *et al*., 2007) and even fully automated sinks can become contaminated with pathogenic organisms if not properly maintained (Jumaa, 2005). Griffith *et al*. (2003) found all taps, paper towel dispensers and soap dispensers to be contaminated with micro-organisms that could re-contaminate washed hands. The need to maintain hand wash stations, therefore, cannot be overemphasised and this maintenance is simplified if the sink is used for hand washing purposes only.

According to the survey, the number of hand washing stations was not sufficient for the number of staff in the kitchen and hand wash stations were also not conveniently located. Outlet O was equipped with a hand wash station for every three chefs (Table 4.2). Outlets Q and M had the fewest facilities and the greatest number of staff in these kitchens. There was no hand wash station on the buffet at outlet Q where chefs routinely served patrons. Outlet M had only one hand wash station, which was located in one corner of the kitchen, a considerable distance from cooking and preparation areas. The hand wash station at the entrance of the latter

locality was designed to ensure all staff washed their hands on entering the kitchen. However, this could be bypassed by staff entering the pastry and hot kitchen areas.

In a survey done by Green *et al*. (2007) on hand washing compliance, it was found that workers and managers most frequently identified access to hand wash stations as significant. Furthermore, it was reported that having too few or inaccessible sinks was a barrier to hand washing, particularly in busy times and that appropriate hand washing was more likely to occur in restaurants where there were multiple sinks and where a sink was in the worker's line of sight.

Hand wash stations were provided with hot water and cold water as shown although there was inadequate control of the temperature, as no mixers were provided. Based on the dual purpose of many sinks, it is likely that water coming out of the tap may be too hot or too cold for effective hand washing purposes. A significant difference has been found in a study by Guzewich and Ross (1999) in resident microflora removal between washing and rinsing with 21°C and 50°C, with no removal of the microflora with water at 4°C. Hand washing with warm water (above 50°C) is thought to exacerbate the damage done to the skin's barrier function. However, it has been suggested that warm water (43°C-48°C) is sufficient to wash off the pathogens that have been loosened by hand washing with plain soap or detergents. The activation energy of antimicrobial agents is easier to achieve at higher temperatures, thus surfactants and other antimicrobial components in hand washes work more efficiently. The authors found in a study of hand washing at various water temperatures, a significant difference in resident microflora removal was seen between washing and rinsing with 21°C and 48°C water. There were no resident microflora removed at 4°C, despite the use of soap and manual hand washing. Washing and rinsing with warm water brings resident flora from deep skin layers to the surface where they are removed with washing or drying. Guzewich and Ross (1999) concluded that in any case, water temperatures must be within a comfortable range to the user in order to be effective and practical.

Table 4.2: Survey findings (n=7).

Outlet	Type of food service	Maximum number of staff/shift	Number of hand wash basins designated for hand washing only	Non-hand-operated	Hot cold water, temperature controlled/mixers	Liquid soap	Paper towel	Signage	Sanitiser	Score
Requirements of standards			**S, C, P**	**S, C**	**S, R, C, P**	**S**	**C, S**		**C, P, S**	
P	Breakfast	4 chefs 3 stewards	1 dedicated	N	Y	Y	Y	Y	Y	6
			1 shared with pot wash	N	Y	Y	Y	Y	Y	5
O	Breakfast buffet	6 chefs	1 in main kitchen	N	Y	Y	Y	Y	Y	6
	All day à la carte service	2 stewards	1 in cold kitchen	N	Y	Y	N	Y	Y	5
			1 shared with sink in buffet area	N	Y	Y	N	N	N	2
A	Breakfast buffet All day à la carte	8 chefs 3 stewards	1 in main kitchen	N	Y	Y	Y	Y	Y	6
SP	All day à la carte	5 chefs 3 stewards	1 in main kitchen	N	Y	Y	N	Y	Y	5
Q	Buffet	Function dependent 11-15 chefs 3 stewards	1 shared with sink in hot kitchen	N	Y	Y	Y	Y	Y	5
			1 shared with prep bowl in cold kitchen	N	Y	Y	Y	Y	Y	5
			1 shared with sink in pastry	N	Y	Y	Y	Y	Y	5
M	Banqueting	Function dependent 18-28 chefs 4 stewards	1 shared with sink in hot kitchen	N	Y	Y	Y	Y	Y	5
			1 in entrance lobby	N	Y	Y	Y	Y	Y	6
			1 in pastry kitchen	N	Y	Y	Y	Y	Y	6
			1 shared with sink in cold kitchen	N	Y	Y	Y	Y	Y	5
GD	Set menu staff canteen	3 chefs 4 stewards	1 shared with sink	N	Y	Y	Y	Y	Y	5

4.6.2 Soap and hand sanitiser

All hand wash stations were stocked with antimicrobial liquid soap, as indicated on Table 4.2. With the exception of one hand wash station, all were equipped with an alcohol-based sanitiser preparation. Although Shojaei *et al*. (2006) found a 56 % reduction in pathogens on hands of street vendors using plain soap and water, Montville *et al*. (2002) found that soap with an antimicrobial agent was more effective than regular soap. The use of a sanitiser was found to further reduce the possibility of cross-contamination, but there was little difference reported in the efficacy of alcohol versus alcohol-free sanitisers in the study. Alcohol sanitisers have been advised not to be used in the presence of physical dirt as they are not cleaning agents (Larson and Kretzer, 1995). The presence of sanitisers may also impact negatively on hand washing, as respondents have been reported to use sanitisers in the place of hand washing (Green and Selman, 2005). The importance of a correct hand washing procedure and proper training is thus further emphasised.

4.6.3 Drying methods

Paper towels were installed for drying purposes at 80 % of the hand wash stations at the time of the survey. Management should ensure that the inventory is closely monitored so that hand soap and paper towels are always available (Howells *et al*., 2008). The use of paper towels for drying is also the correct practice for food safety. Hot air drying has been demonstrated to have the capacity of increasing bacterial contamination, while paper towel drying caused a decrease in the level of contamination (Montville *et al*., 2002). However, Harrison *et al*. (2003) found cross-contamination between hands, towels and paper towel dispensers if either one of these were contaminated and concluded that the design of the paper towel dispenser was important. The facility under study employed a variety of designs of paper towel dispensers. It would be preferable to ensure that the design was the most effective in limiting cross-contamination. No "hands-free" types were used in any of the kitchens audited (Table 4.2).

4.6.4 Hand washing signage

The presence of signage to depict the correct hand washing technique and to promote hand washing was found to be essential in improving compliance, in a study conducted by Pittet (2001). The presence of signage at the facility could assist but only if this is part of a holistic awareness strategy (Table 4.2).

4.6.5 Procedures for hygiene

The food hygiene training programme manual was reviewed during the survey. This manual only addressed hand washing superficially and no provision was made for a practical demonstration of correct hand washing technique, and neither were diagrams or photographs provided. Given the body of research showing the critical importance of hand washing in the prevention of food-borne illness, this may be considered a gross oversight. Allwood *et al*. (2004) found in their study that only 48 % of food handlers were able to demonstrate the correct hand washing technique, omissions being the acceptable length of time and the use of a nail brush. These details should be addressed in a training programme. It has also previously been found that after correct hand washing training, microbial counts were decreased on the hands of street vendors, which highlighted that this training is appropriate at even the most basic level (Shojaei *et al*., 2006).

The kitchen standard operating procedures manual (KSOM) was also assessed for hand washing instructions. However, the procedure in the manual required hand washing for one minute. This is unlikely to be complied with as it is unreasonable. The USA Food Code (2005) requires a minimum of 20 seconds. The use of disinfectants for cleaning and the use of hand sanitisers were not addressed in either document, nor did either document address any legal requirement, nor the legal obligations of a food handler. There was no mention of reporting of illness in the kitchens and neither document addressed the use of gloves when handling ready-to-eat food, or when working with a wound that is correctly dressed.

4.6.6 Supervision of hand washing practices

Sous chefs were required to complete a checklist daily but this checklist only addressed the supplies for hand washing, not the practice. In a survey of food service, conducted by Green *et al*. (2005), workers reported that they commonly undertook risky food handling practices. A quarter of the workers surveyed reported that they did not always wash their hands. The need for supervision of this practice is therefore significant to minimise the possibility of the spread of food-borne illness. Rosenthal *et al*. (2003) found that the introduction of performance feedback in relation to hand washing practices significantly improved hand washing adherence. Similar results were found by Green and Selman (2005) where respondents indicated that management or co-worker emphasis on food safety practices improved hand washing compliance. These respondents also indicated that negative consequences motivated them not to implement unsafe practices. The use of logs or records for hand washing also assisted in such practice. The hand washing procedure defined in the KSOM is unrealistic in that it requires rubbing of the hands for one minute, while Bloomfield *et al*. (2007) recommended a wash time of 15 seconds. However, they admitted that even this time is unlikely to be adhered to. A realistic time should, therefore, be documented and enforced. The procedure also does not require the use of a hand sanitiser after washing although one is provided at most hand wash basins. This use of the hand sanitiser is essential, but if the procedure is not specified, an employee could assume its use to be optional.

4.7 Conclusion

Given the volume of data indicating that food handlers pose a significant risk to food safety in the food service environment, strict performance of personnel hygiene practices are essential for the provision of safe food. The checklist approach to identify any infrastructural shortcomings can easily be incorporated into similar audits such as internal audits to ensure the continuing adequacy of the personnel hygiene facilities. The findings indicated that the implementation of the hand washing requirement was not in line with accepted norms and regulations due to the lack of, amongst others, sufficient hand wash basins. The provision of facilities such as sufficient and conveniently located hand wash basins is a management function

and the findings of this study highlighted that management should first ensure that they are not contributing to the lack of implementation of correct food safety practices by failing to provide the resources for these practices. Similar studies have highlighted that barriers to hand washing are heavily influenced by management (Green and Selman, 2005; Howells *et al.*, 2008). These support the fact that management can have a direct influence on employees having the equipment for hand washing, whether there are negative consequences when hand washing is not done, as well as the consistent emphasis on hand washing even at peak times. Management should further assist by giving frequent reminders, being positive role models and reinforcing employees' food safety behaviour via verbal praise. Management should also re-configure job assignments to ensure that no unnecessary time is wasted (Green *et al.*, 2006; Strobhen *et al.*, 2008).

The results from this study may be useful in guiding other organisations to take note of the mentioned factors when developing a strategy for hand washing. The results should be considered when implementing any aspect of a food safety management system. These factors can be incorporated into quality assurance and audit programmes and training programmes for food handlers in order to strengthen these as well as to ensure that these factors are not overlooked.

4.8 References

Allwood, P., Jenkins, T., Paulus, C., Johnson, L. and Hedberg, C. (2004), "Hand washing compliance among retail food establishment workers in Minnesota". *Journal of Food Protection*. Vol. 67, pp. 2825–2828.

Aycicek, H., Aydogan, H., Kucukkaraaslan, A., Baysallar, M. and Basustaoglu, A.C. (2004), "Assessment of the bacterial contamination on hands of hospital food handlers", *Food Control*, Vol. 15, pp. 253–259.

Bas, M., Ersun, A.O. and Kavanç, G. (2006), "The evaluation of food hygiene knowledge, attitudes and practices of food handlers in food businesses in Turkey", *Food Control*, Vol. 17, pp. 317–322.

Bloomfield, S.F., Aiello, A.E., Cookson, B., O'Boyle, C. and Larson, E.L. (2007), "The effectiveness of hand hygiene procedures in reducing the risks of infection in home and community setting including hand washing and alcohol hand sanitisers", *American Journal of Infection Control*, Vol. 35, No. 10, pp. S27–S64.

BSI (2008), PAS 2200:2008 *Prerequisite programmes on food safety for food manufacturing*, British Standards Institute, London.

CAC/RCP 39-1993, *Code of hygienic practice for pre-cooked and cooked foods in mass catering*, Codex Alimentarius Commission.

Clayton, D.A. and Griffith C.J. (2008), "Efficacy of an extended theory of planned behaviour model for predicting caterers' hand hygiene practices", *International Journal of Environmental Health Research*, Vol. 18, No. 2, pp. 83–98.

Clayton, D., Griffith, C., Price, P. and Peters. A. (2002), "Food handlers' beliefs and self-reported practices', *International Journal of Environmental Health Research*, Vol. 12, pp. 25–39.

Couto Campos, A.K., Soares Cardonha, N.M., Galvao Pinheriro, L.B., Ferreira, N.R., Medeiros de Azevedo, P.R. and Montenegro Stamford, N.L. (2008), "Assessment of personal hygiene and practices of food handlers in municipal public schools in Natal, Brazil", *Food Control*. Accepted manuscript.

Ehiri, J. and Morris, G. (1996), "Hygiene training and education of food handlers: does it work?", *Ecology of Food Nutrition*, Vol. 35, pp. 243–251.

Green, L. and Selman, C. (2005), "Factors impacting food workers' and managers' safe food preparation practices: a qualitative study", *Food Protection Trends*, Vol. 25, pp. 981–990.

Green, L., Selman, C., Banerjee, A., Marcus, R., Medus, C., Angulo, F.J. *et al*. (2005), "Food service workers self reported food preparation practices: an EHS-Net study", *International Journal of Hygiene and Environmental Health*, Vol. 208, pp. 27–35.

Green, L.R., Selman, C.A., Radke, V., Ripley, D., Mack, J.C., Reimann, D.W. *et al*. (2006), "Food worker hand washing practices: An observation study", *Journal of Food Protection*, Vol. 69, pp. 2417–2423.

Green, L.R., Radke, V., Mason, R., Bushnell, L., Reimann, D.W., Mack, J.C. *et al*. (2007), "Factors related to food worker hand hygiene practices", *Journal of Food Protection*, Vol. 70, No. 3, pp. 661–666.

Griffith, C., Malik, R., Cooper, R.A., Looker, N. and Michaels, B. (2003), "Environmental surface cleanliness and the potential for contamination during hand washing", *American Journal of Infection Control*, Vol. 31, No. 2, pp. 93–96.

Guzewich, J. and Ross, M. (1999), "Evaluation of risks related to microbiological contamination of ready-to-eat food by food preparation workers and the effectiveness of interventions to minimise those risks", Available at: http://www.cfsan.fda.gov/_ear/rterisk.html. Accessed 1 August 2009.

Harrison, W.A., Griffith, C.J., Ayers, T. and Michaels, B. (2003), "Bacterial transfer and cross-contamination potential associated with paper-towel dispensing", *American Journal of Infection Control*, Vol. 31, No. 7, pp. 387–391.

Howells, A.D., Roberts, K.R., Shanklin, C.W., Pilling, V.K., Brannon, L.A. and Barrett, B. (2008), "Restaurant Employees' Perceptions of Barriers to Three Food Safety Practices", *American Dietetic Association*, Vol. 108, No. 8, 1345–1349.

Howes, M., McEwen, S., Griffiths, M. and Harris, L. (1996), "Food handler certification by home study: Measuring change in the knowledge and behaviour", *Dairy Food Environmental Sanitation*, Vol. 3, pp. 208–214.

Jumaa, P.A. (2005), "Hand hygiene: Simple and complex", *International Journal of Infectious Diseases*, Vol. 9, pp. 3–14.

Larson, E. and Kretzer E.K. (1995), "Compliance with hand washing and barrier precautions", *Journal of Hospital Infection*, Vol. 30, pp. 88–106.

Lues, J.F.R. and van Tonder, I. (2007), "The occurrence of indicator bacteria on hands and aprons of food handlers in the delicatessen sections of a retail group", *Food Control*, Vol. 18, pp. 326–332.

Lynch, R.A., Phillips, M.L., Elledge, B.L., Hanumanthaiah, S. and Boatright, D.T. (2005), "A preliminary evaluation of the effect of glove use by food handlers in fast food restaurants", *Journal of Food Protection*, Vol. 68, No. 1, pp. 187–190.

Martinez-Tome, M., Vera, A.M. and Murcia, A.M. (2000), "Improving the control of food production in catering establishments with particular reference to the safety of salads", *Food Control*, Vol. 11, pp. 437–445.

Montville, R., Chen, Y. and Schaffner, D.W. (2002), "Risk assessment of hand washing efficacy using literature and experimental data", *International Journal of Food Microbiology*, Vol. 73, pp. 305–313.

Mortimore, S. (1999), "An example of some procedures used to assess HACCP systems within the food manufacturing industry", *Food Control*, Vol. 11, pp. 403–413.

Mullan, B.A. and Wong, C.L. (2009), "Hygiene food handling behaviours. An application of the theory of planned behaviours", *Appetite*, Vol. 52, No. 3, pp. 757–761.

Panisello, P.J. and Quantick, P.C. (2001), "Technical barriers to hazard analysis critical control point (HACCP)", *Food Control*, Vol. 12, No. 3, pp. 165–173.

Pilling, V.K., Brannon, L.A., Shanklin, C.W., Roberts, K.R., Barrett, B. and Howells, A.D. (2008), "Food safety training requirements and food handlers' knowledge and behaviours", *Trends in Food Protection*, Vol. 28, No. 3, pp. 192–200.

Pittet, D. (2001), "Improving adherence to hand hygiene practice: A multidisciplinary approach", http://www.cdc.gov.ncidod/EID/vol7no2/pittet.htm, accessed 17 August 2009.

Powell, S.C., Attwell, R.W. and Massey, S.J. (1997), "The impact of training and knowledge and standards of food hygiene DA pilot study", *International Journal of Environmental Health Research*, Vol. 7, pp. 329–334.

Regulations governing General Hygiene requirements for Food Premises and the transport of food, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), Regulation 10(b), Republic of South Africa.

Roberts, K.R., Barrett, B. and Sneed, J. (2005), "Status of Prerequisite and HACCP program implementation in Iowa and Kansas restaurants: Sanitarians' perspective", *Food Protection Trends*, Vol. 25, No. 9, pp. 694–700.

Rosenthal, V.D., McCormick, R.D., Guzman, S., Villamayor, C. and Orellano, P.W. (2003), "Effect of education and performance feedback on hand washing: The benefit of administrative support in Argentinean hospitals", *American Journal of Infection Control*, Vol. 31, No. 2, pp. 85–92.

SANS (2001), SABS 049:2001 *South African National Standard*, *Code of Practice – Food Hygiene*, Standards SA, Pretoria.

Seaman, P. and Eves, A. (2006), "The management of food safety – The role of food hygiene training in the UK service sector", *Hospitality Management*, Vol. 25, pp. 278–296.

Shojaei, H., Shooshtaripoor, J. and Amiri, M. (2006), "Efficacy of simple hand washing in the reduction of microbial hand contamination of Iranian food handlers", *Food Research International*, Vol. 39, pp. 525–529.

Sprenger, R. (2008), *Hygiene for Management – A Text for Food Safety Courses*, Highfield.co.uk Limited, pp. 264–321.

Strohbehn, C., Sneed, J., Peaz, P. and Meyer, J. (2008), "Hand washing frequencies and procedures used in retail food services", *Journal of Food Protection*, Vol. 71, No. 8, 1641–1650.

Todd, E.C.D., Greig, J.D., Bartleson, C.A. and Michaels, B.S. (2009), "Outbreaks where food workers have been implicated in the spread of food borne disease. Part 6. Transmission and survival of pathogens in the food processing and preparation environment", *Journal of Food Protection*, Vol. 72, No. 1, pp. 202–219.

U.S. Food and Drug Administration. 2005. *Food code*, *2005*. Available at: Http:// www.cfsan.fda.gov/_dms/fc05-toc.html. Accessed 1 September 2009.

The Supplement to the FDA Food Code, 2007.

Veiros, M.B., Proenca, R.P.C., Santos M.C.T., Kent-Smith, L. and Rocha, A. (2009), "Food safety practices in a Portuguese canteen", *Food Control*, accepted manuscript.

Walker, E., Pritchard, C. and Forsythe, S. (2003), "Food handlers' hygiene knowledge in small food business", *Food Control*, Vol. 14, pp. 339–343.

Yapp, C. and Fairman, R. (2006), "Factors affecting food safety compliance within small and medium sized enterprises: Implications for regulatory and enforcement strategies", *Food Control*, Vol. 17, pp. 42–51.

Chapter 5

Food safety at a prominent entertainment facility IV: Towards standardised training best-practice

For submission partially or in full to: Food Control

5.1 Abstract

Purpose:

To identify improvements in the design of food safety training programmes in South Africa.

Design/methodology/approach:

A best practice audit checklist was constructed by reviewing the literature for the design and related content of a proper food handler food safety training programme. To this end, criteria were selected from countries where food safety training programmes are well entrenched. The training manual and standard operating procedures manual from a prominent South African entertainment complex were assessed against these selected criteria.

Findings:

The training programme under review was found not to address many of the requirements used as base line audit criteria. The method of delivery and assessment processes were also not in line with accepted norms and the training programme was not designed using National Unit Standards.

Originality/value:

The results of this study are aimed at assisting hospitality and processing industries of the food industry to identify opportunities for improvement in their training programmes and ensure that the minimum requirements for effective knowledge transfer are accurately addressed.

Keywords: Food safety, auditing, South Africa, training, food service

Paper type: Case study

5.2 Introduction

5.2.1 The role of the food handler in the spread of food-borne disease

Commercial catering premises are the most frequent reported settings of food-borne disease outbreaks in the United Kingdom (UK) and the United States of America (USA) (Clayton and Griffith, 2004). This data is available given that these countries have formal reporting systems; similar data is therefore not available in less developed countries. Reasons for the reported outbreaks may include urbanisation, changing nutritional habits and modern lifestyles resulting in many more consumers eating out rather than preparing their own food (Medeiros de Azevedo *et al*., 2008). It has become increasingly important to identify the causes of these food-borne illnesses and to recognise the contributing practices in, amongst others, food service establishments (Strohbehn *et al*., 2008). Poor personal hygiene has been identified as one of these contributing factors as identified, for example, by the Center for Disease Control (Mead *et al*., 1999). In two U.S Food and Drug Administration (FDA) studies, inadequate hand washing practices by workers were encountered in all types of retail food services (Strohbehn *et al*., 2008) and inadequate hand washing was cited as a contributory factor in 31 % of outbreaks occurring in the USA's Washington State from 1990 to 1999 (Todd *et al*., 2009). The authors also reported observing food handlers washing and drying hands and then wiping clean hands on dirty pants.

Contamination can be transferred to and from workers through raw food, hands (including dirty fingernails, rings, and other jewellery), clothing, aerosols, fomites, food waste, food packaging and other environmental sources (Todd *et al*., 2009). Food handlers may further transmit pathogens passively from a contaminated source, for example raw poultry to food such as cold cooked meat that is consumed without further processing. Food handlers may also themselves be sources of organisms, either during the course of gastrointestinal illness or during and after convalescence, when they may no longer have symptoms (Bas *et al*., 2006). Green *et al*. (2005) showed that food service workers commonly reported risky food handling practices. A quarter of the workers reported that they did not always wash

their hands, while a third did not always change their gloves between touching raw meat or poultry and ready-to-eat (RTE) foods. It is thus evident that food handlers not only play a key role in any food safety management system but also that they pose a significant barrier to effective implementation thereof. Griffith (2000) reported that food handlers often lack interest in food safety systems and also that they often have a negative attitude towards food safety programmes.

5.2.2 Training as a measure to improve food safety compliance

The Audit Commission (1990), in the UK, found a strong link between those premises with poor food safety practices and low levels of training. Motarjemi and Käferstein (1999) reported that a lack of food handler training is a primary factor in the dramatic increase of food-borne illness incidence. Food handler training has become regarded as an important strategy whereby food safety can be increased. In addition, it is a key requirement of the personnel hygiene pre-requisite programme (PRP) for HACCP (Wallace and Williams, 2001). This programme requires, amongst others, the development of a personnel hygiene policy, rules relating to protective clothing, and behaviour and personal hygiene practices (Sprenger, 2008). ISO 22000:2005 furthermore requires that the effectiveness of training should be assessed.

Lack of training was identified as a barrier to HACCP as a food safety management system (Pansiello *et al*., 1999). Due to employees not being able to train themselves, the responsibility lies with management, who should provide resources for training, either in-house training, which will require the development of an adequate in-house training programme, or external, which will require the selection of an appropriate service provider. All training interventions will require time to deliver and staff will require time away from their duties to attend training. Therefore, management should consequently ensure processes to assess the effectiveness of training interventions towards changing and implementing new behaviours.

MacAuslan (2003) is of the opinion that the majority of food businesses do not have satisfactory training policies for staff and emphasised that excessive emphasis is

placed upon obtaining a certificate rather than attention to achieving competency in food hygiene practice. The author further suggested more emphasis and resources be made available towards assisting managers to become motivated food hygiene managers who foster and maintain a food safety-conducive culture within their businesses.

While the need for food handler training has received considerable attention in research, the need for managers and supervisors to be trained is often overlooked. Mortlock *et al*. (1999), found in a UK survey that less than 20 % of managers were trained appropriately in food safety. The author concluded that this lack of training may restrict management's ability to assess risks in their businesses as well as to assign appropriate hygiene training for staff. Similarly, Bolton *et al*. (2008) found that 20 % of head chefs surveyed had no formal training in food hygiene. Senior chefs are responsible for supervising and enforcing food safety practices in a kitchen and are thus crucial in the success of any food safety initiative. Thus, an adequate training policy should address the training needs of all levels of authority to be effective. Training on its own has not proved to be effective in ensuring a robust food safety management system. Clayton *et al*. (2002) asserted for example, that although food handlers were aware of food safety actions, 63 % of them did not conduct behaviour in favour of food safety. Management should consider this when developing a holistic strategy to food safety to ensure the investment made in training delivers the return. Despite the lack of congruence in literature on the effectiveness of training, there is no dispute as to the need for training. Assuming that in its simplest form training is the transfer of the required food safety knowledge, it is imperative that such knowledge be technically correct and the method of training pedagogically sound for the target audience.

5.2.3 The status of food safety training in South Africa

Regulations governing General Hygiene requirements for Food Premises and the transport of food, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), state in regulation 10(b): "A person in

charge of food premises shall ensure that any person working on the food premises is adequately trained in food hygiene by an inspector or any other suitable person." This requirement is supported by further guidelines from the Department of Health regarding the management and health surveillance of food handlers. This guide highlights the training of food handlers being the responsibility of the health authorities that should ensure appropriate programmes to be implemented. The said guide does not however exclude other trainers as service providers, provided they are "properly trained" and requires a test of knowledge and the provision of refresher courses. The current local authorities have been reported to have limited capacity to provide this training for industry and as a result the majority of companies seek alternative training mechanisms to ensure legal compliance.

The South African Skills Development Act, Act 97 of 1998 makes provision for recognition of workplace training as an alternative to formal qualifications. This is done via unit standards which are defined by the South African Qualifications Authority for identified competencies. These unit standards are then grouped into registered qualifications. The Unit Standard 7800: "Maintain health, hygiene and professional appearance", which deals with personnel hygiene requirements including hand washing, is a compulsory unit standard in many registered qualifications used in the food service sector. Training providers providing accredited training may utilise this unit standard in the development of their training and assessment tools. Only registered Education Development and Training Practitioners may however present accredited training. This requirement serves to ensure that the trainers are competent to present the training programmes, although the registration requirements only consider education and qualifications and not whether the trainer is able to effectively transfer knowledge.

There is currently no legal requirement governing the selection of accredited training providers. The majority of companies in South Africa are required to contribute at least 1 % of their employee remuneration costs annually as a skills development levy. There is the option to recoup a percentage of this levy for companies who conduct training in line with their workplace skills programmes although the

administration processes for this are seen as a barrier to utilise this mechanism for training, especially for smaller organisations.

5.2.4 International comparisons

According to Seaman and Eves (2006), the food service industry in the United Kingdom has relied on nationally accredited foundation level food safety education and training to provide the knowledge that food handlers need to make safe and informed decisions about their food safety practices. This requirement was supported through the promulgation of Regulation 852/2004(EC), Chapter XII, which states that food business operators are to ensure that "food handlers are supervised and instructed and/or trained in food hygiene matters commensurate with their work activity". The regulation further requires that those responsible for the development and maintenance of the HACCP procedure have received adequate training in the application of HACCP principles, and compliance with any requirements of national law concerning training programmes for persons working in certain food sectors. The business owner can determine the level of training required, given the nature of the business and the activities carried out by each food handler employed. According to Sprenger (2008), persons preparing high risk open food require a level of training equivalent to that contained in the Level 2 Food safety courses accredited by one of the recognised awarding bodies such as the Royal Institute of Public Health.

The USA model places similar emphasis on the manager. As stated in Chapter 2 of the 2007 Supplement to the Federal Department of Agriculture (FDA) Food Code (2005), a person in charge of a food handling establishment is required to demonstrate knowledge of food safety requirements and be a certified food protection manager. This certification can only be awarded on successful completion of an assessment as stipulated by an accredited agency. The food protection manager shall then ensure that employees are properly trained in food safety as it relates to their assigned duties.

The Food Standards Authority of Australia New Zealand (FSANZ) require food businesses in Australia to ensure that food handlers and supervisors of food handling

operations possess the skills and knowledge of food safety and food hygiene for the work they perform. In the state of Victoria, for example, for a food business to be registered, it should have a food safety programme and an appointed Food safety supervisor. This individual should obtain a statement of formal attainment of their food safety skills and knowledge. The minimum competency standards (SITXFSA001A – Implement food safety procedures, Level 2) is required for the food service sector. Further guidance is given by the FSANZ for the skills and knowledge required by food handlers to assist food service businesses in developing adequate in-house training programmes. This approach using published standards for training and supporting direct or accredited training provision is also used in Canada and Ireland. The training requirements for the USA, the UK and Australia are summarised in Table 5.1.

Table 5.1: Summary of selected food handler training requirements.

Country	Training requirements	Level	Certification required
USA	Food protection	Person in charge	Yes
	Food hygiene	Food handler	No
UK	HACCP requirements	Interpreted as manager	No
	Industry guides		
	Food hygiene	Food handler	No
Australia	Food safety	Manager or person supervising staff	Yes
	Food hygiene	Food handler	No
South Africa	Food hygiene	Food handler	No

5.2.5 The role of standard operating procedures as a training tool

No legal requirement exists in South Africa for a food service business to implement a formal food safety management system (FSMS) or a HACCP system, as is the case in many other parts of the world. However, the establishment that was investigated in this study had undertaken to develop a Kitchen Standard Operating Procedures Manual (KSOM) as part of their voluntary FSMS. This document is intended to assist with in-service training.

Van Zolingen *et al*. (2000) highlighted the benefits of in-house, "on-the-job" training, such as 1) a strong link between training and practice; 2) cost-effectiveness; 3) flexibility; 4) minimisation of problem transfer; and 5) faster learning with improved retention. Given the practicalities of releasing food handlers for training, it is likely that most organisations would favour this type of training. Worsfold and Griffith (2003) found in a survey of food hygiene and safety training in the retail and catering industry that although all businesses surveyed carried out on-the-job training, the content was without exception ill-defined, and the trainers themselves were untrained. It is thus imperative that the contents of any manual provided to food handlers be technically correct and up-to-date in terms of food safety.

Soneff *et al*. (1994) found that the benefits of providing a training manual alone were negligible in improving practices at adult care facilities providing food service. A training workshop provided a significant improvement when compared to the training manual alone. Thus, to rely only on a manual for training would not be prudent, but as a formal extension of a training programme, accessible on a daily basis whilst tasks are being performed, it could be seen as an advantage.

5.2.6 Purpose of the study

The purpose of this study was to assess the design of the training manual and delivery programmes of the study site against national and international requirements. The KSOM was also evaluated to assess whether the content was in line with best practice. The results of this study should assist other similar

organisations in ensuring that in-house training materials are comprehensive and appropriate to conditions.

5.3 Materials and methods

5.3.1 Backdrop to the study

The study area comprised the largest entertainment complex of a well known South African Hotel and Casino Group that is nationally represented. This complex consists of 4 hotels on site and extensive conferencing facilities with a casino. The facility has 7 kitchens under its direct control which were the subject of this study. The kitchens vary in size from a small breakfast outlet with 4 kitchen staff to a banqueting kitchen with 30 kitchen staff during peak periods. The kitchens also vary in terms of production type, from full à la carte service to breakfast buffet only. Jointly, the kitchens employ 168 staff including stewarding and feed on average 140 000 patrons every month.

The organisation has its own in-house training facility and an in-house Food Hygiene Training Programme (FHTP) was developed by the Training Manager. The aim of this training programme was to provide all food handlers with basic food safety information focusing on personnel hygiene requirements. In addition, the Complex Executive Sous Chef had developed the Kitchen Standard Operating Procedures Manual (KSOM) with the aim of providing procedures for consistency in the kitchens. This manual was used by all hotels in the group.

5.3.2 Audit of the FHTP

An audit is by definition a "systematic and independent and documented process of obtaining objective evidence and evaluating it to determine the extent to which requirements are fulfilled (ISO 9000:2005). Sprenger (2008) refers to audits as being concerned with comparing what is actually done with a specific standard.

5.3.3 Development of the checklist

An audit checklist was developed by reviewing relevant literature to select criteria for assessment. The criteria for the audit checklist were selected from the documents listed in Tables 5.2 and 5.3, as they represent the current standard/guidelines available to the food service sector within South Africa. Well recognised international training guides and syllabi were also consulted, as indicated in Table 5.4.

5.3.4 Execution of the audit

The study was conducted in the form of a desktop audit, which entailed reviewing documentation with the criteria. This type of audit does not assess the implementation of the documentation and as such does make use of interviews or records during the audit. The audit was conducted by comparing the content of the study documents (FHTP and KSOM) to the standards selected. If an audit requirement was addressed in either of the documents, this was noted and rated based on the level of compliance with the standards. A customised scoring system was applied for the evaluation of the FHTP as follows: 1) a score of 10 was allocated if the FHTP addressed the minimum requirements adequately; 2) a score of 5 was allocated if the FHTP partly addressed the minimum requirements; and 3) a score of 0 was given if the requirement was not addressed at all in the FHTP.

An additional audit was done to compare the FHTP with the contents of the KSOM for consistency as a training aid. The scoring system was modified slightly for the assessment of the KSOM as an on-the-job training aid for personnel hygiene as follows: 1) a score of 10 was applied if the KSOM addressed the minimum requirements adequately and did not contradict the FHTP; 2) a score of 5 was given if the KSOM addressed the requirement but contradicted the FHTP; and 3) a score of 0 was given if the requirement was not addressed at all in the KSOM.

Clarification on the course design and presentation was requested during an interview with the Training Manager and consisted of open-ended questions to gain information on the length of the training course provided, the qualifications of the

trainers, the methods of evaluation and other pertinent details such as delivery methods and assessment of learning.

Table 5.2: South African Food Safety standards.

Standard title	Standard description
SABS 049:2001(SANS 10049:2001) South African National standard, Code of practice – Food hygiene	This is a voluntary standard which is used by many retailers as the basis of their supplier food safety schemes. Companies with HACCP also use this standard for the basis of their PRP systems
R= Regulation 918 of the Health Act, Act 63 of 1977 and guideline document.	This is the minimum mandatory requirement for all premises handling food.
CAC/RCP 39-1993, Code of hygienic practice for pre-cooked and cooked foods in mass catering, Codex Alimentarius Commission	This guidance document is in the process of being adopted as a South African standard for the food service sector. It will be a voluntary standard.
South African Qualifications Authority (SAQA) Unit standards 7800, 7637	These unit standards may be used by accredited training providers when developing hygiene training for the food service sector.

Table 5.3: Other food safety training programmes used in the study.

Programme	Country
Level 2 Award in food safety in catering	UK. (This programme was developed to comply with the Chartered institute of Environmental Health syllabus, 2007. This training is mandatory in the UK)
Serve safe starter training program	USA. (This training programme was developed to address the mandatory requirements of the FDA Food Code.)
Unit standard SITXFSA001A – Implement food safety procedures	Australia. (This unit standard was developed by the Australian Qualification Authority as the basis of mandatory food handler training.)

Table 5.4: Design characteristics of the training course.

Time	**2 hours**
Training methods	Lecture type
Training tools	Workbook for each learner Flip chart Computer and media projector for slide presentation PowerPoint Slide presentation
Evaluation of pre-training knowledge/behaviours	None
Training effectiveness evaluation	Multiple choice test Pass mark of 50 % required
Training intervention evaluation	None
Trainer qualifications	The trainer has attended several external food safety training courses including HACCP implementation, Food safety
Language of training	English only
Intended level	All food handlers including senior sous chefs and executive sous chefs

5.4 Results and discussion

5.4.1 Characteristics of the training course

Table 5.5 provides details of the design features of the in-house training course developed by the facility. This course had been developed to address the minimum legal requirement for hygiene training as defined by Regulations Governing General Hygiene Requirements for Food Premises and the Transport of Food, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), Regulation 10(b). The course was reported to have been an attempt to improve food safety practices at the establishment. This was the first time such training had been provided to all staff members.

5.4.2 Results of desk study audit of FHTP and KSOM manuals

Table 5.5 provides the comparisons of the standards used as the basis for the selection of the audit criteria. The level 2 award for food safety, CIEH was selected as the most comprehensive syllabus and used for the assessment and subsequent results in Table 5.5. Table 5.6 provides the results of the audit of the FHTP and KSOM against the selected criteria. Table 5.7 provides the results of a detailed assessment of the KSOM against defined best practice for personnel hygiene, whereas Table 5.8 provides the scores calculated. The FHTP scored 28 % (Table 5.8). It addressed the consequences of poor food safety practices and personnel hygiene requirements in relation to jewellery and hair protection. Pest control, protective clothing, hand washing and food-borne illness were partly addressed. The FHTP did not address the importance of temperature control in chilling and cooking processes while legal requirements were also not addressed.

The KSOM scored 42 % (Table 5.8) and fully addressed the requirements for chilling, protective clothing, hand washing and cleaning. The requirements for at-risk populations, consequences of poor practices and legal aspects were not addressed. Requirements that were partly addressed included taking temperatures, cooking, and reporting cuts and grazes. Neither document addressed the importance of food handlers reporting illness.

Table 5.5: Comparison of various training programmes regarding content.

Topic	S	R	C	SAQA	Se	A1	A2	L
Food safety terminology	Y	N	Y	N	Y	Y	P	**Y**
Consequences of poor standards	Y	N	Y	N	P	Y	P	**Y**
Documented food safety management system	Y	P	P	N	P	Y	P	**Y**
Symptoms of food poisoning	N	N	N	N	P	N	Y	**Y**
At-risk populations	N	N	Y	N	P	Y		**Y**
Legal requirements	P	N/A	Y	N	P	Y	P	**Y**
Food safety hazards (Chemical, Biological Physical)	Y	N	P	N	P	Y	P	**Y**
Taking temperatures (The danger zone)	N	Y	Y	N	Y	Y	P	**Y**
Refrigeration, chilling, cold holding of foods	N	Y	Y	Y	Y	Y	P	**Y**
Cooking, hot holding and reheating of foods	N	Y	Y	Y	Y	Y	P	**Y**
Safe food storage	Y	Y	Y	Y	Y	Y	P	**Y**
Cleaning	Y	P	Y	Y	Y	Y	P	**Y**
Food premises and equipment	Y	Y	Y	N	P	Y	N	**Y**
Personnel hygiene relating to cleanliness, wearing of jewellery, hair, etc.	Y	Y	Y	Y	Y	Y	Y	**Y**
Hand washing	Y	Y	Y	Y	Y	P	Y	**Y**
Reporting illness, cuts and grazes	Y	Y	Y	Y	Y	P	Y	**Y**
Protective clothing	Y	Y	Y	Y	Y	P	Y	**Y**
Pest control	Y	P	Y	N	P	Y	P	**Y**

Key:
S - SABS 049:2001
R - Reg 918:2003
C - Codex CAC 39, 1993
SAQA - South African Qualifications Authority Unit standards 7800, 7637
Se - ServSafe Starter edition
A1 - Australian Qualification Authority Supervisor level
A2 - Australian Qualification Authority Food handler level
L - Level 2 Award for food safety, CIEH
Y – covers requirements comprehensively
N – does not cover requirement at all
P – requirement is partially addressed

Table 5.6: Results of desk study audit of FHTP and KSOM against the best practice criteria.

	Topic	L	FHTP score (n=18)	KSOM score (n=18)
1	Food safety terminology	Y	5	0
2	Consequences of poor standards	Y	10	0
3	Documented food safety management system	Y	0	5
4	Symptoms of food poisoning	Y	5	0
5	At-risk populations	Y	0	0
6	Legal requirements	Y	0	0
7	Food safety hazards (Chemical, Biological, Physical)	Y	5	5
8	Taking temperatures (The danger zone)	Y	0	5
9	Refrigeration, chilling, cold holding of foods	Y	0	10
10	Cooking, hot holding and reheating of foods	Y	0	5
11	Safe food storage	Y	0	5
12	Cleaning	Y	0	10
13	Food premises and equipment	Y	0	5
14	Personnel hygiene relating to cleanliness, wearing of jewellery, hair, etc.	Y	10	10
15	Hand washing	Y	5	10
16	Reporting illness, cuts and grazes	Y	0	5
17	Protective clothing	Y	5	10
18	Pest control	Y	5	0
	Total		**50**	**75**

Key:
L – Benchmark programme
FHTP – Food Hygiene Training Programme
KSOM – Kitchen Standard Operating Procedure Manual
Y – requirement is addressed

Table 5.7: Results of content comparison of the KSOM with detailed requirements for personnel hygiene.

Evaluation criteria		Score (n=18)
1.1	Employees should be instructed on the reason for protective clothing and the required clothing	5
1.1	Clothing should be changed at least daily	5
1.2	Clean protective clothing should not be stored with personnel effects of soiled protective clothing	0
1.3	Protective clothing shall be cleaned by employer in an hygienic manner	0
1.4	Protective clothing shall be removed when leaving the production area	0
1.5	Protective clothing shall not be removed offsite	10
1.6	Staff shall be provided with sufficient toilets which are kept in a hygienic condition.	0
1.7	Staff shall be provided with sufficient changing facilities. Staff shall not change in toilets	0
1.8	Adequate storage facilities shall be provided so that personal effects are not stored in the kitchens	0
1.9	Food handlers shall not work with food unless wounds have been adequately dressed and covered to avoid contamination	5
1.10	Food handlers shall be required to report if they are suffering from diarrhoea and other conditions which can lead to food-borne illness	0
1.11	Food handlers shall be instructed in the correct method of hand washing and training should be practical	5
1.12	Unacceptable food safe behaviour should be defined	5
1.13	Adequate dedicated footwear shall be provided with appropriate cleaning facilities.	5
1.14	A formal glove policy shall be in place to deal with wearing of gloves, replacement, cleaning of gloves to avoid contamination	0
1.15	The wearing of jewellery shall not be permitted. If permitted jewellery shall be specified	5
1.17	Fingernails shall be kept short, free of nail polish and false nails or nail art	5
1.18	Staff shall undergo a pre-employment medical to ensure they are fit to handle food. The company shall have a procedure for monitoring the health of staff and reporting illness	0

Table 5.8: Audit scores.

Audit	Percentage (%)
Assessment of FHTP against national and international standards (benchmark criteria)	28
Assessment of KSOM against national and international standards (benchmark criteria)	42
Adequacy of KSOM as a supplementary training tool for personnel hygiene	29

5.4.3 Results of desk study audit on KSOM as a training aid for personnel hygiene

The KSOM scored 29 % for adequacy as an on-the-job training tool to support the FHTP, as shown in Table 5.7 above. A considerable amount of contradiction was highlighted between the FHTP and KSOM. A typical example was that the FHTP did not prescribe the required clothing whereas the KSOM stated that a uniform is required as well as a hairnet and apron. The FHTP required staff to wash their hands while working; no indication was given, however, of specific activities that require hand washing before or after the event. No directions were given as to how hands are to be washed. Staff members were instructed to use a clean nailbrush. The KSOM required staff to wash hands: before commencing work, when hands are soiled, before handling food, after using the toilet, after handling raw food, after sneezing, coughing, blowing nose, touching face or hair, after using tobacco, when a buzzer sounds, in designated hand wash basins and not in food sinks. The KSOM also required staff to wash their hands for 1 minute using hot water and drying with paper towel. Neither document addressed disinfection of hands after washing.

5.4.4 Adequacy of training programme design

The training programme design characteristics were classroom-style training only, as indicated in Table 5.5. The duration of the course was two hours with a written summative assessment (test) on completion. The training did not involve any practical aspects. Despite the large volume of research into the effectiveness of training, there is limited information available on the impact of the design and presentation of the training programme itself within the food safety field. Seaman and Eves (2006) highlight the fact that improper training may pose a greater risk to food safety than no training at all.

Van Zolingen *et al*. (2000) reported well known advantages of on-the-job training as being: a strong link between training and practice, which has a positive impact on the learner's motivation; skills acquired on the job are learned more effectively; cost-effectiveness; flexibility in terms of time; and changes and transfer is minimised as

training is given on the site where employees will work. It was found that food handlers were trained outside the workplace but still within the facility at the training centre, which is equipped with classroom-style training rooms. This approach was used due to the large number of employees that needed to be trained and also the practicalities of training in a busy kitchen. Furthermore, Egan *et al*. (2007) report in a review of training interventions that one of the key features of an effective training intervention is training in the workplace.

The duration of the course was found to be relatively short when compared to occupational health and safety training, which is one full day in duration. This may lead employees to incorrectly conclude that their safety is more important than that of the customer they are preparing food for, based on the comparatively limited amount of time devoted to food safety training. The duration can further be interpreted as an indication of the resources that management was prepared to invest in the training initiative. Given that this is the only food safety training provided for all staff, it can be argued that the 2-hour session is considered an induction, to be followed up by more intensive training at a later date, as suggested in the Industry Guide to Good Hygienic Practice – Catering Guide (JHIC, 1997). The reported training time for the equivalent course in the UK, for example, would be 3 to 4 hours (Seaman and Eves, 2006), as is the case with the ServSafe programme in the USA. Pilling *et al*. (2008) identified that the quality and the length of a training course may affect the outcome of their study as some groups only received a 2-hour training course which was considered inferior to a 4 or 8-hour course with an accredited syllabus.

5.4.5 Method of delivery

The study site had selected lecturing as the method of delivery (Table 5.4). Lecturing as a method of delivery is considered an appropriate training method for adults because of its advantages for large groups. However disadvantages include passivity of learning, a lack of feedback from the learners and being a demanding method for the trainer. Furthermore, the capabilities of the trainer have a more profound effect on the success or failure of a lecture than any other training

method. This method of training was found to be used by all respondents in a survey conducted in the hospitality industry by Harris and Cannon (1995), confirming that it is a method generally used in the sector. Similarly the tools of training are consistent with their findings in this sector, that of being the use of a flip chart and workbooks. The media projector and computer have since replaced the then used overhead projector and transparencies. Research highlighted that learners enjoyed videotape training more than lectures while Campbell *et al*. (1998) concluded after a review of public health interventions that training should be an interactive experience during workshops rather than passive lectures or dissemination of resource materials only. Pilling *et al*. (2008) suggest that practical demonstrations using visual aids assist food handlers to internalise concepts.

A lack of food safety knowledge evaluation as indicated by Table 5.4 could result in learners becoming bored with the repetition of knowledge they already have. The single training intervention for all levels is therefore not appropriate as supervisors require a more in-depth understanding of requirements they are expected to enforce. It is furthermore crucial that training interventions which are designed and presented for different levels in an organisation complementary. Hale (2003b) further highlighted the critical importance of a mentor or superior to connect off-the-job learning with workplace action.

5.4.6 Assessment of training effectiveness and knowledge

As shown in Table 5.5, the post course evaluation was knowledge based only. To be effective, food hygiene training needs to be aimed at changing the behaviours most likely to result in food-borne illness (Egan *et al*., 2007). There were no further interventions associated with the provision of training within the organisation. This traditional approach assumes that the provision of knowledge alone is sufficient to change attitudes and practices (Rennie, 1994). This model has been criticised for its limitations (Ehiri *et al*., 1997, Griffith 2000), while Seaman and Eves (2006) suggest that the effectiveness of food hygiene training would be improved if the training is based on health education theories and models. Thus a training programme should not only consider the information required but also the social and environmental

factors which impact on food safety. In a review of social cognitive models by Tones and Tilford (1994), the authors propose a Health Action Model. This model incorporates knowledge about food hygiene obtained from a well constructed food hygiene training course; the influence of norms within the organisation (which could include social and cultural norms), which could be altered by the provision of support for changes in food handling practices by managers and colleagues; some incentives to change behaviour; the facilitating effects of a workplace correctly equipped and designed; and the development of personal skills to apply the knowledge gained. The authors also propose additional constructs to the model, such as the evaluation of training needs and selection and relevance of the training programme. Both of these factors could affect the food handler's motivation on undertaking a course and thus their behaviour and intentions to carry out safe food handling practices at all times. A holistic approach to training is required, which currently appears to be lacking within the organisation under study.

At the time of the audit, no formal follow-up mechanisms had been put in place to assess the effectiveness of the training. Rennie (1994) recommends the introduction of reliable work site evaluations of food handlers after training, taking into account the fact that knowledge alone does not lead to changes in food handling practices and any non-compliant actions could be corrected at the start. Rennie (1995) further states that the provision of formal food hygiene training without co-ordinated workplace reinforcement or incentives to adopt new or positive behaviours was unlikely to have any major effect on food hygiene standards.

Egan *et al*. (2007) conclude that the current evidence for the effectiveness of food hygiene training is limited. The need for evaluation of training is essential although this should go beyond an assessment of the training content and design. Factors such as management support, availability of equipment and tools, training and pre-training motivation can all influence the extent to which individuals react to training. Their review confirms that management training can be effective in reducing food safety problems. The effectiveness of training is highly dependent on both

management's attitude and their willingness to provide food handlers with the resources and systems to implement good practices.

5.4.7 Attendance at training sessions

In discussions with the Training Officer, it emerged that very few of the senior chefs had attended the mentioned food hygiene training. The lack of awareness of the training programme contents may render them ill-prepared to re-enforce the messages received via training. After training, it is likely that an expectation will have been created, particularly by those employees who may be trained for the first time. If this expectation is not fulfilled by a consistent approach from supervisors at the workplace, application of new knowledge may be negatively affected.

The language of delivery was English. This may pose a problem, as many of the employees do not have English as a first language. This is not only a South African phenomenon as is evident from the recent Chilled Foods Association publication ("Food safety and hygiene training in a multicultural environment") (CFFA, 2008). This guide recommends a range of languages as well as the use of translators during training to assist with understanding. Harris and Cannon (1995) suggest that future training in the food service and hospitality should: 1) be delivered in the learner's own language; 2) be delivered at their own pace; 3) be convenient and efficient; 4) provide immediate feedback; 5) be communicated at their own learning level; 6) be interactive, stimulating and culturally sensitive; and 7) be continuous over the period of employment.

The time of delivery is also important as it is, for example, unreasonable to expect an employee to attend 2 hours of training after working a full night shift. Employees who are required to come in for training on a day off are also not likely to approach the training with a positive attitude. Optimising the time of training delivery was found to be a factor, in a survey conducted by Ramsay and Messersmith (2001).

5.4.8 Adequacy of FHTP manual and KSOM in terms of content

In this study, the UK Level 2 Award in food safety in catering (CIEH syllabus), was selected as the most comprehensive benchmark for the evaluation. The initial review of all standards selected highlighted significant shortcomings both in the South African National Standard, SABS 049:2001 and the existing regulations, as indicated in Table 5.6. The Codex Catering Guide (CAC/RCP 39-1993) covered similar content to the Level 2 Award.

The assessment of the FHTP and the KSOM against the selected benchmark criteria mentioned above identified shortcomings in both documents. The FHTP scored 28 % in terms of adequacy of content, whereas the KSOM scored 42 %, as indicated by the results shown in Tables 5.6 and 5.8. Neither of the instruments are likely to transfer the required food safety knowledge, as the FHTP only addressed personnel hygiene requirements and some aspects of pest control. Although these are important, safe food handling practices such as temperature control, food storage, cooking and reheating are not addressed.

The FHTP only addressed hand washing superficially, no provision was made for a practical demonstration of correct hand washing technique and neither diagrams nor photographs were provided to depict this. Given the body of research showing the critical importance of hand washing in the prevention of food-borne illness, this may be considered a gross oversight. Allwood *et al*. (2004) found that only 48 % of food handlers were able to demonstrate the correct hand washing technique, the omissions being the acceptable length of time and the use of a nail brush. These details should be addressed in a training programme. Shojaei, *et al*. (2006) concluded that after correct hand washing training, the microbial counts decreased on the hands of Iranian street vendors, which highlighted that this training is appropriate at basic levels.

The KSOM was designed as a procedure manual that is intended to define what should be done, and not as a training document that should address why things are

done in a certain way to facilitate understanding (Lopez, 2006). The food safety practices of checking core cooking temperatures and chilling temperatures were only addressed superficially. Hand washing instructions were provided. The procedure in the manual required hand washing for 1 minute, which is unlikely to be complied with as it is unreasonable (The USA Food Code, 2005, requires a minimum of 20 seconds). The use of disinfectants for cleaning and the use of hand sanitisers were not addressed in either of the documents, nor did they address legal requirements or the legal obligations of food handlers. There was also no mention of reporting of illness in the kitchens, and neither document addressed the use of gloves when handling ready-to-eat food or when working with a wound that is properly dressed.

5.4.9 Adequacy of the KSOM as an in-house training aid for personnel hygiene

The personnel hygiene requirements of the KSOM and the FHTP were compared for congruency given that this aspect had shown the most overlap in the desk study audit. It was evident from the desk study, however, that there were contradictions between the FHTP and the KSOM. This could lead to confusion in the implementation of requirements. All staff members are given a copy of the training programme but the KSOM is only available to those with computer access. This could result in supervisors contradicting the training during on-the-job instruction when using the KSOM.

The best practice requirements relating to personnel hygiene were not fully addressed in most instances as shown in Table 5.7. The contents of the KSOM were focused on kitchen activities and preparation of food types. Very little food safety information was available in the file and there was found to be a lack of consistency between the FHTP, the employee handbook and the KSOM manual. Food safety information was limited to checklists and personnel hygiene requirements. The reasons why certain actions are required, such as temperature measurement during cooking, were not given. The document was also not dated or approved by senior management to endorse its credibility and use, and internal audits were not linked to adherence to this manual (refer to Chapter 2). According to Soneff *et al*. (1994), if a

training manual is provided without any formal training, the documentation has negligible benefits on food safety practices and thus the KSOM is not likely to impact on food safety practices without the necessary training.

5.4.10 Specific considerations

Protective clothing

The aspects of the programme that were considered adequate included the provision and care of protective clothing. This was well managed, as the clothing was adequate for the risks of the tasks carried out, with all staff being provided with clean clothing daily. Clean clothing was stored in a dedicated storage area and issued in a controlled manner. The procedures stated that the clothing may not leave the site. The requirement to hand in dirty clothing in order to obtain another set of clean clothing ensures that all clothing is accounted for, but does not prevent its removal from the premises overnight or on days off. The clothing is washed prior to it being reissued, which mitigates the risk of contamination. A further improvement would be the inclusion of the "chef's cloths" in the laundry process to ensure these are cleaned correctly. They are issued for handling hot items, but during kitchen inspections they were observed to be soiled. On investigation, staff members were required to clean their own cloths but this practice was not adequately controlled and the cloths posed a potential risk of cross-contamination. Informal observation also noted that chefs were not wearing hairnets under the chefs' hats, as was required by the procedure.

Aspects of the audit which drew low scores were the practice of not removing protective clothing when leaving the kitchen to use the bathroom and of changing into protective clothing in toilets – see Table 5.7. Todd *et al*. (2009) reviewed outbreaks of food-borne illness where clothing was implicated and Lues and van Tonder (2007) reported *Enterobacteriaceae* and *S*. *aureus* on the aprons of food handlers in delicatessens. There is thus evidence to suggest that cross-contamination could take place between contaminated fabric and surfaces or by wiping hands on contaminated fabric and then handling foods.

Reporting of illness

The lack of a formal system for the reporting and monitoring of illness was noted during the audit – see Table 5.7. The Codex Alimentarius (2004) and Regulation 918 of the Health Act, Act 54 of 1972, in South Africa require that persons who are known to have or suspected of having any disease that might be transmitted by food are prevented from handling food items and that such an individual should immediately inform management of the disease symptoms. The guidelines issued by the Department of Health in South Africa do not support pre-employment medical examinations but rather the establishment and implementation of procedures to ensure that illness is reported to management. No evidence was found for such a system at the organisation under study.

Management plays a critical role in this system, as is indicted by Todd *et al*. (2009), who cite two examples where management decisions relating to worker health resulted in outbreaks of food-borne illness. Requiring sick leave without pay or assuming employees are taking advantage of sick leave can lead to costly incidents of food contamination. Green *et al*. (2005) found that 5 % of food handlers admitted to working while ill with vomiting or diarrhoea. Hedberg *et al*. (2006) reported that neither the presence of polices providing for sick leave and reporting of illness nor the restriction of food handlers appeared to reduce the role of ill food handlers as a major contamination source leading to outbreaks of illness. They suggested either that food handlers do not understand the importance of remaining away from work while ill or that illness is not being effectively monitored by employees and there is a lack of commitment by management to enforce policies regarding ill workers. This aspect should be highlighted during food safety training programmes. However, in the organisation under study, neither the training programme nor the procedures manual made any mention of this requirement. The lack of formal controls for food tasting during preparation posed an additional risk to contamination from sick food handlers.

Hand washing

The lack of formal enforcement of hand washing was noted, as indicated in Table 5.7. Sous chefs were required to complete a checklist daily but this checklist only addressed the supplies for hand washing, not the practice. Green *et al*. (2005), in a survey of food service workers, reported that they commonly undertook risky food handling practices. A quarter of the workers surveyed reported that they did not always wash their hands. The need for supervision of this practice is therefore crucial to minimise the possibility of the spread of food-borne illness. Rosenthal *et al*. (2003) found that the introduction of performance feedback in relation to hand washing practices significantly improved hand washing adherence. Green and Selman (2005) found similar results in their study, where respondents indicated that management/co-worker emphasis on food safety practices improved hand washing compliance. These respondents also indicated that negative consequences motivated them not to implement unsafe practices. The authors' study further highlighted that the use of logs or records for hand washing assisted in the practice. The hand washing procedure defined in the KSOM is unrealistic in that it requires scrubbing of the hands for 1 minute. Bloomfield *et al*. (2007) recommended a wash time of 15 seconds. Even then they admitted that this time is unlikely to be adhered to. A realistic time should therefore be documented and enforced. The procedure does also not require the use of a hand sanitiser after washing although one is provided at most hand wash basins. This use of the hand sanitiser is necessary, given the tasks undertaken. If the procedure is not specified, an employee could assume its use is optional.

Use of gloves

The lack of a formal glove policy and the use of gloves for RTE foods were observed, as indicated by Table 5.7. The FDA recommends that bare hand contact should be prevented when working with ready-to-eat foods and minimised when working with non-RTE foods, because hand washing might not be sufficient to prevent the transmission of pathogens from hands to other items such as food. The Food Code suggests the use of barriers such as tongs or disposable gloves. Proper glove use

can decrease the transfer of pathogens (Michaels *et al*., 2004), although Lynch *et al*. (2005) identified the tendency of food handlers to use the same pair of gloves for long periods of time, with the incorrect idea that wearing gloves reduces or prevents contamination. The authors have argued that this practice may lead to less safe hand washing practices. Green *et al*. (2005) found that glove use increased if gloves were readily accessible. These factors highlight the importance of a robust glove policy, specific training relating to the wearing of gloves and strict enforcement of the correct practice.

5.5 Conclusions

One may agree that any training is better than none at all and given that no basic personnel hygiene training had been conducted prior to the provision of the FHTP, this programme represented a 100 % improvement on past practices. However, training is a costly exercise and it is imperative to ensure it is carried out in the most effective way possible. The findings of this study highlighted the following: 1) the FHTP was not adequate in terms of content when compared to a benchmark syllabus; 2) the design and delivery of the training programme were not optimal for effective learning; and 3) the KSOM contradicted the FHTP and was not suitable as a training aid.

The provision of food handler training in South Africa is largely as a result of legal compliance. While mandatory, this training still requires considerable investment, and organisations similar to the one in the study are faced with training large numbers of employees. It would be prudent to take note of the findings of this study in the development of in-house training programmes and the selection of external training providers to ensure that the basics are adequately covered such as content and course delivery mechanisms. In addition to this, the findings of this study highlight the importance of ensuring that training support mechanisms such as workplace procedures are consistent with training materials. The implementation of post-training processes to ensure the implementation of new skills is also essential. The role of the middle manager level, or sous chef in this instance, should be considered as pivotal in the effectiveness of training.

The results of this study may be useful in guiding future work in food safety training. The detailed evaluation of the training programme and workplace procedures highlighted significant opportunity for improvement. Other organisations should take note of these factors when developing training programmes and food safety management systems.

5.6 References

Allwood, P., Jenkins, T., Paulus, C., Johnson, L. and Hedberg, C. (2004), "Hand washing compliance among retail food establishment workers in Minnesota", *Journal of Food Protection*, Vol. 67, pp. 2825–2828.

Audit Commission (1990), *Environmental Health Survey of Food Premises*. HMSO, London.

Australian Qualification Authority SITXFSA001A – *Implement food safety procedures*.

Bas, M., Ersun, A.O. and Kavanç, G. (2006), "The evaluation of food hygiene knowledge, attitudes and practices of food handlers in food businesses in Turkey", *Food Control*, Vol. 17, pp. 317–322.

Bloomfield, S.F., Aiello, A.E., Cookson, B., O'Boyle, C. and Larson, E.L. (2007), "The effectiveness of hand hygiene procedures in reducing the risks of infection in home and community setting including hand washing and alcohol hand sanitisers", *American Journal of Infection Control*, Vol. 35, No. 10, pp. S27–S64.

Bolton, D.J., Meally, A., Blair, I.S., McDowell, D.A. and Cowan, C. (2008), "Food safety knowledge of head chefs and catering managers in Ireland", *Food Control*, Vol. 19, pp. 291–300.

CAC/RCP 39-1993, *Code of hygienic practice for pre-cooked and cooked foods in mass catering*, Codex Alimentarius Commission.

Campbell, M.E., Gardner, C.E., Dwyer, J.J., Isaaca, S.M., Krueger, P.D. and Ying, J.Y. (1998), "Effectiveness of public health interventions in food safety: A systematic review", *Canadian Journal of Public Health*, Vol. 89, No. 3, pp. 197–202.

Clayton, D.Q. and Griffith, C.J. (2004), "Observation of food safety practices in catering using notational analysis", *British Food Journal*, Vol. 106, No. 3, pp. 211.

Clayton, D.A., Griffith, C.J., Price, P. and Peters, A.C. (2002), "Food Handlers' beliefs and self-reported practices", *International Journal of Environmental Health Research,* Vol. 12, pp. 25–39.

Codex Alimentarius (2004), "Guidelines for the application of the hazard analysis critical control point system", ALINORM, Vol. 93, p. 131.

Department of Health, Regulations governing General Hygiene requirements for Food Premises and the transport of food, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), South Africa.

Egan, M.B., Raats, M.M., Grubb, S.M., Eves, A., Lumbers, M.L., Dean, M.S., *et al*. (2007), "A review of food safety and food hygiene training studies in the commercial sector", *Food Control*, Vol. 18, No. 10, pp. 1180–1190.

Ehiri, J.E., Morris, G.P. and McEwen, J. (1997), "Evaluation of a food hygiene training course in Scotland", *Food Control*, Vol. 8, No. 3, pp. 137–147.

CFFA (2008), *Food safety and hygiene training in a multicultural environment*, Chilled Food Association, Kettering, UK.

Green, L. and Selman, C. (2005), "Factors impacting food workers' and managers' safe food preparation practices: a qualitative study". *Food Protection Trends*, Vol. 25, pp. 981–990.

Green, L., Selman, C., Banerjee, A., Marcus, R., Medus, C., Angulo, F.J., Radke, V. and Buchanan, S., EHS – Net working group (2005), "Food service workers self reported food preparation practices: an EHS-Net study", *International Journal of Hygiene and Environmental Health*, Vol. 208, pp. 27–35.

Griffith, C. (2000), "Food safety in catering establishments". In: Farber, J.M. and Todd, E.C. (Eds.), *Safe Handling of Foods*. Marcel Dekker, New York, pp. 235–256.

Hale, R. (2003a), "How training can add real value to the business: part 1", *Industrial and Commercial Training*, Vol. 35, No. 1, pp. 29–32.

Hale, R. (2003b), "How training can add real value to the business: part 2", *Industrial and Commercial Training*, Vol. 35, No. 2, pp. 49–52.

Harris, K.J. and Cannon, D.F. (1995), "Opinions of training methods used in the hospitality industry – a call for review", *International Journal of Hospitality Management*, Vol. 14, No. 1, pp. 79–96.

Hedberg, C.W., Smith, S.J., Kirkland, E., Radke, V., Jones, T.F. and Selman, C.A., EHS-NET – working group (2006), "Systematic environmental evaluations to identify food safety differences between outbreak and non-outbreak restaurants", *Journal of Food Protection*, Vol. 9, No. 11, pp. 2697–2702.

ISO (2005), ISO 9000:2005, *Quality Management Systems: Vocabulary*, International Organisation for Standardisation, Geneva.

ISO (2005), ISO 22000:2005, *Food Safety Management Systems: Requirements*, International Organisation for Standardisation, Geneva.

Jevsnik, M., Hlebec, V. and Raspor, P. (2008), "Food safety knowledge and practices among food handlers in Slovenia", *Food Control*, Vol. 19, pp. 1107–1108.

JHIC (Joint Hospitality Industry Congress) (1997), *Industry Guide to Good Hygiene Practice: Catering Guide*. HMSO, London.

Level 2 Award in food safety in catering – UK, Chartered Institute of Environmental Health Syllabus, 2007.

Lopez, S. (2006), "Stop training your employees", *AIB Quarterly*, Vol. 7, pp. 10–11.

Lues, J.F.R. and van Tonder, I. (2007), "The occurrence of indicator bacteria on hands and aprons of food handlers in the delicatessen sections of a retail group", *Food Control*, Vol. 18, pp. 326–332.

Lynch, R.A., Phillips, M.L., Elledge, B.L., Hanumanthaiah, S. and Boatright, D.T. (2005), "A preliminary evaluation of the effect of glove use by food handlers in fast food restaurants", *Journal of Food Protection*, Vol. 68, No. 1, pp. 187–190.

MacAuslan, E. (2003), "The boss, the owner, the proprietor...the food hygiene manager?", *The Journal of the Royal Society for the Promotion of Health*, Vol. 123, No. 4, pp. 229–332.

Mead, P.S., Slutsker, L., Dietz, V., McCaig, L.F., Bresee, J.S., Shapiro, C., Griffin, P.M. and Tauxe, R.V. (1999), "Food-Related Illness and Death in the United States", Centre for Disease Control and Prevention, Atlanta, Georgia, USA. [Available at:www.cdc.gov/ncidod/eid/vol5no5/mead.htm].

Medeiros de Azevedo, P.R., Montenegro Stamford, N.L. (2008), "Assessment of personal hygiene and practices of food handlers in municipal public schools in Natal, Brazil", *Food Control*. Accepted manuscript.

Michaels, B., Keller, C., Blevins, M., Paoli, G., Ruthman, T., Todd, E. and Griffith, C. (2004), "Prevention of food worker transmission of food-borne pathogens: Risk assessment and evaluation of effective hygiene intervention strategies", *Food Service Technology*, Vol. 4, pp. 31–49.

Mortlock, M.P., Peters, A.C., and Griffith, C.J. (1999), "Food hygiene and hazard analysis critical control point in the United Kingdom food industry: Practices, perceptions, and attitudes", *Journal of Food Protection*, Vol. 62, No. 7, pp. 786–792.

Motarjemi, Y., and Käferstein, F. (1999), "Food safety, HACCP and the increase in food-borne diseases: A paradox?", *Food Control*, Vol. 10, pp. 325–333.

National Restaurant Association Educational Foundation (2002). *ServSafe Essentials* (2nd ed.). National Restaurant Association Educational Foundation, Chicago.

Pansiello, P.J., and Quantick, P.C. (2001), "Technical barriers to hazard analysis critical control point (HACCP)", *Food Control*, Vol. 12, No. 3, pp. 165–173.

Panisello, P.J., Quantick, P.C., and Knowles, M.J. (1999), "Towards the implementation of HACCP: Results of a UK regional survey", *Food Control*, Vol. 10, pp. 87–90.

Pilling, V.K., Brannon, L.A., Shanklin, C.W., Roberts, K.R., Barrett, B. and Howells, A.D. (2008), "Food safety training requirements and food handlers' knowledge and behaviours", *Trends in Food Protection*, Vol. 28, No. 3, pp. 192–200.

Powell, S.C., Attwell, R.W., and Massey, S.J. (1997), "The impact of training and knowledge and standards of food hygiene DA pilot study", *International Journal of Environmental Health Research*, Vol. 7, pp. 329–334.

Ramsay, J. and Messersmith, A. (2001), "Food safety knowledge and continuing education interests of hospital foodservice managers", *Journal of the American Dietetic Association*, Vol. 101 No. 9, Supplement 1.

Regulation EC (2004). *No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the Hygiene of Foodstuffs*. Official Journal of the European Communities, p. 18

Regulations governing General Hygiene requirements for Food Premises and the transport of food, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), Regulation 10(b), Republic of South Africa.

Rennie, D. (1994), "Evaluation of food hygiene education", *British Food Journal*, Vol. 96, No. 11, pp. 20–25.

Rennie, D. (1995), "Health education models and food safety education", *Journal of the Royal Society of Health*, Vol. 115, pp. 75–79.

Rosenthal, V.D., McCormick, R.D., Guzman, S., Villamayor, C. and Orellano, P.W. (2003), "Effect of education and performance feedback on hand washing: The benefit of administrative support in Argentinean hospitals", American Journal of Infection Control, Vol. 31, No. 2, pp. 85–92.

SANS (2001), SABS 049:2001, *South African National Standard*, *Code of Practice – Food Hygiene*, Standards SA, Pretoria.

Seaman, P. and Eves, A. (2006), "The management of food safety – The role of food hygiene training in the UK service sector", *Hospitality Management*, Vol. 25 (2006), pp. 278–296 295.

Shojaei, H., Shooshtaripoor, J. and Amiri, M. (2006), "Efficacy of simple hand washing in the reduction of microbial hand contamination of Iranian food handlers", *Food Research International*, Vol. 39, pp. 525–529.

Soneff, R., McGeachy, F., Davison, K., McCargar, L., and Therien, G. (1994), "Effectiveness of two training methods to improve the quality of food service in small facilities for adult care", *Journal of the American Dietetic Association*, Vol. 94, No. 8, pp. 869–873.

South African Qualifications Authority Unit standards 7800, 7637, available at: http://www.saqa.org.za, accessed 1 September 2009.

Sprenger, R. (2008), *Hygiene for Management – A Text for Food Safety Courses*, Highfield.co.uk Limited, pp. 264–321.

Strohbehn, C., Sneed, J., Peaz, P. and Meyer, J. (2008), "Hand washing frequencies and procedures used in retail food services", *Journal of Food Protection*, Vol. 71, No. 8, pp. 1641–1650.

Todd, E.C.D., Greig, J.D, Bartleson, C.A. and Michaels, B.S. (2009), "Outbreaks where food workers have been implicated in the spread of food borne disease. Part 6. Transmission and survival of pathogens in the food processing and preparation environment", *Journal of Food Protection*, Vol. 72, No. 1, pp. 202–219.

Tones, K. and Tilford, S. (1994), *Health Education Effectiveness*, *Efficiency and Equity*, second ed. Chapman & Hall, London, pp. 90–103.

U.S. Food and Drug Administration. 2005. *Food code*, *2005*. Available at: Http://www.cfsan.fda.gov/_dms/fc05-toc.html. Accessed 1 September 2009. *The Supplement to the FDA Food code*, *2007*.

Van Zolingen, S.J., Streumer, J.N., De Jong, R. and van der Klink, M.R. (2000), "Implementing on-the-job training: critical success factors", *International Journal of Training and Development*, Vol. 4, No. 3, pp. 208–216.

Wallace, C. and Williams, T. (2001), "Pre-requisites: A help or a hindrance to HACCP", *Food Control*, Vol. 12, pp. 235–240.

Websites

http://www.cdc.gov/nceh/ehs/ehsnet/certification.htm

www.doacs.state.fl.us/fs/certfoodmgr.pdf

http://www.foodstandards.gov.au/foodstandards/foodsafetystandardsaustraliaonly/standard321.cfm

Worsfold, D. and Griffith, C.J. (2003), "A survey of food hygiene and safety training in the retail and catering industry", *Nutrition & Food Science*, Vol. 33, No. 2, pp. 68–79.

Chapter 6

Conclusion

6.1 General comments

Unsafe food handling practices in food service establishments are a major contributor to the transmission of food-borne illness. This has been concluded by numerous investigations carried out in developed and less developed countries (Olsen *et al.*, 2000; Clayton *et al.*, 2002; Worsfold *et al.*, 2004; Shojaei *et al.*, 2006; Lues and van Tonder, 2007; Mitchell *et al.*, 2007; Strobehn *et al.*, 2008). Food safety training is generally accepted as a strategy for improving food handling practices (Motarjemi and Käferstein, 1998; Mitchell *et al.*, 2007). To be effective, food hygiene/food safety training needs to target those behaviours likely to result in food-borne illness. However, the literature is inconsistent regarding the effect of food safety training on employee knowledge and even less persuasive on the impact of knowledge orientated training on behaviour (Rennie, 1995; Clayton and Griffith, 2004; Mitchell *et al.*, 2007).

A large number of studies have been undertaken, but it is not possible to compare all the results as different variables have been used. In their extensive review of food hygiene training studies, Egan *et al.* (2007) found that 63 of the studies used questionnaires to assess the improvement of knowledge. Nine of these studies identified significant improvement, two measured some improvement and only one measured no significant differences in post-training scores. Few studies made any detailed investigation of attitude. The studies that did used either inspection scores or structured surveys to assess improvements in attitudes, behaviour and practices. Although comparison of these studies may be difficult, and a positive attitude was expressed by food handlers towards food safety, this was not supported by observed or self-reported practices. The importance of training food handlers is acknowledged by many as critical to effective food hygiene, yet there have been limited studies on the effectiveness of such training. Across the studies, however, there seems to be a more basic problem: the failure to examine the context in which these behaviours occur (Rennie, 1995).

6.2 General conclusions from the study

Numerous studies have been conducted on the knowledge, perceptions and behaviours of food handlers in food service outlets. Less research is available on the management factors of these outlets – defined as the situational factors by Cooper (2000) when discussing organisational culture, and defined as enabling and reinforcing factors when discussing food handler behaviour. The present study commenced with the hypothesis that it was reasonable to propose that food handlers are not able to implement the correct food safety behaviours in the absence of management support. This support would require appropriate policies regarding food safety, the provision of training and infrastructure and enforcing the correct behaviours by line management. The aim of this study was to investigate and assess the role of line management in relation to food safety at a prominent South African entertainment facility. In developing the study, the PLAN-DO-CHECK-ACT model proposed by ISO 9001 was used as the benchmark for the design of an effective management system.

The objective of conducting a qualitative study of management practices, policies and resource provision with respect to food safety revealed the following: There was no formal evidence of management commitment to food safety other than the recent provision of food handler training. The findings also indicated the lack of a formal management system for food safety. The PLAN requirement of the PDCA model, which requires management to define an appropriate food safety policy that can be implemented through food safe procedures, was not addressed.

The objective of assessing the design and presentation of the food safety training programme used to provide food handlers with the correct food safety knowledge and skills highlighted the following: 1) the FHTP was not adequate in terms of content when compared to a benchmark syllabus; 2) the design and delivery of the training programme were not optimal for effective learning; 3) the KSOM contradicted the FHTP and it was not suitable as a training aid. The DO aspect of the PDCA model is thus not addressed, as the training programme in place has the potential to result in incorrect practices and behaviours taking place.

In the exploratory survey of food safety training and knowledge, the results of the study identified that only 60 % of staff surveyed had received training. Although this result indicated that the study site did not fully comply with the minimum legal requirements, it did represent an improvement given that food safety training was only introduced shortly before the study took place. The results of the limited employee survey indicated that employees were aware of the importance of hand washing, although it was not possible to determine if this was as a result of the training intervention or prior knowledge. Many of the supervisors were not yet trained in food safety. The impact of the food safety training intervention on food safety behaviours will require more in-depth assessment.

The objective of assessing the food hygiene infrastructure provided at the study site to enable food handlers to carry out the correct behaviours highlighted the important role of management in the PRP for personnel hygiene. The findings indicated that although the PRP addressed most of the requirements in design, the implementation of the hand washing requirement was not in line with accepted norms due to the lack of sufficient hand wash basins. The provision of facilities such as sufficient and conveniently located hand wash basins is a management function. In studies undertaken to assess the barriers to implementation of a PRP or HACCP system, lack of knowledge/training and specifically a lack of food handler knowledge have been blamed for difficulties in implementing these systems (Panisello and Quantick, 2001; Eves and Dervisi, 2005; Sun and Ockerman, 2005; Roberts *et al.*, 2005; Yapp and Fairman, 2006; Bas *et al.*, 2007). The findings of this study highlighted that management should first ensure that they are not contributing to the lack of implementation as a result of failing to provide resources that only they can provide.

6.3 Conclusions relating to the PRECEDE factors

This study sought to interpret the results in the context of a prominent South African entertainment facility using the PRECEDE-PROCEED model for food handler behaviour, as suggested by Mitchell *et al.* (2007) although originally constructed by Dedobbeleer and German (1987).

6.3.1 Pre-disposing factors

a) Knowledge causes and perceived risk of food-borne illness

The results of the survey of food handlers' attitudes to food safety indicated that most food handlers were aware that poor hygiene practices could result in the transmission of food-borne illness.

b) Perceived control and self-efficacy over safety practices

Although only reviewed superficially, the results of this study highlighted time as a barrier to hand washing compliance.

6.3.2 Enabling factors

In the study, no formal food safety training policy was in place, no formal needs analysis had been conducted and all levels of employees were subjected to the same training. This research would suggest that the study site in this study would benefit by providing additional food safety training for supervisors and managers.

a) Safe handling instructions at initial employment.

The results of the survey of the training programme identified that no induction training was provided by the facility under study. The employee handbook provided also made no reference to food safety. Sprenger (2008) recommends induction training within 4 weeks of employment. This is consistent with the CFA guideline (2008). The guideline highlights the importance of introducing the new employee to typical food safety/hygiene hazards.

b) Exposure to food safety training: intensity

Given that the training provided in this study is the only food safety training provided for all staff, it can be argued that the 2-hour session is considered as an induction, which is required to be followed up by more intensive training at a later date, as suggested in the Industry Guide to Good Hygienic Practice – Catering Guide (JHIC, 1997).

c) Exposure to food safety training: quality of instruction

The training programme reviewed in this study was of the lecture type, with no interaction opportunities for food handlers. The literature shows this is the traditional approach to food safety/food hygiene training. Given the evidence indicating the traditional mode of training is not successful, the mode of training should be reviewed.

d) Development of food safety procedures and protocols

In the organisation under study, although these procedures did exist, supervisors had not been formally exposed to them, internal audits did not address the content of the procedures and they were not available to food handlers.

e) Availability of appropriate equipment and physical space

In the study, none of the hand wash stations fully complied with the requirements. None of the outlets in the study had automated facilities and all taps were hand-operated.

f) Work pace

The impact of the effect of busy periods on hand washing was indicated in the survey in Chapter 3. Further research is required to investigate the relationship between work pace and the demonstration of safe food handling behaviours.

g) Worker literacy and language skills

The training programme under review was only presented in English and no formal methods were in place to address language difficulties or cultural beliefs in relation to the content.

6.3.3 Reinforcing factors

a) Management's attitude towards food handling practices

In the current study, management's attitudes were assessed in terms of the development of a formal food safety management system, the provision of an

adequate food safety training programme and the provision of resources for hand washing. All three aspects were found to be below the recognised norms.

The findings of this study highlighted that management should first ensure that they are not contributing to the lack of implementation as a result of failing to provide resources that only they can provide. Management can directly influence whether employees have equipment for hand washing, whether there are negative consequences when hand washing is not done and the consistent emphasis on hand washing even in busy times. Management can further assist by giving frequent reminders, being positive role models and reinforcing employees' food safety behaviour by giving verbal praise. Management can also re-configure job assignments to ensure unnecessary time is not wasted. Further research is required in this area.

b) Management's enforcement of food handling practices

In the study, a limited amount of descriptive information was obtained in relation to the handling of incorrect food safety behaviours. A strict no-tolerance policy appeared to be in practice which was generally accepted by the employees. No formal mechanisms were in place to review food safety related job performance. The results of external food safety audits were found to be important in reviewing the food safety performance of an outlet, but the real value of this tool in motivating employees was questioned.

c) Management incentive concerning food handling practices

In the study, the opportunity to implement a similar system was possible given that the majority of staff were contract staff. The impact of an incentive scheme, where only staff members with a valid food safety training certificate are employed, requires further research. The study highlighted that current feedback information was generally negative in nature and no formal reward systems were in place.

d) Co-workers' attitudes toward food handling practices

The evidence obtained in this study in interviewing trainees was revealed that they were aware of hygiene requirements but did not see them practiced by staff at the establishment and therefore discontinued practices they knew to be correct. Further research is required to measure this.

e) Job stress and organisational justice

The evidence obtained during this study suggest that the impact of organisational justice, that being the perception of employees that they are being treated fairly in terms of procedures, and supervisor-employee relationships may be significant and worthy. Comments were recorded during interviews suggesting disparities between the treatment of contract staff and that of permanent employees, and the survey of attitudes indicated that some staff perceived written warnings for incorrect food safety practices to be unfair.

6.4 Link to organisational culture

Sheppard *et al*. (1990) observed that undesirable practices are often deeply rooted in kitchen culture. In commenting on this Clayton and Griffith (2008) suggest that qualitative techniques could be utilised to explore issues beyond the analysis of individual attitudes in order to form a picture of interactions at an organisational level. Research into the effectiveness of food safety training interventions has focused largely on the behaviours of food handlers and attempting to change these by the provision of knowledge – the KAP model. The theory of planned behaviour and the theory of reasoned action attempt to measure the behaviour intention while considering the uncontrollable factors that can inhibit implementation and the element of subjective norm of the perceived beliefs of others (Clayton and Griffith, 2008). The Health Action models include other environmental factors that may affect the outcome of food safety training. The PRECEDE model, used in this study, suggests that other ecological factors should be considered in conjunction with the provision of knowledge.

6.5 Concluding remarks

Understanding the culture of a company and targeting specific food safety attitude changes will not only improve effectiveness of training interventions but also the long-term sustainability of food safety programmes and ultimately result in safer food. Regardless of how effective the design of a food safety training programme or a food safety management system, on its own it will yield limited returns if the climate and underlying culture of the organisation are not conducive to the implementation of the knowledge and practices for food safety.

6.6 Recommendations to governance and audit bodies

In the assessment and auditing of food safety training programmes, environmental health practitioners and auditors should ensure that they take into account the factors reviewed in this study. The suitability of the training programmes delivered by industry should be considered in terms of technical accuracy, duration, and correlation with procedures.

A review of regulation 10B of Regulation 918 is required, as it does not take cognisance of the factors considered in this study and which have been found to impact on the effectiveness of food safety training, such as level, minimum instructional standard and the need for certification. The systems utilised in the UK, the USA and Australia should be considered as an improvement on the current legal requirements in this country.

6.7 Recommendations to industry

In-house training is still the preferred option for compliance with Regulation 918, as it is considered more cost effective and employees are not removed from the workplace. However, the quality of this training may differ in level and content, as is the case in this study. The findings of this study should be taken into account when developing in-house training programmes to ensure that these programmes will provide food handlers with the correct knowledge. The design of the delivery of training programmes should also be reviewed in the light of this research to ensure

that the most effective methods are used. Detailed evaluation of the facilities for personnel hygiene can be incorporated into internal audit programmes and training programmes for food handlers can also be strengthened to ensure that these factors are not overlooked. Management should consider the resources needed for staff to be able to practice the correct food safety behaviours.

6.8 References

Bas, M., Ersun, A.O. and Kavanç, G. (2007), "Implementation of HACCP and prerequisite programs in food businesses in Turkey", *Food Control*, Vol. 17, No. 2, pp. 118–126.

CFA (2008), *Food Safety and Hygiene Training in Multicultural Environments*, Chilled Foods Association, Kettering, UK.

Clayton, D.A. and Griffith, C.J. (2008), "Efficacy of an extended theory of planned behaviour model for predicting caterers' hand hygiene practices", *International Journal of Environmental Health Research*, Vol. 18, No. 2, pp. 83–98.

Clayton, D.A., Griffith, C.J., Price, P. and Peters, A.C. (2002), "Food handlers' beliefs and self-reported practices", *International Journal of Environmental Health Research*, Vol. 12, pp. 25–39.

Clayton, D.Q. and Griffith, C.J. (2004), "Observation of food safety practices in catering using notational analysis", *British Food Journal*, Vol. 106, No. 3, pp. 211–227.

Cooper, M.D. (2000), "Towards a model of safety culture", *Safety Science*, Vol. 36, pp. 111–136.

Dedobbeleer, N. and German, P. (1987), "Safety Practices in Construction Industry", *Journal of Occupational Medicine*, Vol. 29, No. 11, pp. 863–868.

Egan, M.B., Raats, M.M., Grubb, S.M., Eves, A., Lumbers, M.L., Dean, M.S. *et al*. (2007), "A review of food safety and food hygiene training studies in the commercial sector", *Food Control*, Vol. 18, No. 10, pp. 1180–1190.

Eves, A. and Dervisi, P. (2005), "Experiences of the implementation and operation of HACCP in the food service sector", *International Journal of Hospitality Management*, Vol. 24, pp. 3–19.

ISO (2008), ISO 9001:2008, *Quality Management Systems: Requirements*, International Organisation for Standardisation, Geneva.

JHIC (Joint Hospitality Industry Congress) (1997), *Industry Guide to Good Hygiene Practice: Catering Guide*. HMSO, London.

Lues, J.F.R. and van Tonder, I. (2007), "The occurrence of indicator bacteria on hands and aprons of food handlers in the delicatessen sections of a retail group", *Food Control*, Vol. 18, pp. 326–332.

Mitchell, R., Fraser, A. and Bearon, L. (2007), "Preventing food-borne illness in food service establishments: Broadening the framework for intervention and research on safe food handling behaviours", *International Journal of Environmental Health Research*, Vol. 17, No. 1, pp. 9–24.

Motarjemi, Y. and Käferstein, F. (1998), "Food safety, Hazard Analysis and Critical Control Point and the Increase in Food-borne Disease: A Paradox?", *Food Control*, Vol. 10, pp. 325–333.

Olsen, S., MacKinon, L., Goulding, J., Bean, N. and Slutker, L. (2000), *Surveillance for foodborne disease outbreaks – United States 1993–1997*, *MMWR Surveillance summaries*, 49 (ss01):1–51, Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/ss4901a1.htm. Accessed 1 September 2010.

Panisello, P.J. and Quantick, P.C. (2001), "Technical barriers to hazard analysis critical control point (HACCP)", *Food Control*, Vol. 12, No. 3, pp. 165–173.

Rennie, D. (1995), "Health education models and food safety education", *Perspectives in Public Health*, Vol. 115, pp. 75–79.

Regulations governing general hygiene requirements for food premises and the transport of food, Published under Government Notice no. R.918 of 30 July 1999, of the Health Act, 1977 (Act no. 63 of 1977), Regulation 10(b), Republic of South Africa.

Roberts, K.R., Barrett, B. and Sneed, J. (2005), "Status of Prerequisite and HACCP program implementation in Iowa and Kansas restaurants: Sanitarians' perspective", *Food Protection Trends*, Vol. 25, No. 9, pp. 694–700.

Sheppard J., Kipps, M. and Thomson, J. (1990), "Hygiene and hazard analysis in food service", In: Cooper, C. (ed.), *Progress in tourism*, *recreation and hospitality management*, London, Belhavel Press, pp. 192–226.

Shojaei, H., Shooshtaripoor, J. and Amiri, M.E. (2006), "Efficacy of simple hand washing in the reduction of microbial hand contamination of Iranian food handlers", *Food Research International*, Vol. 39, pp. 525–529.

Sprenger, R. (2008), "*Hygiene for Management – A Text for Food Safety Courses"*, Highfield.co.uk Limited, pp. 264–321.

Strohbehn, C., Sneed, J., Peaz, P. and Meyer, J. (2008), "Hand washing frequencies and procedures used in retail food services", *Journal of Food Protection*, Vol. 71, No. 8, pp. 1641–1650.

Sun, Y.-M. and Ockerman, H.W. (2005), "A review of the needs and current applications of hazard analysis and critical control point (HACCP) system in foodservice areas", *Food Control*, Vol. 16, No. 4, pp. 325–332.

Worsfold, D., Worsfold, P.M. and Griffith, C.J. (2004), "An assessment of food hygiene and safety at farmers' markets", *International Journal of Environmental Health Research*, Vol. 14, pp. 109–119.

Yapp, C. and Fairman, R. (2006), "Factors affecting food safety compliance within small and medium sized enterprises: Implications for regulatory and enforcement strategies", *Food Control*, Vol. 17, pp. 42–51.